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South Sacramento Corridor

Alternatives Analysis

Draft Environmental Impact Statement

Draft Environmental Impact Report

SACRAMENTO REGIONAL TRANSIT DISTRICT

ICF Kaiser Engineers (California) Corporation

in association with

Korve Engineering and ESA, Inc.

ALTERNATIVES ANALYSIS/
DRAFT ENVIRONMENTAL IMPACT STATEMENT/
DRAFT ENVIRONMENTAL IMPACT REPORT

for the

SOUTH SACRAMENTO CORRIDOR
SACRAMENTO, CALIFORNIA

prepared by

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL TRANSIT ADMINISTRATION

and

SACRAMENTO REGIONAL TRANSIT DISTRICT

Pursuant to

National Environmental Policy Act of 1969, §102, 41 U.S.C. §4332(2)(C); National Historic Preservation Act of 1966, §106, 16 U.S.C. §470f; Federal Transit Act, as amended, §§3(d), 3(i) & 14,49 U.S.C. §§1602(d) and (i) and 1610; Title 49 U.S.C. §303 formerly Department of Transportation Act of 1966, §4(f); and California Environmental Quality Act, Public Resource Code §21000 *et seq.*; and the State of California CEQA Guidelines as amended June 1986 (California Administrative Code, §15000 *et seq.*).

Date: 9/19/94

For FTA: Stewart F. Taylor
Stewart F. Taylor
Regional Administrator

Date: September 7, 1994

For RT: Pilka Robinson
Pilka Robinson
Interim General Manager

R93051AT-2429413-2

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COVER SHEET

RESPONSIBLE AGENCIES

Federal Transit Administration
Sacramento Regional Transit District

TITLE OF PROPOSED ACTION

Transit Improvements in the South Sacramento Corridor of Sacramento, California

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ABSTRACT

This document, referred to as the South Sacramento Corridor Alternatives Analysis/Draft Environmental Impact Statement/Draft Environmental Impact Report (AA/DEIS/DEIR), provides the transportation and environmental impacts, the capital and operating costs, and a comparative evaluation for each alternative transit improvement being considered for the South Sacramento Corridor of the Sacramento, California urbanized area. The proposed action described in this document is an improvement to the transit system in the southern portion of the Sacramento Regional Transit District (RT) area of jurisdiction between the Sacramento Central Business District and the Laguna/Elk Grove communities in Sacramento County. Connections to other elements of the transit system are included as part of the proposed action. RT intends to seek a federal transit grant to assist in the funding of the Locally Preferred Alternative (LPA).

The alternatives being considered include: 1) a Baseline alternative; 2) two Transportation System Management (TSM) alternatives having "Low" and "High" capital investment options; and 3) Light Rail Transit (LRT) alternatives, having "Low" and "High" capital investment options, along two principal alignments to a Minimum Operable Segment (MOS) terminal with extension options to the Laguna and Elk Grove communities. The AA/DEIS/DEIR details the alignment concepts, along with the capital and operating costs, and considers the potential effects each alternative would have on transportation service, traffic, transit ridership, accessibility, neighborhoods, economic factors, natural resources, air quality, noise, parklands, utilities, energy, hazardous materials, cultural and historic sites, and financial feasibility. The information in the AA/DEIS/DEIR will be used by RT and the Sacramento Area Council of Governments (SACOG) to select a LPA for the corridor and by the Federal Transit Administration (FTA) to make informed funding decisions.

This AA/DEIS/DEIR is intended to cover state and local governmental approvals that may be needed to construct and implement such a project.

COMMENTS

Comments on this document may be submitted in writing or made orally at a public hearing to be held at 6:30 p.m. on Monday, October 24, 1994 in the auditorium of Luther Burbank High School, 3500 Florin Road in south Sacramento. Written comments should be submitted to Ms. Debra Jones at the address noted on the previous page on or before Monday, November 14, 1994. Information on the public hearing can be obtained from the Sacramento Regional Transit District.

FOREWORD

This South Sacramento Corridor AA/DEIS/DEIR is being carried out in accordance with regulations developed by the Council on Environmental Quality for the National Environmental Policy Act, the US Department of Transportation, the Federal Transit Administration, and the California Environmental Quality Act. This document follows the Federal Transit Administration's September 1986 *Draft Procedures and Technical Methods for Transit Project Planning,* as updated. The structure of this document is as follows.

The purpose of the AA/DEIS/DEIR is to examine alternative transit improvements in the South Sacramento Corridor and to compare the alternatives according to the following criteria: 1) new transit riders; 2) travel time savings for transit riders; 3) capital and operating costs; 4) beneficial and adverse environmental impacts, particularly related to regional air quality; 5) transportation impacts, both local and regional; 6) financial feasibility; and 7) acceptability to the affected communities.

The AA/DEIS/DEIR describes the trade-offs among the alternatives according to these and other criteria. The information is used by local decision makers and the Federal Transit Administration to determine which alternative is the most cost-effective and beneficial to the community, and which has the strongest local support and is within the financial capacity of the local project sponsor. The AA/DEIS/DEIR is made available for public and agency review. Formal public hearings are scheduled to ensure that public comments on the AA/DEIS/DEIR are received and recorded. Additionally, monthly meetings of the project's Technical Advisory Committee and Community Advisory Committee have provided agency and community commentary throughout the planning process.

Chapter 1, Purpose and Need, describes the study area and existing transportation facilities, presents a discussion of regional and local transportation goals, and discusses the specific transportation problems in the region.

Chapter 2, Alternatives Considered, provides an overview of the screening and selection process, and a definition and description of the alternatives being considered for the AA/DEIS/DEIR. This chapter also discusses the capital and operating and maintenance costs.

Chapter 3, Affected Environment, describes the existing social and natural environmental conditions in the study area. The discussion provides an understanding of the environment in which the project would take place and identifies the significant sensitive resources in the study area.

Chapter 4, Transportation Impacts and Mitigation Measures, presents both the transit and the highway impacts for the alternatives being evaluated as well as the mitigation measures that could be initiated to minimize the impacts.

Chapter 5, Environmental Consequences, discusses the potential impacts of the alternatives being evaluated on the built and natural environments. It identifies the construction-related, long-term, and cumulative impacts. Mitigation measures to address impacts are defined where appropriate. The specific elements analyzed in this chapter include:

- land use plans and policies,
- economic characteristics,
- neighborhoods and businesses,

- acquisition and displacement of existing uses,
- public safety and security,
- visual and aesthetic resources,
- cultural resources,
- parklands and Section 4(f) properties
- geology, soils, and seismicity,
- hydrology and water quality,
- biological resources
- noise and vibration,
- hazardous materials
- utilities, and
- energy.

Chapter 5 also includes a summary of the applicable federal laws governing historic, archaeological, and parkland resources known as Section 106 and Section 4(f). A summary of cumulative impacts, growth-inducing impacts, and significant unavoidable adverse impacts is also provided.

Chapter 6, Financial Analysis and Evaluation of Alternatives, presents information on the goals attainment, cost-effectiveness, equity, and financial feasibility of the Baseline, TSM, and LRT alternatives.

The following technical reports support this AA/DEIS/DEIR:

- NEPA Notice of Intent, CEQA Notice of Preparation, Distribution Lists
- Scoping Information Booklet
- Conceptual Definition of Alternatives Report - Final Version
- Patronage Methodology Report - Draft & Final
- Capital Cost Methodology Report - Draft & Final
- Operating and Maintenance Costs Methodology Report - Draft & Final
- Transportation Impacts Methodology Report - Draft & Final
- Social, Economic, and Environmental Impacts Methodology Report - Draft & Final
- Financial Analyses Methodology Reports - Draft & Final
- Evaluation of Alternatives Methodology Report - Draft & Final
- Public Participation Methodology Report - Draft & Final
- Modeling Issues Memorandum
- Detailed Definition of Alternatives Report - Draft & Final
- Preliminary Plan and Profile Drawing Package
- Final Definition of Alternatives Report - Draft & Final
- Conceptual Engineering Drawings of the LRT Alignments, Stations, and Park-and-Ride Lots.
- Final Plan and Profile Drawing Package
- Travel Demand Forecasting Results Report - Draft & Final
- Capital Cost Results Report - Draft & Final
- Operating and Maintenance Cost Results Report - Draft & Final
- Transportation Impact Results Report - Draft & Final
- Financial Analyses Results Report - Draft & Final
- Evaluation of Alternatives Report - Draft & Final

This document also contains Appendices as follows:

Appendix A, Notice of Preparation, provides the Notice of Preparation of the Environmental Impact Report for improvements in the corridor.

Appendix B, Transportation Impact Analysis Data, provides data that supports the transportation impact analysis.

Appendix C has been deliberately omitted.

Appendix D, Potential Special-Status Species, provides a list of the plant and animal species that are threatened or endangered within the corridor.

Appendix E, FTA Cost-Effectiveness Indices and Financial Analysis Assumptions, provides the calculation of the cost-effectiveness indices, assumptions for the financial analysis, and the capital cost assumptions.

Appendix F, Preparers and Advisory Committee Members, provides a list of the preparers of the AA/DEIS/DEIR and a list of members of the project's Technical Advisory and Community Advisory Committees.

Appendix G, Recipients, provides a list of the recipients who were mailed copies of the AA/DEIS/DEIR.

Appendix H, Public Participation and Consultation, provides information regarding the public involvement process for this project.

Glossary, a list of the acronyms and technical terms used in the AA/DEIS/DEIR.

References, a list of all documents utilized in the preparation of this AA/DEIS/DEIR.

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Executive Summary

EXECUTIVE SUMMARY

S. PURPOSE OF THE ALTERNATIVES ANALYSIS/DRAFT ENVIRONMENTAL IMPACT STATEMENT/DRAFT ENVIRONMENTAL IMPACT REPORT

The purpose of the Alternatives Analysis/Draft Environmental Impact Statement/Draft Environmental Impact Report (AA/DEIS/DEIR) is to examine alternative transit improvements in the South Sacramento Corridor and to compare the alternatives according to the following criteria: 1) new transit riders; 2) travel time savings for transit riders; 3) capital and operating costs; 4) beneficial and adverse environmental impacts, particularly those related to regional air quality; 5) transportation impacts, both local and regional; 6) financial feasibility; and 7) political support in the affected communities. The AA/DEIS/DEIR describes the trade-offs among the alternatives according to these and other criteria. The information, along with community input, will be used by local decision makers and the Federal Transit Administration (FTA) to determine which alternative would be the most cost-effective and beneficial to the South Sacramento Corridor community, have limited environmental impacts, have strong local support, and would be within the financial capacity of the Sacramento Regional Transit District (RT). From this comparative analysis, a Locally Preferred Alternative (LPA) will be selected by the Sacramento Regional Transit District Board.

The South Sacramento Corridor AA/DEIS/DEIR is being carried out in accordance with regulations developed by the Council of Environmental Quality for the National Environmental Policy Act (NEPA), the US Department of Transportation, the Federal Transit Administration, and the California Environmental Quality Act (CEQA). Because implementation of an alternative would require approvals from both federal and state entities, compliance with both NEPA and CEQA will be necessary. In those circumstances, both CEQA and its guidelines and NEPA and the implementing regulations strongly encourage state entities and federal agencies to work together to prepare a single document that will satisfy both state and federal laws. This joint DEIS/DEIR is the result of Regional Transit and the Federal Transit Administration working together to meet that policy and to comply with both the spirit and the letter of both CEQA and NEPA, as well as other applicable federal laws.

However, some of the requirements of CEQA and NEPA differ. In those cases, the document integrates the requirements to the extent possible. Where a requirement is more stringent, the document incorporates the more stringent. For example, the federal process requires that a 4(f) evaluation (49 U.S.C. 1653(f)) be incorporated into the NEPA document. Thus, the initial 4(f) analysis is included in Chapter 5 of the DEIS/DEIR. Similarly, CEQA requires that each significant impact of a project be identified in the EIR and feasible mitigation measures or alternatives be identified and implemented. In contrast, NEPA requires that federal agencies consider the potential significant adverse environmental impacts of a project, evaluate all reasonable alternatives and suggest appropriate mitigation measures. Thus, the DEIS/DEIR identifies each significant impact in order to meet the requirements of CEQA.

The AA/DEIS/DEIR is a public document available for both public and agency review and comment.

S.1 NEED FOR PROPOSED ACTION

S.1.1 Growth Projections

The Sacramento Area Council of Governments recently developed Sacramento regional growth projections for the year 2010, using 1990 as the base year. Table S-1 presents a comparison of the number of households, jobs, and daily person-trips in the South Sacramento Corridor, the Sacramento Central Business District, and the region as a whole for 1990 and 2010. The projections indicate that household and job growth in the corridor are expected to increase by more than 75 percent over this 20-year period.

TABLE S-1
SOUTH SACRAMENTO CORRIDOR GROWTH PROJECTIONS, 1990-2010

Item	1990	2010	Increase	% Increase
Households				
South Sacramento Corridor	106,624	186,196	79,572	+75%
Sacramento CBD	18,465	22,420	3,955	+21%
Sacramento Region	547,159	934,666	387,507	+71%
Jobs				
South Sacramento Corridor	65,925	129,666	63,741	+97%
Sacramento CBD	95,341	181,962	86,621	+91%
Sacramento Region	605,181	1,208,284	603,103	+100%
Daily Person Trip Generation				
South Sacramento Corridor - Trip Productions:				
• Home-Based Work Trips	371,667	652,131	280,464	+75%
• Total Trips	1,580,194	2,808,666	1,228,472	+78%
Sacramento CBD - Trip Attractions:				
• Home-Based Work Trips	183,363	326,238	142,875	+78%
• Total Trips	740,066	1,230,896	490,830	+66%
Sacramento Region - Trip Productions:				
• Home-Based Work Trips	2,267,998	4,062,040	1,794,042	+79%
• Total Trips	10,084,672	17,938,110	7,853,438	+78%

Source: Population and Employment Projections for the 1993 Regional Transportation Plan, SACOG, April 1993.

S.1.2 Specific Transportation Problems in the South Sacramento Corridor

An increase in trip-making of the magnitude projected in Table S-1 would lead to substantial increases in traffic volumes on the corridor's streets and freeways. As a result, four primary transportation-related problems are expected to become critical over the planning period: 1) freeway and arterial congestion; 2) air quality degradation; 3) parking deficiencies (Sacramento City College and downtown); and 4) transit service equity and mobility problems.

S.1.2.1 Roadway Congestion

By 2010, the increase in additional traffic on SR 99 and I-5 is expected to produce substantial deterioration in the level of service[1] on these freeways. Stop-and-go (LOS F) conditions would occur during peak periods. In addition, several arterials in the corridor are expected to operate at LOS F by 2010. These arterials are: 1) Sutterville Road between Freeport Boulevard and SR 99; 2) Fruitridge Road between Franklin Boulevard and SR 99; 3) Florin Road between Greenhaven and Franklin Boulevard; 4) Mack Road between Center Parkway and SR 99; and 5) Stockton Boulevard between Florin Road and Elsie Avenue.

S.1.2.2 Air Quality Degradation

Sacramento County is a federal non-attainment area for carbon monoxide, ozone, and suspended particulate matter according to the US Environmental Protection Agency's (EPA) National Ambient Air Quality Standards. Similarly, Sacramento County is designated as a state non-attainment area. Since vehicle-miles traveled in the Sacramento region are projected to increase by nearly 80 percent between 1990 and 2010, the region's air quality problems will intensify. The 1991 *Air Quality Attainment Plan* for the Sacramento region identifies the steps to be taken to reduce emissions of non-attainment pollutants by five percent per year or an equivalent acceptable to the California Air Resources Board. In addition, the EPA recently promulgated guidelines for determining the conformity of regional transportation plans and policies with air quality standards and programs (November 1993). According to the new EPA guidelines, a transportation project would have to be a part of a conforming regional transportation and air quality plan to be eligible for funding. Expansion of the region's public transportation system to increase the use of transit and High Occupancy Vehicles (HOVs) are a key element for achieving this goal.

S.1.2.3 Parking Deficiencies

Portions of downtown Sacramento currently have parking deficiencies. Without proposed public transportation improvements, the unmet demand for downtown Sacramento parking could grow to over 10,000 spaces by 2007 even if all new developments provided the amount of off-street parking required by the current city parking code. At Sacramento City College, which only has 1,217 parking spaces on its campus, students must regularly find parking in nearby areas such as William Land Park and along streets in the adjacent residential neighborhoods.

S.1.2.4 Transit Service Equity and Mobility Problems

The transit service currently provided in the South Sacramento Corridor is consistent with RT's service standards, such as on-time performance. However, the study corridor is underserved in terms of service frequency and transit capacity compared with the northeast and eastern portions of RT's service area, which have the availability of frequent light rail transit service. In addition, the corridor contains several census tracts which have over 15 percent of their households below the poverty level, an indicator of significant numbers of transit dependent population. Currently, transit dependent populations in the corridor have neither direct access to the light rail transit

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[1] Level of service (LOS) is a letter designation that describes the quality of traffic flow, and is defined by the Transportation Research Board's *1985 Highway Capacity Manual* as a qualitative measure describing operational conditions on a given roadway, freeway, or intersection. LOS measurements are by letter designation. LOS A represents the best operating conditions (free traffic flow) and LOS F designates the worst operating conditions (stop and go).

system nor have service frequencies on a par with the light rail service offered in other parts of RT's service area.

S.2 ALTERNATIVES CONSIDERED

S.2.1 Alternatives Selected for Analysis

Seven transit investment alternatives were selected for analysis and carried forward for technical analysis in the AA/DEIS/DEIR. These alternatives are described in detail in the *Final Detailed Definition of Alternatives Report* (January 1994). A companion set of conceptual engineering drawings illustrating the alternatives entitled *Conceptual Engineering Drawings of the LRT Alignments, Stations, and Park-and-Ride Lots* (February 1994) are available upon request from RT. The seven alternatives are:

- **Baseline Alternative**: includes only those committed and fully-funded improvements to the year 2010 for the regional highway and transit systems;

- **Transportation Systems Management-Low Alternative (TSM-Low)**: assumes a 100 percent expansion in regional transit services made possible by a significant increase in new local transit revenues (e.g., through a countywide one-half cent sales tax dedicated to transit). Many new express bus routes connecting South Sacramento neighborhoods with downtown Sacramento would be implemented using HOV lanes on I-5 and SR 99. Figure S-1 illustrates the TSM-Low concept.

- **TSM-High Alternative**: assumes a 200 percent expansion in regional transit services and a significant increase in new transit revenues (e.g., through a countywide one-half cent sales tax dedicated to transit, plus a 20-cent per gallon gas tax). Many new express bus routes connecting South Sacramento neighborhoods with downtown Sacramento would be implemented using HOV lanes on I-5 and SR 99. Figure S-2 illustrates the TSM-High concept.

- **Light Rail Transit-Low Alternative (LRT-Low): Old Southern Pacific Railroad (SPRR) Alignment [LRT-Low Old SPRR]** - includes most elements of the TSM-Low alternative, plus a new LRT line that would follow the Old SPRR and proposed Cosumnes River Boulevard right-of-way to Calvine Road/Auberry Drive (14.0 miles). Figure S-3 illustrates the LRT alternative along the Old SPRR alignment.

- **LRT-Low Alternative: Union Pacific Railroad (UPRR) Alignment (LRT-Low UPRR)** - includes most elements of the TSM-Low alternative plus a new LRT line that would follow the UPRR and proposed Cosumnes River Boulevard right-of-way to Calvine Road/Auberry Drive (11.3 miles). Figure S-4 illustrates the LRT alternatives along the UPRR alignment.

- **LRT-High Alternative: Old SPRR Alignment (LRT-High Old SPRR Calvine/ Auberry)** - includes most elements of the TSM-High alternative plus a new LRT line that would follow the Old SPRR and proposed Cosumnes River Boulevard right-of-way to Calvine/Auberry (14.0 miles). The LRT alignment would be the same as the LRT-Low alternative shown in Figure S-3. However, peak period LRT headways would be decreased from 10 minutes to 7.5 minutes. This is the Minimum Operable Segment (MOS) for this LRT alternative - Option A.

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Figure S-1

TSM - LOW ALTERNATIVE SOUTH SACRAMENTO CORRIDOR

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Figure S-2

TSM - HIGH ALTERNATIVE
SOUTH SACRAMENTO CORRIDOR

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Figure S-3

LRT ALTERNATIVES FOLLOWING THE OLD SPRR ALIGNMENT

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Figure S-4

LRT ALTERNATIVES FOLLOWING THE UPRR ALIGNMENT

- **LRT-High Alternative: UPRR Alignment (LRT-High UPRR Calvine/Auberry)** - includes most elements of the TSM-High alternative plus a new LRT line that would follow the UPRR and proposed Cosumnes Boulevard right-of-way to Calvine/Auberry (11.3 miles). The LRT alignment would be the same as the LRT-Low alternative shown in Figure S-4. For this alternative, peak period LRT headways would be decreased from 10 minutes to 7.5 minutes. This is the MOS for this LRT alternative - Option A.

Three different extension options beyond Calvine/Auberry to Elk Grove and/or Laguna would provide for six subalternatives to the LRT-High alternatives (Figure S-5), as follows:

- **LRT-High Alternative: Old SPRR Alignment and Elk Grove Extension (LRT-High Old SPRR Elk Grove)** - extends the Old SPRR alignment to Grant Line Road in south Elk Grove via the SPRR mainline right-of-way (about 19.5 miles total) - Option B.

- **LRT-High Alternative: UPRR Alignment and Elk Grove Extension (LRT-High UPRR Elk Grove)** - extends the UPRR alignment to Grant Line Road in south Elk Grove via the SPRR mainline right-of-way (about 16.8 miles total) - Option B.

- **LRT-High Alternative: Old SPRR Alignment and Laguna Extension (LRT-High Old SPRR Laguna)** - adds a branch to the Old SPRR alignment from Cosumnes River Boulevard to Elk Grove Boulevard in Laguna via the UPRR right-of-way (about 17.5 miles total) - Option C.

- **LRT-High Alternative: UPRR Alignment and Laguna Extension (LRT-High UPRR Laguna)** - adds a branch to the UPRR alignment from Cosumnes River Boulevard to Elk Grove Boulevard in Laguna via the UPRR right-of-way (about 14.8 miles total) - Option C.

- **LRT-High Alternative: Old SPRR Alignment and Elk Grove/Laguna Extensions (LRT-High Old SPRR Elk Grove/Laguna)** - adds the Elk Grove and Laguna extensions to the Old SPRR alignment (about 23 miles total) - Option D.

- **LRT-High Alternative: UPRR Alignment and Elk Grove/Laguna Extensions (LRT-High UPRR Elk Grove/Laguna)** - adds the Elk Grove and Laguna extensions to the UPRR alignment (about 20.3 miles total) - Option D.

All the LRT alternatives would include a feeder bus system that provides access to the LRT stations and connects with radial and crosstown bus routes. All the TSM and LRT alternatives assume that LRT service would be extended along the Northeast (I-80) Corridor to Antelope Road, along the Folsom (US 50) Corridor to Sunrise/Gold River, and to the site of the proposed intermodal terminal at North 7th and North "B" Streets.[2] Additionally, the LRT alternatives assume that the competing express bus services in the South Sacramento Corridor identified in the TSM alternatives would be eliminated.

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[2] Project-level CEQA documentation has already been prepared on the Northeast and Folsom Corridor LRT extensions including the Hazel Avenue extension incorporated in the TSM- and LRT-High alternatives. The City of Roseville has also finalized an EIR for extending the LRT system from Antelope Road to Roseville. The Roseville project is not included in the TSM or LRT alternatives. Program-level CEQA documentation has been prepared for the Downtown/Natomas/Airport Corridor, of which the extension to the proposed intermodal terminal is the first phase.

S.2.2 Physical and Operating Characteristics of the Selected Alternatives

Table S-2 presents a summary of the major physical and operating characteristics of the seven transit alternatives proposed for detailed analysis and evaluation in this AA/DEIS/DEIR. The alternatives represent a progressively increasing range of transit capital investment choices that address the future transportation needs of the South Sacramento Corridor.

S.2.3 Capital Cost and Annual Operating and Maintenance Cost Comparisons

The estimated capital costs are presented in Figure S-6 by alternative, and are expressed in millions of 1992 dollars. The TSM and LRT alternatives incorporate the Baseline alternative costs.

- The Baseline alternative would require about $193 million over the period from 1994 to 2010 to: 1) maintain the existing bus and LRT system (vehicles and facilities) in good working order; 2) add 60 buses; and 3) construct a new bus operating and maintenance base. The additional buses would be required to maintain the existing service in the face of significant projected increase in roadway congestion.

- The TSM-Low alternative would require an additional $725 million in capital costs over and above the Baseline alternative for: 1) bus expansion in the corridor ($225 million); 2) bus expansion in the remainder of RT's service area ($50 million); and 3) three LRT extensions outside the corridor ($450 million) for a total capital cost of $918 million.

- The two LRT-Low alternatives have very similar capital costs. They would cost an estimated $940 million more than the Baseline alternative and $215 million more than the TSM-Low. The major capital cost components of the LRT-Low alternatives would be: 1) South Sacramento Corridor LRT line to the MOS terminus ($390 million); 2) bus expansion in the corridor ($50 million); 3) bus expansion in the remainder of RT's service area ($50 million); and 4) three LRT extensions outside the corridor ($450 million) for a total capital cost of $1,133 million.

- The TSM-High alternative would require an additional $1,135 million in capital costs over and above the Baseline alternative and $410 million more than TSM-Low alternative. The major capital cost components of the TSM-High alternative would be: 1) bus expansion in the corridor ($375 million); 2) bus expansion in the remainder of RT's service area ($180 million); and 3) four LRT extensions outside the corridor ($580 million) for a total capital cost of $1,328 million.

- The two LRT-High alternatives to Calvine/Auberry (Option A) have very similar capital costs and would cost an estimated $1,300 million more than the Baseline alternative and $165 million more than TSM-High. The major cost components of the LRT-High alternatives would be: 1) South Sacramento Corridor LRT line ($420 million); 2) bus expansion in the corridor ($120 million); 3) bus expansion in the remainder of RT's service area ($180 million); and 4) four LRT extensions outside the corridor ($580 million) for a total capital cost of $1,498 million.

- Extending the South Sacramento Corridor LRT line from Calvine/Auberry to Grant Line Road in Elk Grove (Option B) would cost an additional $115 million; to Elk Grove Boulevard in Laguna (Option C), an additional $58 million; and to both areas (Option D), an additional $173 million.

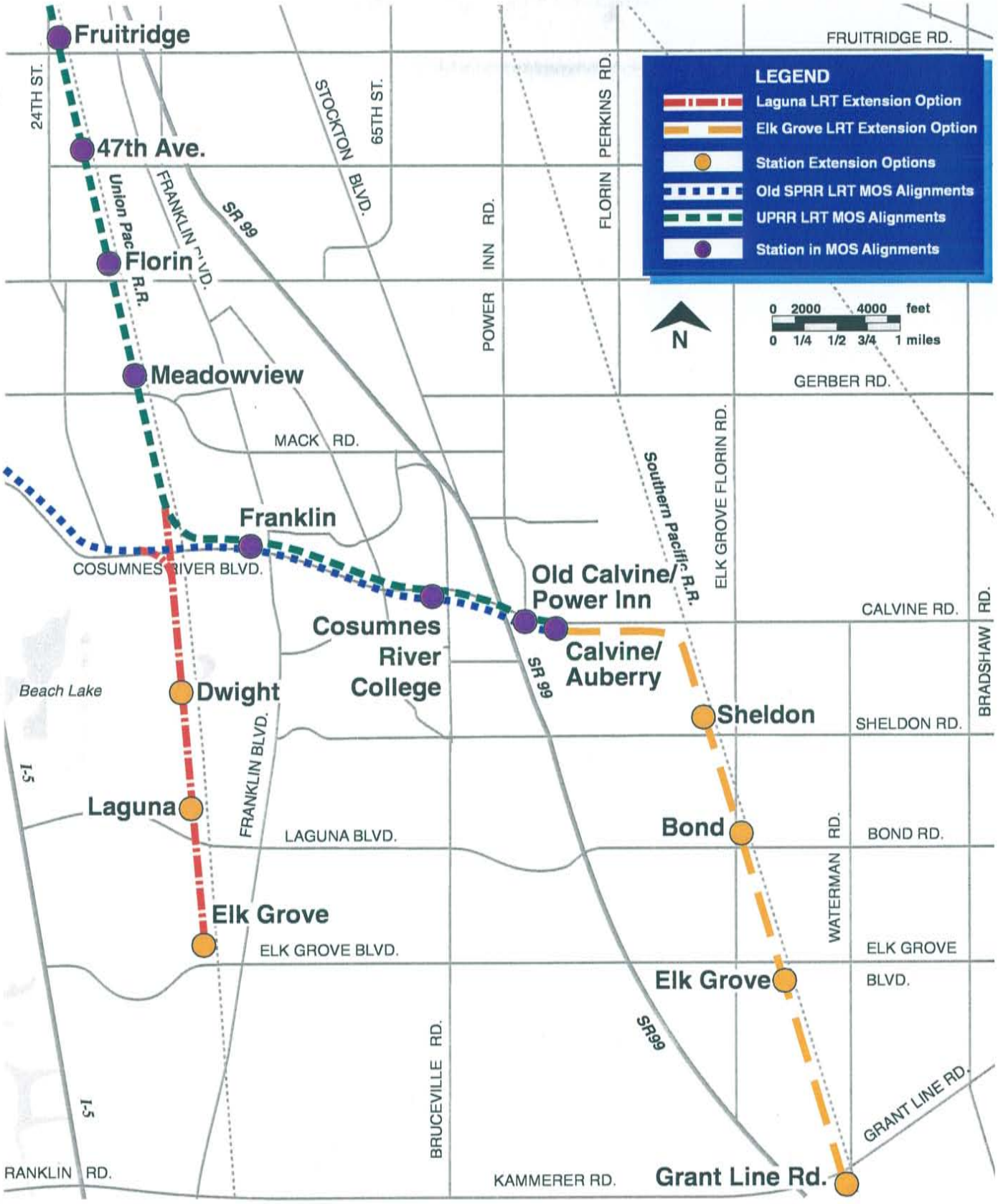

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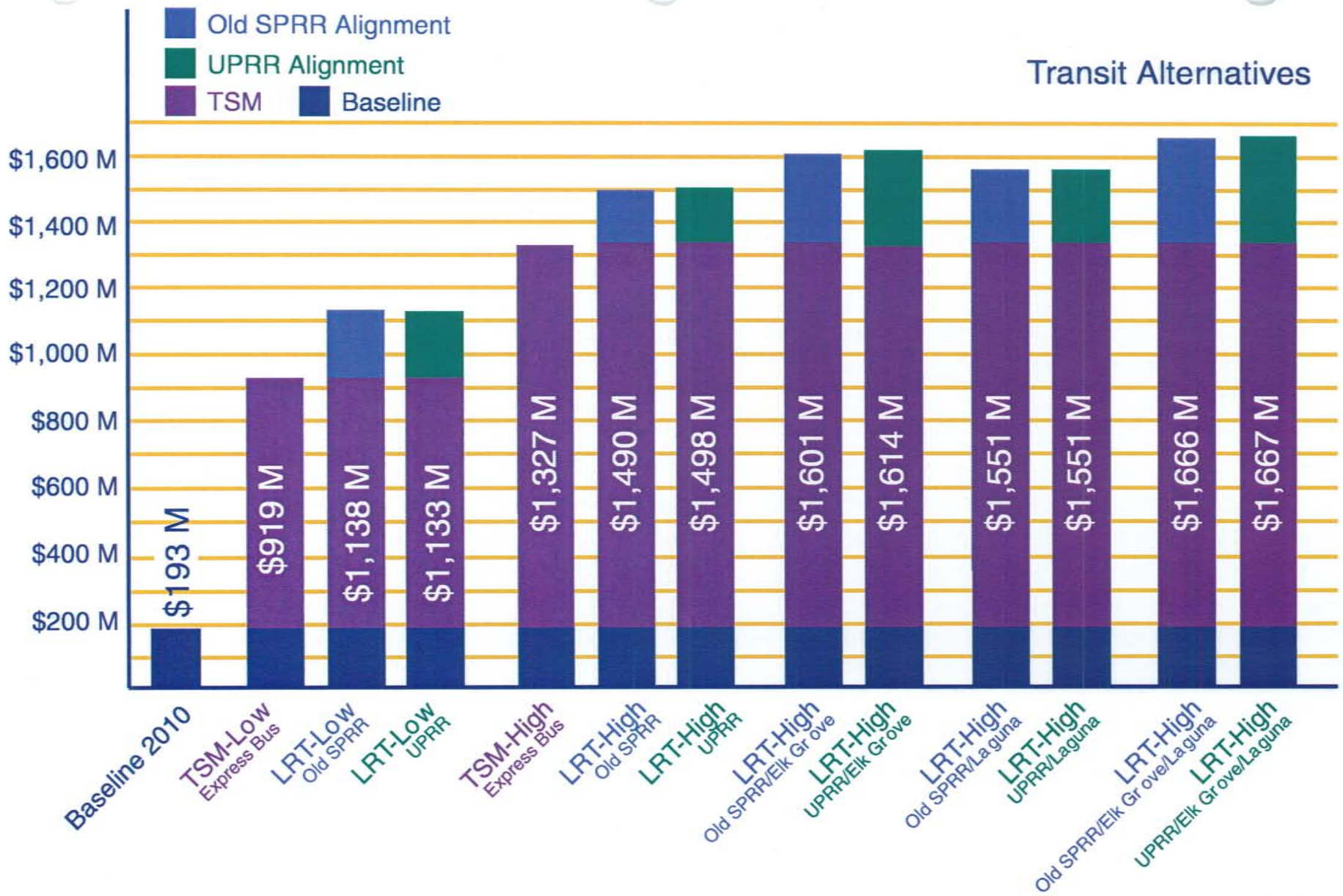
Figure S-5

LRT HIGH ALTERNATIVES EXTENSION OPTIONS



South Sacramento Corridor AA/DEIS/DEIR

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Figure S-6

ESTIMATED CAPITAL COSTS (MILLIONS OF 1992 DOLLARS)

TABLE S-2
SUMMARY OF MAJOR PHYSICAL AND OPERATING CHARACTERISTICS OF ALL ALTERNATIVES

Alternative	Major Capital Improvements in Corridor		Transit Services							
	Facility Types	Features	Transit Routes		Bus Fleet Size Peak	Bus Fleet Size Total	Annual Revenue Bus Hours	LRT Fleet Size Peak	LRT Fleet Size Total	Annual Revenue Train Hours
Baseline										
All regional highway and transit facilities that either exist now or are fully funded.	Freeway HOV Lanes	9.6 miles	Feeder	12	221	265	584,428	32	38	47,140
	On-ramp Bypass Lanes	18 locations	Radial	12						
			Crosstown	10						
	Park-and-Ride Facilities	3 lots	Peak Exp Feeder	9						
		150 spaces	Peak Exp Radial	5						
			LTD Radial	1						
	Transit Centers in Corridor	2 locations	Peak Feeder	1						
			Express Radial	2						
TSM-Low (Express Bus) (Includes Baseline)										
HOV lanes on I-5 and SR 99 with HOV bypass lanes at key on-ramps and new park-and-ride lots. Greatly expanded express bus service operating on HOV lanes. Extension of Northeast (I-80) and Folsom (US 50) Corridor LRT lines and decrease in LRT headways from 15 to 10 minutes. Modest expansion of bus service in remainder of the region.	Freeway HOV Lanes	24.8 miles	Feeder	19	375	450	1,041,356	72	86	90,270
	On-ramp Bypass Lanes	13 locations	Radial	13						
			Crosstown	13						
	Park-and-Ride Facilities	11 lots	Peak Exp Feeder	9						
		6,200 spaces	Peak Exp Radial	14						
			LTD Radial	1						
	Transit Centers in Corridor	4 locations	Peak Feeder	0						
			Express Radial	3						
TSM-High (Express Bus) (Includes TSM-Low Improvements)										
HOV lanes on I-5 and SR 99 with new park-and-ride lots, direct connector ramps and priority treatments in downtown. Greatly expanded express service operating on HOV lanes. Extension of Northeast (I-80) and Folsom (US 50) Corridor LRT lines and decrease in LRT headways from 15 to 7.5 minutes. Major expansion in bus service in remainder of the region.	Freeway HOV Lanes	24.8 miles	Feeder	23	504	605	1,466,250	100	120	105,130
	On-ramp Bypass Lanes	13 locations	Radial	14						
	Direct Connector Ramps on I-5 and Bus. 80	2 locations	Crosstown	13						
	Exclusive Bus Lanes on "P"/"Q" Streets.	5 miles	Peak Exp Feeder	6						
	Transit Malls on 7th and 8th Streets.	3 miles	Peak Exp Radial	14						
			LTD Radial	1						
	Park-and-Ride Facilities	11 lots	Peak Feeder	0						
		6,400 spaces	Express Radial	3						
	Transit Centers in Corridor	4 locations								

TABLE S-2 (Cont.)
SUMMARY OF MAJOR PHYSICAL AND OPERATING CHARACTERISTICS OF ALL ALTERNATIVES

Alternative	Major Capital Improvements in Corridor		Transit Services							
	Facility Types	Features	Transit Routes		Bus Fleet Size Peak	Bus Fleet Size Total	Annual Revenue Bus Hours	LRT Fleet Size Peak	LRT Fleet Size Total	Annual Revenue Train Hours
LRT-Low: Old SPRR (Includes TSM-Low Improvements)										
LRT line to Calvine/Auberry Drive via Old SPRR and Cosumnes River Boulevard. Deletion of competing express bus routes.	Freeway HOV lanes Freeway on-ramp bypass lanes Park-and-Ride facilities LRT Line to Calvine/Auberry Drive	24.8 miles 13 locations 7 lots 7,800 spaces Route: 14 miles 14 stations	Feeder Radial Crosstown Peak Exp Feeder Peak Exp Radial LTD Radial Peak Feeder Express Radial	22 15 13 9 0 1 0 0	278	333	853,613	96	115	116,380
LRT-Low: UPRR (Includes TSM-Low Improvements)										
LRT line to Calvine/Auberry Drive via UPRR and Cosumnes River Boulevard. Deletion of competing express bus routes. Maintain three express bus routes to the Pocket and Laguna West, areas not well served by LRT.	Freeway HOV Lanes Freeway On-ramp Bypass Lanes Park-and-Ride Facilities LRT Line to Calvine/Auberry Drive	24.8 miles 13 locations 7 lots 8,300 spaces Route: Miles Stations 11.3 miles 12 stations	Feeder Radial Crosstown Peak Exp Feeder Peak Exp Radial LTD Radial Peak Feeder Express Radial	24 13 13 9 3 1 0 0	285	342	862,219	96	115	116,380
LRT-High: Old SPRR (Includes TSM-High Improvements)										
LRT line to Calvine/Auberry Drive via Old SPRR and Cosumnes River Boulevard, with options for extensions to Elk Grove and/or Laguna. Deletion of competing express bus routes, downtown HOV connector ramps, and priority treatments.	Freeway HOV Lanes Freeway On-ramp Bypass Lanes Park-and-Ride Facilities: 1) Calvine/Auberry Drive 2) Grant Line Road 3) Elk Grove Boulevard 4) Grant Line/Elk Grove Blvd. LRT Line: 1) Calvine/Auberry Drive 2) Grant Line Road 3) Elk Grove Boulevard 4) Grant Line/Elk Grove Blvd.	24.8 miles 13 locations Lots: Spaces: 7 8,300 11 8,500 10 7,900 14 8,500 Route: Miles Stations 14.0 14 20.1 18 18.1 17 23.6 21	Feeder Radial Crosstown Peak Exp Feeder Peak Exp Radial LTD Radial Peak Feeder Express Radial	26 15 13 6 0 1 0 0	1) 409 2) 411 3) 414 4) 416	491 493 497 499	1) 1,314,844 2) 1,315,481 3) 1,322,813 4) 1,331,100	1) 132 2) 136 3) 132 4) 136	158 163 158 163	1) 133,780 2) 141,030 3) 170,760 178,010

TABLE S-2 (Cont.)
SUMMARY OF MAJOR PHYSICAL AND OPERATING CHARACTERISTICS OF ALL ALTERNATIVES

Alternative	Major Capital Improvements in Corridor			Transit Services								
	Facility Types	Features		Transit Routes		Bus Fleet Size Peak	Bus Fleet Size Total	Annual Revenue Bus Hours	LRT Fleet Size Peak	LRT Fleet Size Total	Annual Revenue Train Hours	
LRT-High: UPRR (Includes TSM-High Improvements)												
LRT line to Calvine/Auberry Drive via UPRR and Cosumnes River Boulevard, with options for extensions to Elk Grove and/or Laguna. Deletion of competing express bus service, downtown HOV connector ramps, and priority treatments. Maintain express bus routes to the Pocket and Laguna West, areas under options without LRT branch to Elk Grove Boulevard in Laguna.	Freeway HOV Lanes	24.8 miles		Feeder	28							
	Freeway On-ramp Bypass Lanes	13 locations		Radial	13							
				Crosstown	13							
	Park-and-Ride Facilities:	Lots:	Spaces:	Peak Exp Feeder	6							
	A. Calvine/Auberry Drive	7	8,800	Peak Exp Radial	3							
	B. Grant Line Road	12	9,500	LTD Radial	1							
	C. Elk Grove Boulevard	10	8,300	Peak Feeder	0							
	D. Grant Line/Elk Grove Blvd.	14	9,000	Express Radial	0							
		Route:										
	LRT Line:	Miles	Stations									
	A. Calvine/Auberry Drive	11.3	12			1) 428	514	1) 1,347,675	1) 132	158	1)	133,780
	B. Grant Line Road	17.4	16			2) 430	516	2) 1,348,313	2) 136	163	2)	141,030
	C. Elk Grove Boulevard	15.4	15			3) 425	510	3) 1,337,749	3) 132	158	3)	163,520
	D. Grant Line/Elk Grove Blvd.	20.9	19			4) 427	512	4) 1,346,081	4) 136	163	4)	179,770

The estimated annual operating and maintenance costs are presented in Figure S-7 by alternative and are expressed in millions of 1992 dollars.

- The Baseline alternative would cost about $60 million per year to operate.
- The TSM-Low Alternative would require an additional $52 million per year for operating and maintenance costs, an 87 percent increase over the Baseline alternative.
- The two LRT-Low alternatives have very similar annual operating and maintenance costs. They would cost an additional $42 million per year over the Baseline alternative and $10 million less than the TSM-Low alternative, a savings of about 10 percent.
- The TSM-High Alternative would require an additional $90 million per year for operating and maintenance costs, a 150 percent increase over Baseline.
- The two LRT-High alternatives to Calvine/Auberry (Option A) have very similar annual operating and maintenance costs. They would cost an additional $85 million per year over the Baseline alternative and $5 million less than TSM-High alternative, a savings of about 3 percent.
- Extending the South Sacramento Corridor LRT line from Calvine/Auberry to Grant Line Road in Elk Grove (Option B) would cost an additional $2.8 million in annual operating and maintenance costs; to Elk Grove Boulevard in Laguna (Option C), an additional $2.8 million; and to both areas (Option D), an additional $5.6 million.

S.3 TRANSPORTATION IMPACTS

S.3.1 Transit Impacts

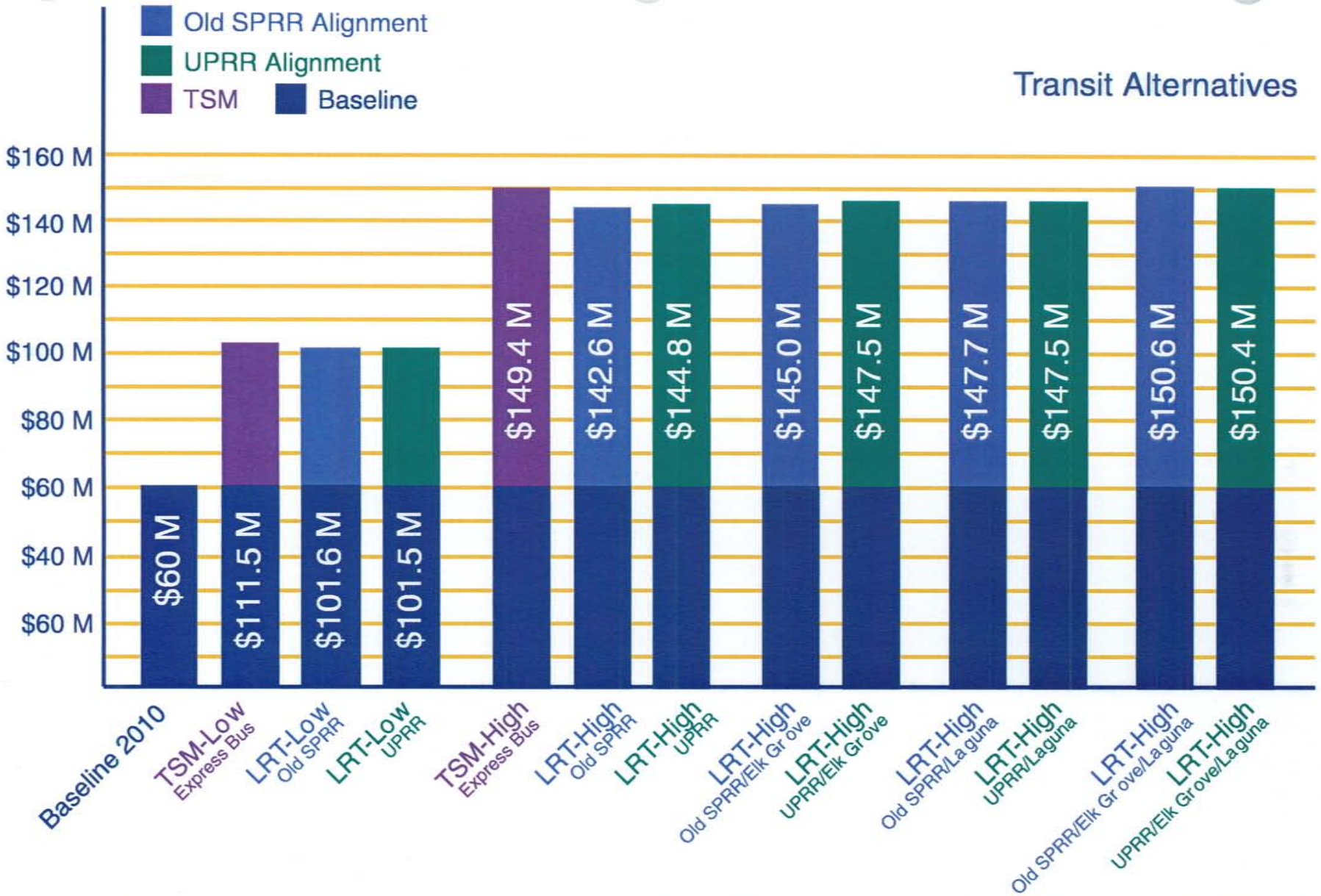
The extent to which each alternative would achieve improved transit service and ridership is best understood by comparing travel times, ridership increases, and mode split impacts. These impacts are summarized below.

S.3.1.1 Impacts to Travel Times

For travel between any South Sacramento Corridor point of origin (except Laguna) and the Sacramento CBD, the LRT alternatives would consistently provide shorter transit travel times than the TSM alternatives. In the case of the alternatives using the UPRR alignment, travel time savings greater than 30 minutes could be realized for many transit trips. Additionally, the LRT alternatives along the UPRR alignment would offer slightly shorter travel times (generally 2-12 minutes) than the LRT alternatives along the Old SPRR alignment for both intra-corridor and regional trips.

S.3.1.2 Patronage Impacts

Figure S-8 compares the ridership projections in terms of the total number of linked transit trips for the TSM and the LRT alternatives. As this figure indicates, the LRT alternatives would attract more ridership than the comparable TSM alternative. Although LRT alternatives following either the Old SPRR or the UPRR alignments would attract more riders than the comparable TSM alternative, the largest increases in total daily transit ridership would be attracted to those alternatives along the UPRR alignment.



South Sacramento Corridor AA/DEIS/DEIR

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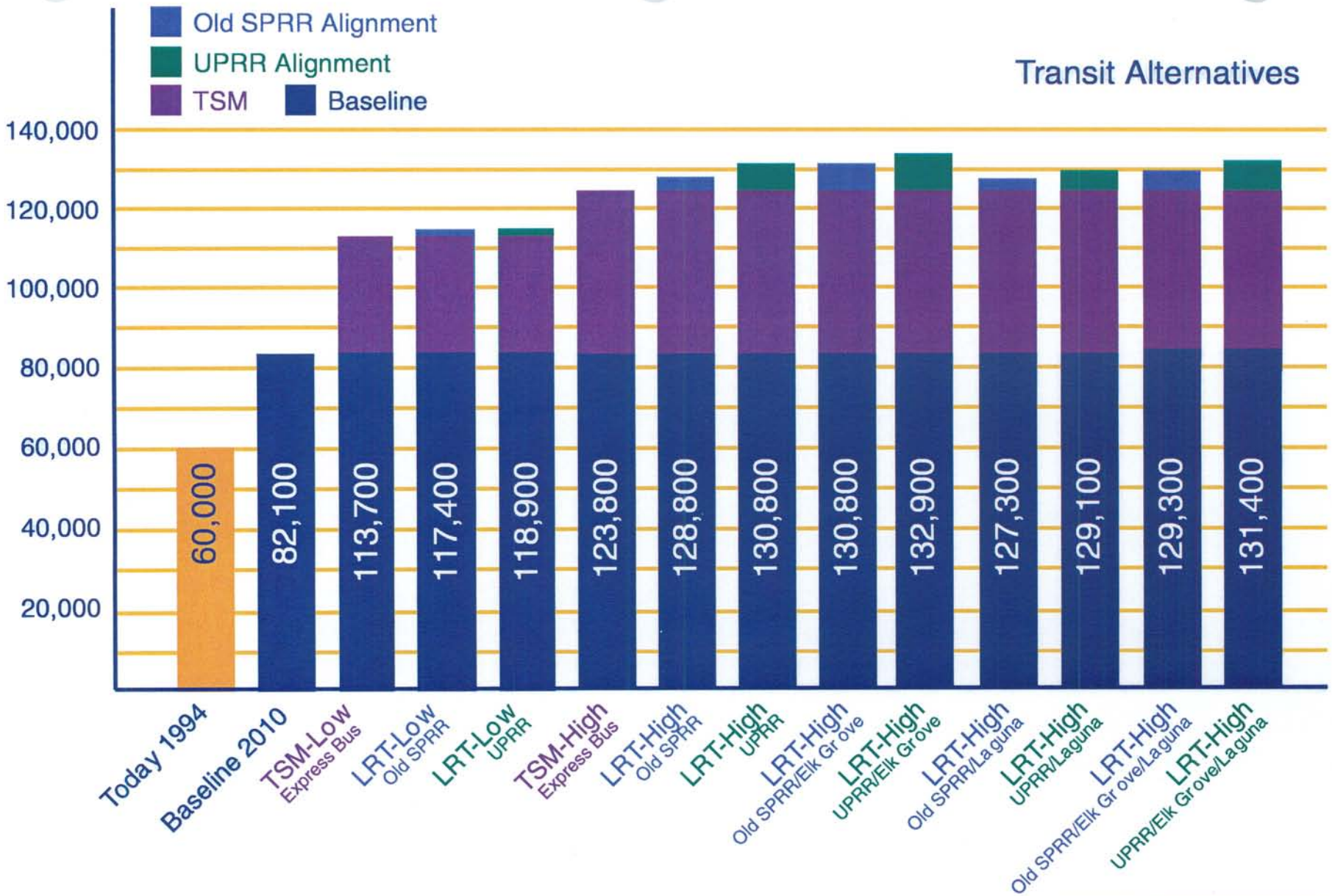
Figure S-7

ESTIMATED ANNUAL OPERATING AND MAINTENANCE COSTS (MILLIONS OF 1992 DOLLARS)



South Sacramento Corridor AA/DEIS/DEIR

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Figure S-8

FORECAST AVERAGE WEEKDAY TRANSIT RIDERSHIP - 2010 (LINKED TRIPS)

S.3.1.3 Mode Split

Mode split refers to the market share of a region's total trips carried by each mode of transportation. When compared to the respective TSM alternatives, the transit mode split would be slightly greater for the LRT alternatives. When compared to the Baseline alternative, the LRT-High alternatives would generate the greatest increases in transit mode split. For example, the transit mode split for home-based work trips would increase from 1.9 percent for the Baseline alternative to 5.3 percent for the LRT-High alternative using the UPRR alignment extended all the way to Elk Grove.

S.3.2 Street and Highway Impacts

The impacts to streets and highways were based on an analysis of regional, corridor, and local street traffic as described below. To determine future traffic volumes, figures generated by the Sacramento Metropolitan Regional (SACMET) travel demand model were used to calculate growth factors which were then applied to counts of existing 1990 traffic volumes.

S.3.2.1 Regional Traffic Impact

On a regional basis, all of the alternatives would show improved travel characteristics when compared with the 2010 Baseline alternative scenario. These results are consistent with the expectations that improved transit service on a regional basis enhances mobility and decreases roadway congestion, thereby reducing mobile source air pollutants. These improvements represent significant beneficial impacts.

S.3.2.2 South Sacramento Corridor Traffic

Traffic projections in the corridor for the alternatives would not vary much on a 24-hour basis from the projected 2010 Baseline alternative conditions. However, significant peak period traffic reductions would be expected to occur on I-5 and SR 99 as a result of the implementation of the alternatives. The resulting reduction in delays due to traffic congestion would be a significant beneficial impact.

S.3.2.3 Local Street Traffic Impacts: TSM Alternatives

Downtown traffic circulation patterns would change most significantly for the TSM alternatives. For the TSM-Low alternative, 7th Street between "P" Street and Capitol Mall would be sufficiently congested during peak periods so that bus reliability would be seriously affected. With the implementation of the transit malls, the TSM-High alternative would divert traffic from 7th and 8th Streets onto nearby parallel streets. As a result, the following streets would be expected to operate at LOS F: 1) 5th Street between "P" and "N" Streets; 2) 9th Street between "L" and "P" Streets; 3) 16th Street between "L" and "N" Streets; and 4) "P" Street between 5th and 9th Streets. (See Footnote 2 in S.1.2 for explanation of LOS.)

S.3.2.4 Local Street Traffic Impacts: LRT Alternatives: Old SPRR Alignment

The LRT alternatives following 5th Street would have the greatest potential impact on downtown Sacramento traffic since a portion of the street right-of-way would be used for LRT construction and operation. At the intersections of Florin Road/Freeport Boulevard and Pocket Road/

Freeport Boulevard, the LOS would deteriorate during the afternoon peak due to LRT operation.

For the Baseline alternative, traffic conditions are projected to be LOS F during both the morning and afternoon peaks at the intersections of Cosumnes River Boulevard with Franklin Boulevard and Center Parkway. The LRT alternatives using either the Old SPRR alignment or UPRR alignment are expected to cause substantially longer delays at these two intersections, particularly at the intersection of Cosumnes River Boulevard and Center Parkway.

S.3.2.5 Local Street Traffic Impacts: LRT Alternatives: UPRR Alignment

The LRT operation along this alignment would increase activity at the at-grade crossings at "S," "T," "W," and "X" Streets, and at Broadway. At each of these rail crossings, the projected queue lengths would regularly block the intersections to the west and east of the crossings. Additionally, the projected queues for eastbound traffic on 2nd Avenue would extend through the intersection of Freeport Boulevard and 2nd Avenue. These queues would affect traffic operations at this intersection six and eight times per hour, respectively, for the LRT-Low and LRT-High alternatives.

At the Franklin Boulevard/Mack Road intersection, the LOS during the morning peak would fall from C (LRT-Low alternatives) to F for the LRT-High alternatives. Existing development around this intersection and along both roadways limits the opportunity for significant capacity improvements, such as widening Franklin Boulevard to six lanes.

S.3.3 Parking Impacts

S.3.3.1 Downtown Parking Impacts

Under the 2010 Baseline conditions, as employment in the downtown Sacramento area grows, the demand for parking would greatly increase. If any of the alternatives were implemented, the projected number of person-trips by automobile to the Sacramento Central Business District would be significantly reduced from the 2010 Baseline alternative conditions.

However, the TSM alternatives would produce adverse effects on the downtown parking supply as well. For the TSM-Low alternative, the creation of exclusive HOV lanes on 7th and 8th Streets would eliminate 82 curb parking spaces from the west curb lane of southbound 7th Street from "E" Street to "Q" Street, and 105 spaces from the east curb lane along the same segment of northbound 8th Street. For the TSM-High alternative, the conversion of 7th and 8th Streets from "Q" to "E" Streets to transit/pedestrian malls would eliminate 170 curb parking spaces on the east and west sides of 7th Street, and 163 curb parking spaces on the east and west sides of 8th Street. Additionally, exclusive bus lanes that would be implemented on "P" and "Q" Streets between 8th and 30th Streets would eliminate 235 curb parking spaces from the north side of "P" Street, and 251 curb parking spaces from the south side of "Q" Street. Thus, the total loss of downtown curb parking spaces would be 187 spaces for the TSM-Low alternative, and 819 spaces for the TSM-High alternative.

The reduction in downtown parking space demand would range from over 8,000 spaces for the TSM-Low to almost 14,000 spaces for the LRT-High alternative along the UPRR alignment with the Elk Grove extension. This reduction in downtown parking demand would be a significant beneficial impact.

S.3.3.2 Sacramento City College and Cosumnes River College

If the TSM or LRT alternatives were implemented, the projected number of person-trips by automobile to Sacramento City College would decline. The greatest reduction would be for the LRT-High UPRR alignment alternatives. A reduction of 1,558 person-trips made by automobile would result in a lower parking demand of about 649 parking spaces throughout the day, thereby creating a significant beneficial impact. Sufficient parking at Cosumnes River College is available in several large lots around the periphery of the campus to accommodate parking demand through year 2010.

S.3.3.3 Transit Center/Station Area Parking Impacts

Three lots are projected to slightly exceed the proposed available parking supply for the TSM-Low alternative and the TSM-High alternative. The largest excess demand would be 14 spaces more than the proposed supply at the SR 99/Calvine park-and-ride lot.

Although most proposed LRT park-and-ride lots would have sufficient parking spaces to accommodate the demand, three are projected to be significantly deficient:

- Pocket/Freeport on Old SPRR LRT Alignment - up to 330 spaces;
- 47th Avenue/UPRR on UPRR LRT Alignment - up to 240 spaces; and
- Calvine/Auberry on both LRT Alignments - up to 770 spaces.

Multi-level parking garages could be built at these sites to accommodate the anticipated demand.

S.3.4 Pedestrian and Bicycle Impacts

The TSM alternatives would not affect the bicycle circulation system. The construction of a light rail system would affect the bicycle system along the Old SPRR alignment. For example, the *2010 Sacramento City/County Bikeway Master Plan* identifies a proposed off-street bike trail utilizing part of the Old SPRR right-of-way from San Mateo Way to south of Pocket/Meadowview Road. Portions of the existing Old SPRR right-of-way would not have sufficient width for the proposed LRT tracks, the steam excursion train tracks, and a bike trail. However, there is sufficient width on nearby parallel streets on which this bike trail could be rerouted past the narrow Old SPRR right-of-way segments. Bicycle impacts are not anticipated along the UPRR alignment or proposed extensions, except at Sacramento City College. The College currently has plans to construct a bikeway facility from Freeport Boulevard/21st Street along the west side of the UPRR rail right-of-way immediately adjacent to the LRT alignment to approximately Hughes Stadium.

S.3.5 Railroad Operation and Freight Movements Impacts

Within the Old SPRR right-of-way, construction of an LRT double track line would involve relocation of portions of the existing steam excursion train track for about two miles. Steam excursion train operations would be disrupted during construction, unless construction occurred during the non-summer months when the steam excursion train is not in operation. This disruption would consist of discontinuing service during critical periods of construction for about four to six months. Additionally, construction of light rail along the UPRR and SPRR rights-of-way could temporarily affect freight rail operation.

Design and operation of a LRT line adjacent to existing mainline freight tracks along the UPRR and SPRR rights-of-way would be done in accordance with CPUC standards and procedures to ensure the safety of rail operations in shared rights-of-way.

S.4 ENVIRONMENTAL CONSEQUENCES

The environmental analysis of the alternatives considered was performed in full accordance with the provisions of the federal National Environmental Policy Act and California Environmental Quality Act. A comparison of the potential environmental benefits and impacts that may not be able to be fully mitigated for the South Sacramento Corridor alternatives is presented below.

S.4.1 Summary of Beneficial Impacts

S.4.1.1 Land Use Plans and Policies

Implementation of both the TSM and the LRT alternatives would offer expanded opportunities for transit-oriented development and land use planning, to be compatible with transit improvements. A significant amount of vacant and under utilized land exists within walking distance of the proposed LRT stations along both the Old SPRR and the UPRR alignments and their extensions to Elk Grove and/or Laguna. Whether private developers would take advantage of these opportunities if a light rail line were built is uncertain.

S.4.1.2 Economic Activity

The TSM and LRT alternatives would provide new employment opportunities and increased economic activity. The TSM and LRT-High alternatives would create over 1,000 new construction and transit jobs with over $50 million in total annual income for the Sacramento region.

S.4.1.3 Neighborhoods and Businesses

The TSM and LRT alternatives would enhance mobility for corridor residents, particularly for the large transit-dependent population residing in the South Sacramento Corridor.

S.4.1.4 Transportation

The TSM and LRT alternatives would reduce travel times between corridor and regional destinations and increase transit ridership and transit's share of the regional travel market. As a result, auto vehicle trips would be significantly reduced compared with the 2010 Baseline alternative. A reduction in the number of auto trips entering downtown Sacramento and to Sacramento City College would reduce both traffic congestion and parking demand.

S.4.1.5 Air Quality

The TSM and LRT alternatives would offer a reduction in regional air pollutant levels, particularly carbon monoxide, nitrogen oxides, and particulate matter, because of the significant reduction in auto vehicle miles traveled compared with the Baseline alternative. The greatest reductions in mobile source emissions would result from the implementation of the LRT-High alternatives.

S.4.2 Potentially Significant Impacts That Could Not Be Fully Mitigated

S.4.2.1 Land Use

The greatest number of land use impacts would be associated with the LRT alternatives along the Old SPRR alignment. The site of the Florin Road Station would be within the Executive Airport Overflight Zone, a significant impact that could not be fully mitigated.

S.4.2.2 Acquisition and Displacement

All alternatives would involve 10 or more property acquisitions, except for the alternatives along the UPRR MOS alignment, which would involve eight. The TSM alternatives and the LRT alternatives along the Old SPRR alignment would displace the least number of businesses and employees, state and federal relocation guidelines provide a mechanism to fully compensate property owners and tenants of displaced properties resulting from implementation of a proposed alternative.

S.4.2.3 Transportation

The TSM-High alternative would include transit malls on 7th and 8th Streets between "E" and "Q" Streets, diverting traffic to heavily congested parallel downtown streets, displacing parking, and restricting vehicular access to businesses and office buildings along 7th and 8th Streets. The LRT alternatives along the Old SPRR alignment would aggravate congested traffic conditions along 5th Street and at Florin Road/Freeport Boulevard and Pocket Road/Freeport Boulevard. Cosumnes River Boulevard would be affected at Center Parkway for both the Old SPRR and UPRR alignment alternatives. These impacts would be difficult to mitigate fully.

S.4.2.4 Visual Resources

The TSM-High alternative would add visual intrusions by having direct connector ramps constructed over existing elevated freeway structures at Business 80/"Q" Street and at I-5/Broadway. The LRT-Low and LRT-High alternatives along the UPRR alignment would require a flyover structure of the UPRR mainline track at Morrison Creek, which would add a visual intrusion in the residential neighborhood at Ann Arbor Way. Tall power poles already exist along the alignment at this location. The cumulative impact of these visual intrusions could not be fully mitigated.

S.4.2.5 Biological Resources

Construction of the LRT alternatives along the UPRR alignment would potentially affect more biological resources than other alternatives. Along the UPRR alignment and Laguna extension, the disturbance to burrowing owls, which is protected under the federal Migratory Bird Treaty Act of 1916 and is classified as a Species of Special Concern by the California Department of Fish and Game (CDGF), could represent a potentially significant impact that may not be fully mitigated. Similarly, the nesting areas for tricolored blackbirds, which the US Fish and Wildlife Service classifies as Category 2 Candidate Species and CDGF classifies as a Species of Special Concern, may be affected by implementation of the LRT extension to Elk Grove. Additionally, the LRT alternatives would disturb the greatest number of acres of wetlands, primarily at park-and-ride lots. The Old SPRR alignment would directly affect approximately four acres of wetlands, over twice the number of acres potentially affected by the TSM alternatives.

S.5 EVALUATION OF ALTERNATIVES AND FINANCIAL ANALYSIS

The evaluation of alternatives takes the broadest view possible of the advantages and disadvantages of each alternative and points out the key trade-offs of costs and benefits to be considered in choosing the Locally Preferred Alternative. In accordance with Federal Transit Administration guidelines, the evaluation considers: 1) goals and objectives attainment; 2) cost-effectiveness; 3) equity; and 4) financial feasibility. The trade-offs among the alternatives are identified below.

S.5.1 Effectiveness

The LRT alternatives would be expected to achieve more favorable ridership, travel time, and reduced traffic congestion statistics than either the Baseline or TSM alternatives. The land use and community acceptance goals would appear to be more favorable for the LRT alternatives, particularly those following the UPRR alignment. Although the Baseline alternative would create the fewest environmental impacts, the LRT alternatives would produce the most beneficial impacts. The Baseline alternatives would incur the lowest capital and operating costs.

S.5.2 FTA Cost-Effectiveness Indices

Under Federal Transit Administration guidelines, for an alternative to be eligible to proceed into preliminary engineering and final design, the cost per new rider or New Transit Rider Index should not exceed $6.00. Based on this FTA threshold, the LRT alternatives along the Old SPRR and UPRR alignments to Calvine/Auberry and the alternatives that extend from Calvine/Auberry to Elk Grove would be eligible for preliminary engineering and the preparation of a Final Environmental Impact Statement (FEIS) (Figure S-9).[1] A sensitivity test was also performed which examined a 50 percent increase in downtown Sacramento jobs versus the current official SACOG projection of a 100 percent increase. The results showed that, for the reduced Sacramento CBD job growth scenario, the total number of daily transit trips produced in the region would drop by 17 percent, and that the number of net new transit riders for the various LRT alternatives compared to the TSM alternatives would drop by 22 percent. This reduction in net new transit riders would in turn cause the New Transit Rider Index to increase by 22 percent for all of the LRT alternatives. For example, the New Transit Rider Index for the LRT-Low UPRR alternative would increase from $1.57 per new rider to $1.92 per new rider, but would remain under the FTA $6.00 threshold.

The User Benefit Index is a ratio between the incremental costs of building and operating an alternative, and the travel time and cost benefits that accrue to the users of that alternative. According to this index, the most cost-effective LRT alternatives are those along the Old SPRR and UPRR alignments to Calvine/Auberry (Figure S-10).

S.5.3 Equity

The evaluation of alternatives in terms of equity deals with the distribution of project costs and benefits by geographic location and socioeconomic strata. Of particular importance is the distribution of costs and benefits to people who depend upon transit. This group generally includes

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[1] It is FTA's assessment that the travel forecasting model has produced results which show the relative ability of each of the build alternatives to attract new riders; however, some questions remain on the accuracy of the ridership numbers themselves. Therefore, FTA and RT have agreed to prepare new ridership and cost-effectiveness forecasts during preliminary engineering, using the new travel forecasting model which is currently being developed by the Sacramento Area Council of Governments (SACOG).

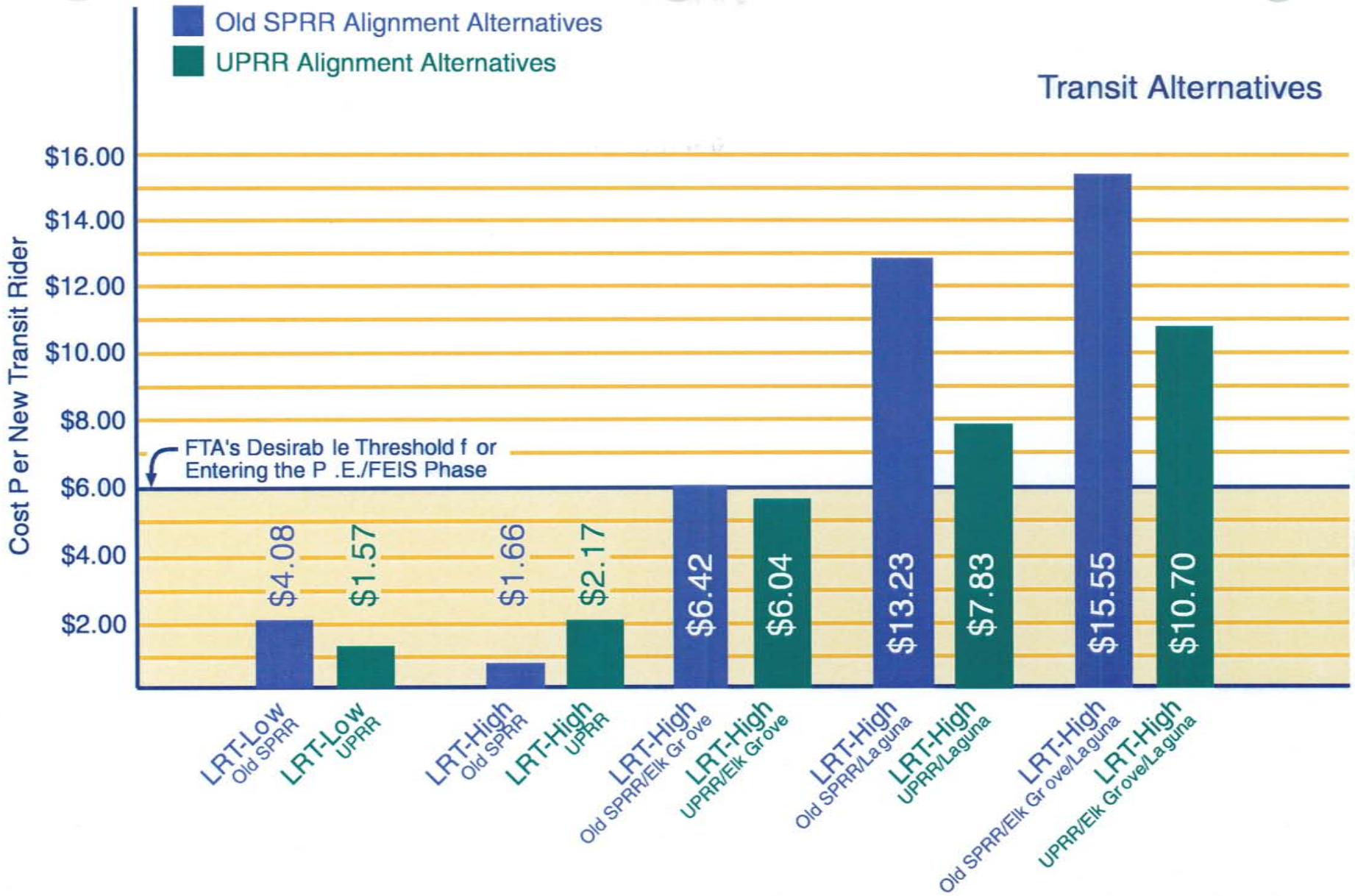

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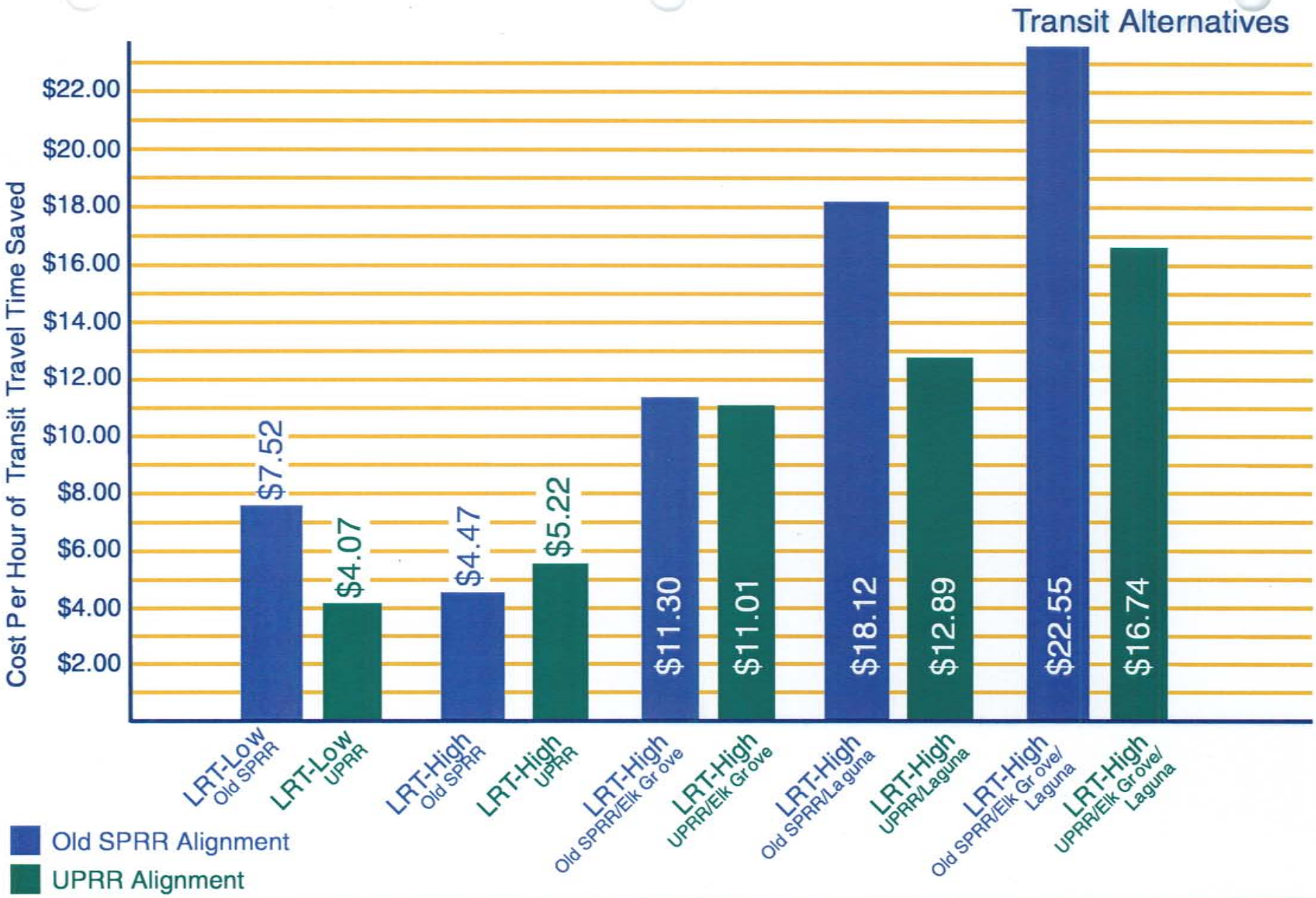
Figure S-9

FTA TOTAL COST PER NEW RIDER INDEX (MILLIONS OF 1993 DOLLARS)



South Sacramento Corridor AA/DEIS/DEIR

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Figure S-10

FTA TOTAL COST PER USER BENEFIT (TRAVEL TIME SAVED) (MILLIONS OF 1993 DOLLARS)

low-income households, households without automobiles, seniors, and people with mobility disabilities.

S.5.3.1 Financial Equity

Financial equity is assessed by comparing who pays for the transportation improvements versus who benefits from the project. The assessment of financial equity can be made by identifying the funding mechanisms used to pay for construction and operation of the transportation improvements.

The funds used to construct and operate the Locally Preferred Alternative would consist of a complex mix of federal, state, and local sources. Costs borne directly by the Sacramento region's population would include local sales taxes, passenger fares, and other local revenue sources (e.g., taxes from benefit districts). Indirect costs would include federal and state gasoline and income taxes, and user fees. Local funding sources would provide up to 47 percent of the capital and 97 percent of the operating costs for the project.

The primary source of local funds for the corridor project would be local sales taxes. Currently, RT receives sales tax revenues through the State Transportation Development Act and through Measure A, the one-half cent sales tax increase passed by County voters in 1988. RT receives about one-third of Measure A revenues.

The South Sacramento Corridor *Financial Analysis Results Report*[2] concluded that a new one-half cent sales tax dedicated exclusively to transit, referred to as Measure B, would be necessary to pay the local share for the TSM and LRT alternatives. The *Financial Analysis Results Report* also concluded that a significant increase to the state gas tax, or an equivalent new revenue source, would also be required, in addition to Measure B, before any of the High alternatives could be implemented. All residents of the County would contribute to the implementation of the Locally Preferred Alternative through the local sales taxes and other funds, including those residents living outside of the corridor.

Benefits derived by the local population would include improved mobility, reduced travel times for transit users, reduced levels of congestion for auto users, and improved environmental quality in the region. Clearly, those people located within the corridor would receive most of these benefits. However, those residents living outside of the corridor would benefit from the transportation improvements as well.

Each of the alternatives includes significant transit improvements to areas outside of the corridor. These improvements consist of bus service expansion and extensions to the existing LRT line.

Table S-3 shows the distribution of improvements as measured by their initial capital costs within and outside of the corridor for each of the alternatives. The table indicates that between 52 percent and 69 percent of costs for the project would be incurred for transit improvements outside of the corridor, mainly for extensions to the existing LRT system.

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[2] *Financial Analysis Results Report*, G.R. Swanson & Associates, April 1994.

TABLE S-3
DISTRIBUTION OF SOUTH SACRAMENTO CORRIDOR IMPROVEMENTS BY ALTERNATIVE

Category	Baseline	TSM-Low	LRT-Low		TSM-High	LRT-High, Old SPRR Options				LRT-High, UPRR Options			
			Old SPRR	UPRR		A Calvine/ Auberry MOS	B Elk Grove	C Laguna	D Elk Grove & Laguna	A MOS	B Elk Grove	C Laguna	D Elk Grove & Laguna
South Sacramento Corridor	NA	31%	47%	47%	33%	42%	46%	44%	48%	42%	47%	44%	48%
Outside of corridor	NA	69%	53%	53%	67%	58%	54%	56%	52%	58%	54%	56%	52%

Based on the data presented above, the transportation improvements would significantly benefit both the residents of the corridor and the County residents living outside of the corridor. Therefore, the transportation represents an equitable distribution of improvements across the geographic areas of Sacramento County.

S.5.3.2 Transit Service Equity

Service equity measures the extent to which the project investment improves transit service to various population groups. The focus of this evaluation is on the transit-dependent population. For this analysis, the transit-dependent population consists of: 1) households below the poverty level; 2) households with no automobile; 3) people sixty-five years of age or older; and 4) people with mobility disabilities.

Households Below Poverty Level

Despite the high concentration of low-income households in the Upper Land Park area served by the Old SPRR alignment, the UPRR alignment would serve the highest concentration and greatest number of households below the poverty level. Of all households along the UPPR MOS alignment, 16.4% are below the poverty level. LRT-High UPRR Option B would serve the next highest percentage of low income households (15.4%), followed by the LRT alternatives along the Old SPRR MOS alignment (15.3%).

Households with No Automobiles

LRT alternatives along the UPRR alignment would best serve those areas that have high concentrations of households with no auto (11.4%). LRT alternatives along the Old SPRR alignment would also well serve a high concentration of households with no auto (11.2%).

Population 65 Years or Older

Census data indicates that seniors would be best served by the Old SPRR alignment. In particular, the LRT alternatives along the Old SPRR MOS alignment would serve the highest concentration of seniors (11.2%), followed by LRT-High Old SPRR Option B (10.8%).

Population with Mobility Disabilities

People with mobility disabilities are dispersed throughout the South Sacramento Corridor. However, there appears to be a concentration of people with mobility disabilities in parts of downtown, and near Sacramento City College and Executive Airport. The census data indicate that LRT alternatives along the UPRR alignment would best serve the areas with high percentages of persons with mobility disabilities (8.1%).

S.5.4 Financial Feasibility of the Alternatives

The evaluation of the alternatives in terms of financial feasibility determines the relative degree to which they can be constructed and operated given existing and potential (new) sources of transit revenue.

The costs to construct and operate each of the alternatives were calculated in other parts of the study.[3] The financial analysis[4] was performed to determine the revenue that would be available to pay for the alternatives, and to identify potential new funding sources when existing revenues would not be sufficient. Financial feasibility was determined for five alternatives, which were sufficient to represent the full range of financial needs and issues for all of the alternatives. The alternatives chosen for full financial analysis were: 1) Baseline, 2) TSM-Low, 3) LRT-Low UPRR, 4) TSM-High, and 5) LRT-High UPRR Elk Grove.

The financial analysis concluded that only the Baseline alternative could be implemented with RT's current transit funding sources. The TSM-Low and LRT-Low alternatives would require an additional one-half cent sales tax to pay for the local share of construction and operations. The TSM-High and LRT-High alternatives would require another major source of transit funds *in addition to* the one-half cent sales tax, such as a progressive 20-cent per gallon gasoline tax.

For the financial analysis, it was assumed that beginning in 1997 a new one-half cent sales tax (Measure B) would be available to fund all TSM and LRT alternatives. Measure B would contribute $1.3 billion to RT operations and capital from 1997 through 2010.[5] This sales tax would be used as the local match[6] for state and federal capital funds, and to provide operating funds for all of the expanded transit services in the County (this sales tax would not be used to fund RT's existing transit operations). If Measure B did not pass, none of the TSM or LRT (Low and High) alternatives could be implemented.

In addition, it was assumed that a 1-cent-per-gallon-per-year progressive increase for 20 years in the state gasoline tax would be adopted by the state legislature, and that a majority of the revenues from this tax would be made available to RT beginning in fiscal 1995-1996. This increase would contribute $750 million to RT over a 20-year period. The gas tax increase would be used only for capital improvements for the High alternatives (the State Constitution currently prohibits its use to pay for transit operations). Both new funding assumptions are consistent with the Sacramento Area Council of Government's *Metropolitan Transportation Plan* adopted in September 1993.

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[3] *Capital Cost Results Report* and *Operating and Maintenance Cost Results Report*.

[4] *Financial Analyses Results Report*, G.R. Swanson & Associates, April 1994.

[5] *Ibid*, Table 2-2.

[6] State and federal grants require that local governments match funds on a percentage basis. Thus, if the federal or state pledges 50 percent of the funds to pay for a transit project, the local government must contribute the other 50 percent in order to receive the funds.

The best indicator of financial feasibility is cash flow. The cash flow analysis measures the annual surplus or deficit that would result from implementing each alternative. The alternatives that do not result in deficits, after the Measure B and gas tax revenues are considered, are the most financially feasible.

Another indicator of financial feasibility is the proportion of local revenue used to construct and operate each alternative. Metropolitan areas that are able to provide a high percentage of dedicated local and state funding for major capital projects are more likely to secure federal funding.

S.5.4.1 Cash Flow Analysis

The cash flow analysis measures the financial surplus/deficit generated by each alternative on an annual basis and on a cumulative basis over the 17-year analysis period (1994-2010). Annual *and* cumulative cash flows are analyzed because, due to construction schedules and other factors, an alternative can have a surplus at the end of the 17-year analysis period but can have several individual years of deficits. Financial surpluses/deficits are measured in three ways on an annual and cumulative basis: operating, capital, and combined (operating and capital) reserve.

The operating surplus/deficit is the difference of operating revenues less operating expenses. The capital surplus/deficit is the difference between capital funds and capital expenditures. The combined ending reserve takes into account both operating and capital balances. It is the difference between operating and capital funds less operating and capital expenditures.

Table S-4 presents the cumulative (17-year total) operating, capital, and combined surplus/deficit based on the cash flow for each alternative. The data in this table include Measure B sales tax funds for all TSM and LRT alternatives (Low and High), and funds from the proposed progressive state gasoline tax increase for the TSM-High and LRT-High alternatives. It should be noted that the rate of increase in sales tax revenues is predicated on the growth of population and inflation (as determined by the Consumer Price Index). This increase averages 6.5% per year.

TABLE S-4
CUMULATIVE CASH FLOW ANALYSIS - 1994-2010
(MILLIONS OF ESCALATED DOLLARS)

Cash Flow	Baseline	TSM-Low	LRT-Low	TSM-High	LRT-High UPRR Elk Grove
Operating Surplus/(Deficit)	$106.7	$763.8	$987.0	$92.7	$368.9
Capital Surplus/(Deficit)	$193.4	($522.9)	($360.0)	($360.6)	($485.3)
Combined Surplus/(Deficit)	$300.1	$240.9	$627.0	($267.9)	($116.4)

For the Baseline alternative, cumulative year-end cash reserves grow to an estimated $300.1 million by FY 2010. This $300.1 million ending balance represents approximately 16.4% of the $1,830 million total combined capital and operating costs expended over the 17-year analysis period.

Although no fund deficits are anticipated to occur in implementing the capital improvement program under the Baseline alternative, RT does possess the ability to pledge future revenues for the purpose of using debt financing to finance its acquisition of new buses and construction of new service facilities.

For the TSM-Low alternative, a surplus of $240.9 million is expected to occur at the end of the service expansion program. This figure represents only 6.2% of the $3.9 billion total combined capital and operating costs for the 17-year period. The TSM-High alternative, on the other hand, will have a combined cumulative shortfall of $267.9 million at the end of the service expansion program. This figure represents a -5.2% of the $5.1 billion total combined capital and operating costs for the 17-year period. This shortfall can be attributed to the nearly tripling of bus service in TSM-High.

For the LRT-Low alternative, RT would experience no operating deficits and would have annual surpluses. These surpluses would then be available for use in funding the capital requirements under the program. On the capital side, annual deficits occur nine times throughout the program. With annual deficits occurring more frequently, RT's use of debt financing may become an important element in successfully implementing the transit service improvements included in this alternative. However, on a combined cumulative basis, the program could be completed, leaving a surplus of nearly $627.0 million. This figure represents 16.5% of the $3.8 billion total combined capital and operating costs for the 17-year program.

For the LRT-High alternative, RT would have annual operating deficits occur six times over the 17-year forecast. Annual deficits would occur frequently in funding capital costs. On a combined cumulative basis, the LRT-High alternative would have a funding shortfall of $116.4 million at the conclusion of the program. This figure represents a -2.3% of the $5.1 billion total combined capital and operating costs for the 17-year period.

The capital shortfalls for the TSM-High and LRT-High alternatives probably cannot be avoided, since capital funds make-up the majority of the combined deficit. RT would not have the funds to construct the High alternatives without an additional source of funds to supplement the Measure B sales tax funds and the funds from the gas tax increase.

S.5.4.2 Local Funding Commitment

Metropolitan areas throughout the country compete for a limited supply of federal funds based on criteria established by Congress and the Federal Transit Administration. As stated above, metropolitan areas that demonstrate a high level of local funding commitment for major capital projects are generally more likely to secure federal funds. Table S-5 presents the local funding commitments for each of the alternatives in the financial analysis. (The Baseline alternative is not competing for large amounts of discretionary federal funds, but is included for comparison purposes). This table shows funding commitments for the entire RT transit system, including operations and capital projects outside of the corridor.

The local funding share for all of the TSM and LRT alternatives would be at least 97 percent for operations and 34 percent for capital. These amounts, which include transit service improvements within and outside of the South Sacramento Corridor, show that a strong local funding commitment is required by RT. In the financial analysis, it was assumed that RT and the state would have to contribute at least 25 percent of the corridor project costs to match federal grants. Table S-5 shows that RT would have more than enough local revenues to match the federal funds. When combined with state funds, some of which are already reserved for RT, the local commitment is further emphasized.

TABLE S-5 PERCENT OF FUNDING SHARE BY TYPE - 1994-2010					
Type of Funding	**Baseline**	**TSM-Low**	**LRT-Low**	**TSM-High**	**LRT-High UPRR Elk Grove**
Operations					
Local	95.2%	97.3%	97.2%	97.4%	97.1%
State	0.0%	0.0%	0.0%	0.0%	0.0%
Federal	4.8%	2.7%	2.8%	2.6%	2.9%
Capital					
Local	24.0%	44.7%	44.5%	34.4%	37.0%
State	11.3%	18.7%	14.6%	18.9%	14.8%
Federal	64.7%	36.6%	40.9%	46.7%	48.2%

S.5.5 Trade-Off Analysis

The final component of the evaluation of alternatives involves the identification of trade-offs. The trade-off analysis highlights important differences in the relative performance of each alternative according to measures of effectiveness, efficiency, equity, and financial feasibility. The analysis takes the broadest view possible of the advantages and disadvantages of each option, pointing out the key trade-offs of costs and benefits to be considered in choosing a course of action.

The trade-off analysis of the corridor alternatives is designed to assist decision-makers in judging which criteria are most important to the Sacramento area generally, and the South Sacramento Corridor specifically. The analysis is an important step toward selecting a preferred transit investment alternative. It frames the decision on a preferred alternative in terms of the advantages of choosing one option compared to the advantages of options not chosen.

Trade-offs are identified for key decision points for the corridor alternatives. The key decision points are:

- **Build or No Build?** Should Sacramento County approve an increase in local taxes (e.g., one-half cent sales tax increase and/or state gasoline tax increase) to greatly expand its bus and light rail transit system? How would an expanded transit system affect freeway congestion, parking, and overall transportation mobility in the Sacramento region?

- **Low or High?** What level of local funding increase should be approved if a build alternative is selected? Should one of the lower cost alternatives be selected or should one of the higher cost alternatives, which require more than a sales tax increase, an increase to the state gasoline tax, and possibly more local taxes, be chosen? Do the "High" level of investment alternatives generate sufficient increased benefits to warrant the higher level of local funding support?

- **TSM or LRT?** Given a decision to build at a certain investment level, is one of the TSM alternatives (i.e., express buses) preferable to one of the LRT (i.e., bus and rail)

alternatives? Which would achieve the greatest patronage and the least adverse transportation impacts?

- **Old SPRR Alignment or UPRR Alignment?** For the LRT alternatives, should the Old SPRR alignment be chosen or should the UPRR alignment be selected? What are the advantages and disadvantages of each alignment?

- **Minimum Operable Segment (MOS) or Beyond MOS?** For the LRT alternatives, should the LRT line end at the MOS (Calvine/Auberry - Option A) or should it be extended (Elk Grove - Option B, Laguna - Option C, or Elk Grove/Laguna - Option D)? What are the advantages and disadvantages of extending beyond the MOS?

It is important to note that both RT and SACOG support the "High-Level/High Investment" transit improvement alternatives in the: 1) 1994 Metropolitan Transportation Plan for the Sacramento region approved by SACOG; 2) RT's 20-Year Transit Master Plan approved by the RT Board of Directors; and 3) Transportation Sales Tax Strategic Plan. SACOG has also approved for transit expansion both the new ½-cent transit sales tax and the progressive state gasoline tax increase (1 cent per gallon increase per year for 20 years). Both of these potential new revenue sources would have to be approved by the voters of Sacramento County.

S.5.5.1 Selection of Baseline Alternative or TSM/LRT Alternative

The decision to select one of the TSM or LRT alternatives, or not to build at all (Baseline alternative) involves these trade-offs:

- The Baseline alternative would have the lowest capital and operating costs.

- Implementing any of the alternatives would require increased taxes for the County's residents. The Low alternatives would require a new one-half cent sales tax, and the High alternatives would require the sales tax plus a significant increase to the state gasoline tax. However, County residents would very likely pay more for auto transportation, congestion delays, and health problems than these new tax revenues would cost them.

- If the Baseline alternative were selected, the County would forego the opportunity to obtain large amounts of federal and state transit dollars, and these funds would go to other urban areas.

- In the Baseline alternative, traffic on local streets and freeways in the study corridor would increase as a result of continued population and job growth.

- Environmental impacts associated with the construction of the TSM and LRT alternatives would be avoided if the Baseline alternative were chosen, while others associated with increased traffic and congestion (e.g., air pollution and noise) would be increased.

- In the Baseline alternative, the corridor, which includes high numbers and a high percentage of transit-dependent people, would not be served equally as well as other parts of the region that have a more extensive transit network.

- If the Baseline alternative were selected, parking issues would not be addressed and parking problems would increase in downtown Sacramento, and at Sacramento City and Cosumnes River Colleges.

S.5.5.2 Selection of Low or High Alternatives

The selection of the Low alternatives (TSM-Low and the LRT-Low Old SPRR and UPRR) versus the High alternatives (TSM-High and all the LRT-High Old SPRR and UPRR) involves these trade-offs:

- The TSM- and LRT-High alternatives would include enhancements to the RT system outside of the corridor, which are not part of the Low alternatives. Electric trolley bus service[7] and a further LRT extension to Hazel Avenue from the proposed Sunrise/Gold River extension would be included in all High alternatives.

- Funding of the High alternatives would be dependent on a new source of revenue, currently assumed to be an increase to the state gasoline tax, above and beyond the new one-half cent sales tax assumed for the Low alternatives. The chances of securing such a funding source appear to be remote at this time.

- The TSM-High alternative would cost 56 percent more to implement than the TSM-Low alternative and 35 percent more to operate, yet would only attract 19 percent more daily transit riders.

- The LRT-High alternatives to Calvine/Auberry would generally cost 35 percent more to implement than the LRT-Low alternatives and 45 percent more to operate, yet would only attract 12 percent more daily transit riders.

- The LRT-Low alternatives would produce reductions in air pollution compared to the Baseline alternative, but the relative reductions in air pollution produced by the LRT-High alternatives compared to the LRT-Low alternatives would not be as great.

S.5.5.3 Selection of TSM or LRT Alternatives

The selection of the TSM-Low and TSM-High alternatives or one of the LRT alternatives (LRT-Low Old SPRR, LRT-Low UPRR, and the LRT-High alternatives Options A-D) involves these trade-offs:

- The LRT alternatives would provide for more direct service, carry more riders, and divert more drivers to transit than the TSM alternatives.

- The LRT alternatives would reduce auto vehicle miles traveled in the region and traffic congestion more than the TSM alternatives. The TSM-Low alternatives would reduce congested lane miles by only half as much as the LRT-Low alternatives.

- The LRT alternatives would generally provide faster and more direct service to downtown Sacramento and areas along the Old SPRR and UPRR alignments; however, the

[7] Although the LRT-High alternatives include implementation of electric trolley bus service, RT is not pursuing this project.

TSM alternatives would provide shorter travel times to certain areas outside of the corridor.

- Overall operating cost-effectiveness measures are mixed, but would generally favor the LRT alternatives.

- The LRT alternatives would cost significantly more to construct than the TSM alternatives. However, the TSM alternatives would cost more to operate (up to $10 million more) on an annual basis.

- Federal and state grants would contribute more towards the cost of the LRT alternatives than for the TSM alternatives, which would reduce the amount of local funds required.

- The TSM alternatives would require the relocation of fewer businesses within the corridor.

- The LRT alternatives would provide the greatest reduction of carbon monoxide emissions and total air pollution emissions.

- The LRT alternatives would adversely affect more acreage of wetlands and more threatened species than the TSM alternatives.

- The TSM alternatives, with their exclusive bus lanes on "P," "Q," 7th, and 8th Streets, would exacerbate traffic conditions in downtown Sacramento and reduce the number of curbside parking spaces due to the large number of express buses that would be using downtown streets.

- LRT, in conjunction with supporting City and County general plans, would provide the opportunity for greater influence on focusing land use than TSM alternatives. If selected, the LRT alternatives would result in greater transit and pedestrian travel, and less suburban sprawl. In other words, the LRT alternatives are more compatible with local land use plans and objectives than the TSM alternatives.

S.5.5.4 Selection of Old SPRR MOS Alignment or UPRR MOS Alignment

The selection of the LRT Old SPRR alternatives (LRT-Low Old SPRR and the LRT-High Old SPRR Options A-D) or the LRT UPRR alternatives (LRT-Low UPRR and the LRT-High UPRR Options A-D) involves these trade-offs:

- The LRT alternatives along the UPRR alignment would carry up to 13 percent more riders than the LRT alternatives along the Old SPRR alignment and would divert 10 percent more drivers to transit, providing greater reductions in traffic congestion and air pollution.

- The LRT alternatives along UPRR alignment would directly serve Sacramento City College and the Campbell Soup Company, two primary trip destinations in the corridor, and provide a highly desired direct transit link between City College and Cosumnes River College.

- By providing more direct service and reduced travel times for residents in the corridor, the alternatives along the UPRR alignment would encourage more high-density, multi-use development than the alternatives along the Old SPRR alignment.

- User benefits consisting of travel time savings (waiting, walking, riding, and transferring) for both existing as well as new transit riders are mixed, but generally improve with alternatives along the UPRR alignment.

- There is a high level of community support for the UPRR alignment, as demonstrated by its endorsement by the South Sacramento Corridor Community Advisory Committee.

- In most cases, both alignments perform extremely well with regards to the FTA cost-effectiveness criteria; however, these measures would favor alternatives along the UPRR alignment compared to the alternatives along the Old SPRR alignment.

- Fewer businesses would be relocated for the alternatives along the Old SPRR compared to the alternatives along the UPRR.

- The transit-dependent population would be better served with the alternatives along the UPRR alignment than with the alternatives along the Old SPRR alignment.

- The alternatives along the UPRR alignment and alternatives along the Old SPRR alignment would produce some potentially significant environmental impacts that may not be able to be fully mitigated to a level of insignificance. These impacts would include: disturbance of burrowing owl nesting areas; and creating visual impacts from the LRT flyover structures.

- The alternatives along the Old SPRR alignment would require removal of four times as many native trees and oaks than the alternatives along the UPRR alignment.

- The LRT alternative along the Old SPRR alignment would require altering the California Department of Parks and Recreation historic steam excursion train track and embankment and the Sacramento River levee (a National Register property). This alternative would also result in a conflicting land use with the Executive Airport over-flight zone (LRT station and parking structure at Freeport and Florin Road).

S.5.5.5 Selection of LRT MOS or Beyond MOS

The decision to stop the LRT system at the MOS terminal at (Calvine/Auberry - Option A) or, extend beyond the MOS to (Elk Grove, Laguna, and Elk Grove/Laguna - Options B-D) involves these trade-offs:

- Extending the LRT alternatives beyond the MOS to Elk Grove would cost 26 percent more to implement ($116 million) and 5 percent more to operate, yet attract only 5 percent more daily riders (2,000 more).

- Extending the LRT alternatives beyond the MOS to Laguna would cost 13 percent more to implement ($52 million) and 9 percent more to operate, yet would attract 4.5 percent less daily riders (1,700 less).

- Extending the LRT system beyond the MOS would not increase ridership and would decrease travel time in all instances.

- More environmental impacts would be incurred for the extensions compared to the MOS, and traffic congestion would not diminish appreciably if the MOS alternatives were extended.

- Alignment Options A (MOS) and C (Laguna) would be better at reducing traffic congestion than alignment Options B (Elk Grove) and D (Elk Grove/Laguna).

- Alignment Option B (Elk Grove) would reduce parking demand in downtown Sacramento the most.

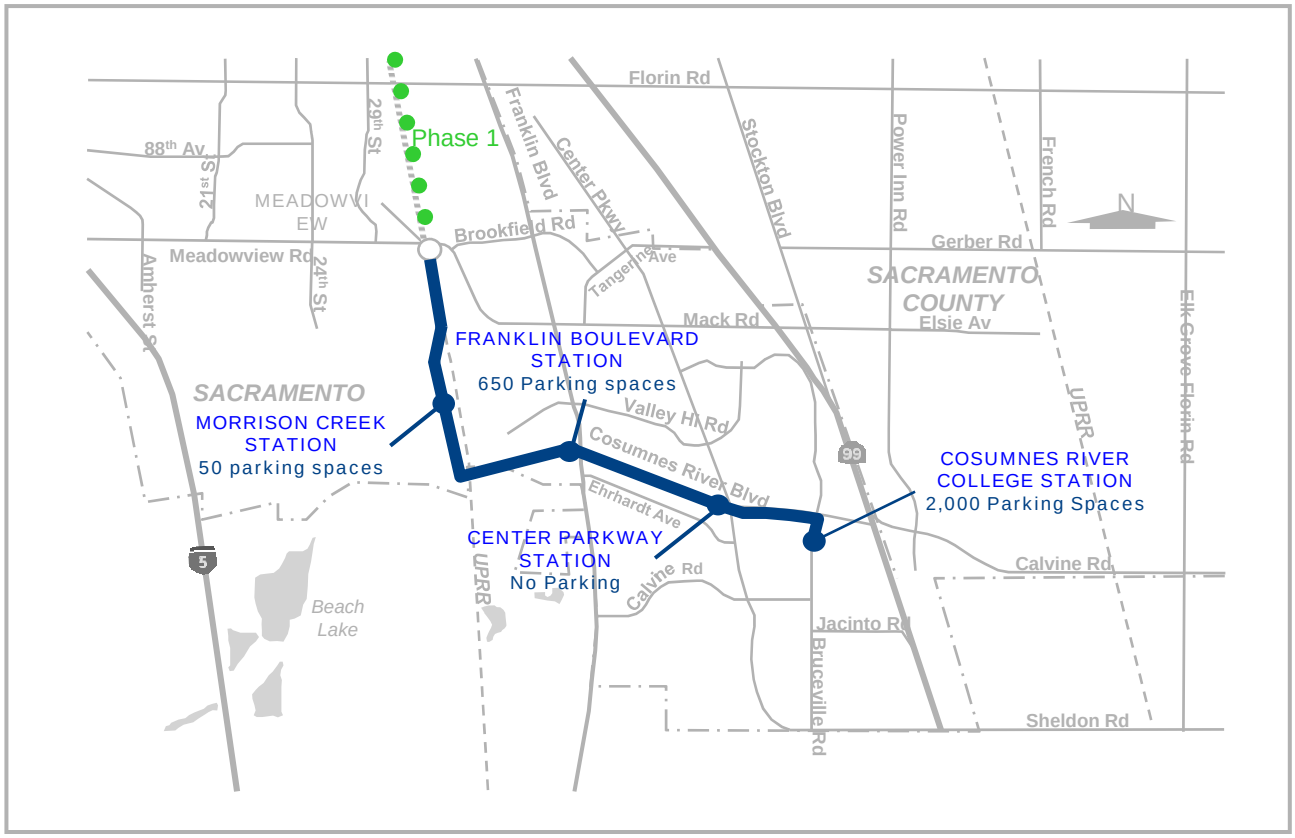
- Operating cost per boarding passenger would be lower for alignment Options A (MOS) and B (Elk Grove) than for alignment Options C (Laguna) and D (Elk Grove/Laguna), which reflect diseconomies of scale (i.e., it would cost relatively more to operate a larger transit system compared to the ridership it would generate).

- The FTA cost-effectiveness indicators (cost per new rider and cost per user benefit) are more favorable for alignment Options A, followed by B, then C, and then D.

- The MOS alignment alternatives would serve the areas with the highest concentrations of the transit-dependent population in the corridor. Extending beyond the MOS would not serve an appreciably greater number of transit-dependents.

SCH # 1996052075

South Sacramento Corridor Phase 2 Project



SUPPLEMENTAL FINAL ENVIRONMENTAL IMPACT STATEMENT/ SUBSEQUENT FINAL ENVIRONMENTAL IMPACT REPORT

SEPTEMBER 2008

SOUTH SACRAMENTO CORRIDOR PHASE 2
in the City and County of Sacramento, California

SUPPLEMENTAL FINAL ENVIRONMENTAL IMPACT STATEMENT/
SUBSEQUENT FINAL ENVIRONMENTAL IMPACT REPORT/

Pursuant to

Pursuant to the National Environmental Policy Act (NEPA) of 1969 as amended, 42 United States Code (USC) §4332(2); the regulations of the Council of Environmental Quality (CEQ), 40 Code of Federal Regulations (CFR) 1500-1508; the Federal Transit Laws, 49 USC Chapter 53; Section 4(f) of the Department of Transportation Act of 1966, as amended, 49 USC §303; Section 6(f)(3) of the Land and Water Conservation Fund Act, 16 USC §4601-U; the National Historic Preservation Act of 1966, 16 USC §470(f), Environmental Impact and Related Procedures-Federal Highway Administration/Federal Transit Administration, 23 CFR Part 771; The Clean Air Act as amended, 42 USC §7401-7671; the Endangered Species Act of 1973, 16 USC §1531; Section 402 of the Clean Water Act, 33 USC §1342; Executive Order 12898; Executive Order 11990, Protection of Wetlands; Executive Order 11988, Floodplain Management; and California Environmental Quality Act, PRC 21000 *et seq.*; and the State of California CEQA Guidelines, California Administrative Code, 15000 *et seq.*

by the

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL TRANSIT ADMINISTRATION

and the

SACRAMENTO REGIONAL TRANSIT DISTRICT

For FTA: Leslie T. Rogers
Leslie T. Rogers
Regional Administrator, Region IX
Federal Transit Administration

SEP 23 2008
Date of Approval

For RT: Michael R. Wiley
Michael R. Wiley
General Manager/Chief Executive Officer
Sacramento Regional Transit District

September 16, 2008
Date of Approval

ABSTRACT

Sacramento Regional Transit District (RT) proposes to extend light rail transit (LRT) service 4.3 miles from the South Sacramento Corridor Phase 1 terminus at Meadowview Road southward along the UPRR right-of-way, turning east crossing the UPRR and Union House Creek, continuing east to the north of the proposed extension of Cosumnes River Boulevard (CRB), crossing Franklin Boulevard, traveling along the northern side of CRB, turning south along the western side of Bruceville Road and terminating at Cosumnes River College (CRC). This Project, called the Locally Preferred Alternative Phase 2 (LPAP2), includes four new stations at: (a) Morrison Creek, (b) Franklin, (c) Center Parkway, and (d) CRC. Three new park-and-ride lots would provide over 2,700 spaces: (a) Morrison Creek with 50 spaces, (b) Franklin with 650 spaces, and (c) CRC with 2000 spaces.

In addition to the LPAP2, a No-Action Alternative and a Transportation Systems Management (TSM) Alternative are evaluated in this Supplemental Final Environmental Impact Statement/Subsequent Final Environmental Impact Report (SFEIS/SFEIR). Impacts include noise and vibration, impacts to wetlands and habitat for special status species, floodplain impacts, traffic impacts, and impacts during construction. Proposed mitigation measures include replacement of or compensation for wetlands, habitat and floodplain areas; noise barriers and techniques to reduce noise and vibration at the source; refining signal timing and adding turn lanes at intersections; coordination with utility providers, and advance notice to customers; a Worker Health and Safety Plan and management practices during construction.

FOR ADDITIONAL INFORMATION CONCERNING THIS DOCUMENT, CONTACT:

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A Notice of Intent to Prepare an EIS was published in the Federal Register on March 8, 2002, and a Notice of Preparation was distributed in early March of that year. Public scoping meetings were held on March 25 and April 11 of 2002.

A public hearing was held on the SDEIS/SDEIR during the RT Board meeting on March 12, 2007 at 6:00 pm at the Pannell Meadowview Community Center, 2450 Meadowview Road, Sacramento, CA.

PREFACE

This Supplemental *Final* Environmental Impact Statement/Subsequent *Final* Environmental Impact Report (*SFEIS*/*SFEIR*) supplements the 1994 Alternatives Analysis/Draft Environmental Impact Statement and is a subsequent environmental document to the 1995 Final Environmental Impact Report for the South Sacramento Corridor project. It represents another formal step in a planning process that began in 1981, when the Sacramento Regional Transit (RT) Board designated Cosumnes River Boulevard (CRB) to Calvine Road as an alignment for a future light rail transit (LRT) extension. Portions of this alignment were reconfirmed during the 1980s and 1990s in studies undertaken by RT or the Sacramento Area Council of Governments (SACOG) to identify, (re-)evaluate, and (re-)prioritize corridors for future extensions of LRT.

The RT Board's adoption of future LRT alignments was intended to preserve rights-of-way in accordance with City and County of Sacramento planning processes, by depicting the alignments on the land use and circulation element maps of their respective general plans, and by adoption of policies "dedicating" these rights-of-way for LRT.

Studies undertaken in support of this planning process included the 1984 SACOG *Sacramento LRT Extension Study Expanded LRT System Analysis,* 1987 SACOG *Sacramento Light Rail Transit Extension Study Final Report,* and 1991 RT *Sacramento Systems Planning Study*, on the basis of which RT proceeded to prepare Environmental Impact Reports (EIR) to enable preservation of right-of-way for the Downtown-Natomas Airport and Folsom Corridor LRT extensions, prepared a project-level EIR for extending the starter line to Sunrise/Gold River, and advanced the South Sacramento Corridor into conceptual engineering and environmental review.

The process achieved a major milestone when, on March 29, 1995, following public review of seven investment alternatives in the 1994 South Sacramento Corridor Alternatives Analysis/Draft Environmental Impact Statement/ Draft Environmental Impact Report (AA/DEIS/DEIR), the RT Board of Directors adopted a Locally Preferred Alternative (LPA) for long-term development of LRT improvements in the South Sacramento Corridor. This designation identified LRT as the preferred mode and the "LRT-Low/UPRR Alignment" as the preferred alignment for extension of transit from downtown Sacramento southward to Calvine Road/Auberry Drive and thence to Elk Grove. On May 8, 1995 (Board Resolution No. 95-05-2356 included as Appendix F of this S*F*EIS/S*F*EIR), the RT Board certified the Final EIR for the South Sacramento Corridor Light Rail Project.

In response to funding constraints, the RT Board decided to implement the South Corridor project in phases. The first segment, the South Sacramento Corridor Phase 1 project, was built between 2000 and 2003 and began operations in September, 2003. It extends from the 16th Street LRT station in downtown Sacramento along the Union Pacific Railroad (UPRR) corridor to Meadowview Road in south Sacramento.

In 2000, RT completed the Multi-Corridor Study that re-evaluated 19 candidate corridors for future extensions of fixed-guideway transit. That study re-confirmed the South Sacramento Corridor as the top priority and the Downtown/Natomas Airport Corridor as second priority for further LRT extension. Both projects are included in the financially constrained portion of SACOG's *2006* Metropolitan Transportation Plan for *2027* (MTP - *July 2006*).

Consistent with this planning to date, this *SFEIS/SFEIR* focuses on the environmental impacts of the second phase of the LPA adopted by the RT Board of Directors in 1995 and supplements the environmental evaluation contained in the 1994 AA/DEIS/DEIR. Specifically, it describes the current environmental setting, it recognizes current and recent planning activities and plans, and evaluates impacts from a more precisely defined Phase 2 project, including a description and evaluation of changes between that portion of the 1995 LPA that is now defined as LPAP2. This phase extends from Meadowview Road in South Sacramento along the previously designated alignment down the UPRR right-of-way and along Cosumnes River Boulevard to Cosumnes River College in the City of Sacramento. A new LRT station at Morrison Creek has been added to the previously defined LPA.

The proposed second phase – the Locally Preferred Alternative Phase 2 (LPAP2) – would include an extension of LRT 4.3 miles, with four stations at Morrison Creek (50 parking spaces), Franklin (650 parking spaces), Center Parkway (walk-on station), and Cosumnes River College (2,000 parking spaces). Light rail will operate at 15 minute intervals in the weekday off-peak hours, an effective 10 minutes during weekday peak hours, and 30 minutes evenings / weekends. Light rail vehicles have been acquired for the LPAP2 and will be maintained at the expanded RT central LRT maintenance facility at Academy Way.

Given its anticipated transportation system user benefits and its logical terminus at Cosumnes River College – an expanding community college located near a developing retail and housing center and near a major north-south commuter highway route (State Route 99) – the LPAP2 Project has independent utility within these limits. Various alignment options are still in consideration to extend light rail to Elk Grove as a third phase of the project. The LPAP2 Project does not preclude any of the alternative alignments under consideration for the Phase 3 project. The Phase 3 project will be evaluated in a separate alternatives analysis and is not included in this current environmental evaluation.

This *SFEIS/SFEIR* is prepared pursuant to the requirements of the National Environmental Policy Act (NEPA) and the California Environmental Quality Act (CEQA). There are a few differences between these regulations that affect reporting in this document. CEQA requires identification of and mitigation for significant adverse impacts in an EIR, while NEPA provides for an EIS to identify and provide mitigation for all of the adverse effects of a project where it is practicable to do so. This combined NEPA/CEQA document identifies the impacts of the alternatives regardless of whether they would be considered significant under CEQA and proposes mitigation wherever practicable to reduce adverse effects. Specific discussion of impact significance and mitigation in accordance with CEQA is provided in Chapter 6.

Technical studies were prepared in support of this environmental document for the proposed project. These studies analyzed existing conditions and identified impacts under each of the build alternatives in detail. The technical reports listed below are available for review at RT's offices, 1400 29th Street, Sacramento. Complete citations for these reports are provided in Appendix A.

- Historic Properties Survey Report
- Preliminary Wetlands Delineation Report
- Ridership Forecasting Technical Memorandum
- Travel Demand Forecasting Methodology and Results Report
- *Biological Opinion (USFWS #81420-2008-F-0285)*

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SUMMARY

This Supplemental *Final* Environmental Impact Statement/Subsequent *Final* Environmental Impact Report *(SFEIS/SFEIR)* evaluates environmental consequences of transportation alternatives in the South Sacramento Corridor, which includes areas east of the Sacramento River and south of the American River within Sacramento County. The eastern boundary of the corridor is approximately Elk Grove-Florin Road and Watt Avenue, expanding to the Cosumnes River in the vicinity of Elk Grove, and the southern limit is roughly Kammerer Road. The alternatives analyzed consist of the Locally Preferred Alternative Phase 2 (LPAP2), a Transportation Systems Management (TSM) Alternative, and a No-Action Alternative.

S-1 REGIONAL PLANNING CONTEXT

Planning for the South Sacramento Corridor as a part of Regional Transit's (RT) Light Rail Transit (LRT) program began over 25 years ago. Segments of the Corridor were formally identified for future LRT extension as early as 1981, when the RT Board designated Cosumnes River Boulevard (CRB) to Calvine Road for a future LRT extension. In 1984, the Sacramento Area Council of Governments (SACOG) completed the *Sacramento LRT Extension Study Expanded LRT System Analysis*, which prioritized projects to guide future LRT expansion efforts. This study identified the Meadowview, Laguna, Route 148, and Elk Grove extensions, portions of which generally follow the alignments of the recently completed South Sacramento Corridor Phase 1, Phase 2 (the subject of the present *SFEIS/SFEIR),* and a future Phase 3 (which will be the subject of a future alternatives analysis and environmental evaluation).

The SACOG *Sacramento Light Rail Transit Extension Study Final Report*, which identified nine preferred alignments that included the Meadowview, Calvine, and Elk Grove extensions, was brought before the RT Board for adoption in June, 1987. The RT Board's adoption of these alignments was intended to preserve rights-of-way in accordance with City and County of Sacramento planning processes, by depicting the alignments on the land use and circulation element maps of their respective general plans, and by adoption of policies "dedicating" these rights-of-way for LRT. In 1987, the RT Board unanimously passed a resolution "reaffirming Cosumnes River Boulevard as a preferred high capacity transit corridor." This resolution depicted the Meadowview LRT Extension (along the old Southern Pacific Railroad right-of-way) from downtown Sacramento, and thence eastward along Union House Creek within Cosumnes River Boulevard to Calvine Road, key portions of which reflect the LPAP2 alignment under consideration in the present document.

The South Sacramento Corridor was identified as a candidate for a future extension of LRT during RT's 1991 *Sacramento Systems Planning Study*, on the basis of which RT proceeded to prepare Environmental Impact Reports (EIR) to enable preservation of right-of-way for the Downtown-Natomas Airport and Folsom Corridor LRT extensions, prepared a project-level EIR for extending the starter line to Sunrise/Gold River, and advanced the South Sacramento Corridor into conceptual engineering and environmental review. This EIR, prepared under the state California Environmental Quality Act (CEQA), was for the program-level *Systems Planning Study* and did not evaluate detailed environmental impacts for specific projects contained in the study; but it did enable right-of-way preservation through local land use planning processes. It was recognized that additional detailed environmental evaluations for individual projects and phases would need to occur under the Federal National Environmental Policy Act (NEPA) for federal projects and under the state CEQA.

On March 29, 1995, following public review of seven investment alternatives in the 1994 *South Sacramento Corridor Alternatives Analysis/Draft Environmental Impact Statement/ Draft*

Environmental Impact Report (AA/DEIS/DEIR), the RT Board of Directors adopted an LPA for long-term development of LRT improvements in the South Sacramento Corridor. This designation identified the "LRT-Low/UPRR Alignment" as the preferred alignment for extension of LRT from downtown Sacramento southward to Calvine Road/Auberry Drive and thence to Elk Grove. The RT Board certified the EIR for this LPA on May 8, 1995 (see Resolution No. 95-05-2356, shown in Appendix F)

In response to funding constraints, the RT Board stated its intention to implement the South Corridor project in two phases. On August 28, 1995, the RT Board adopted the Interim Operable Segment, or first implementation phase of the project. The project was advanced to preliminary engineering and a project-specific draft and final Supplemental EIS/Subsequent EIR were prepared for this phase. Final design was completed in 2000. The South Sacramento Corridor Phase 1 Project extends from the 16th Street LRT station in downtown Sacramento along the UPRR corridor to Meadowview Road in south Sacramento. The Phase 1 project was open to the public in September 2003.

Also in 2000, in its *Multi-Corridor Study*, RT re-evaluated 19 candidate corridors for future extensions of fixed-guideway transit. This study confirmed the South Sacramento and Downtown/Natomas Airport corridors in order as the top ranking high priority corridors for further LRT extension. LRT extension in the South Sacramento Corridor was also included in the Metropolitan Transportation Plan for *2027*, adopted by the Board of Directors of SACOG in *July 2006*.

Consistent with this planning to date, this *SFEIS/SFEIR* focuses on the environmental impacts of the second phase of the LPA adopted by the RT Board of Directors in 1995 and supplements the environmental evaluation contained in the 1994 AA/DEIS/DEIR. Specifically, it describes the current environmental setting, it recognizes current and recent planning activities and plans, and evaluates impacts from a more precisely defined Phase 2 project, including a description and evaluation of changes between that portion of the 1995 LPA that is now defined as LPAP2. This phase extends from Meadowview Road in South Sacramento along the previously designated alignment down the UPRR right-of-way and along Cosumnes River Boulevard to Cosumnes River College in the City of Sacramento. A new LRT station at Morrison Creek has been added to the previously defined LPA.

Various design options alignments will be considered in the future to extend LRT to the City of Elk Grove as a third phase of the project. The present project does not evaluate these alternative alignments, but engineering refinements for the LPAP2 are being carried out so as not to preclude any of the viable alignments that have been identified for the Phase 3 LRT extension. Phase 3 alignments and options will be fully evaluated in a subsequent alternatives analysis and environmental evaluation.

This SFEIR will be certified by the RT Board of Directors under CEQA, and the Federal Transit of Administration will issue a Record of Decision for the SFEIS. These actions will enable the design, development of funding agreements, and construction of the project.

Table S-1 summarizes the timeline for these prior planning activities and shows anticipated future milestone activities.

Table S-1
South Sacramento Corridor Milestones

1981	RT Board Designates Cosumnes River Blvd. & Calvine Road for Right of Way Preservation	Current Milestones
1984	SACOG Completes *Sacramento LRT Extension Study - Expanded LRT System Analysis*	Current Milestones
1987	SACOG Issues *Sacramento Light Rail Transit Extension Study Final Report*	Current Milestones
1991	RT Completes *Sacramento Systems Planning Study,*	Current Milestones
1994	RT Board Certifies South Sacramento Corridor AA/DEIS/DEIR	Current Milestones
1995	RT Board Adopts Locally Preferred Alternative	Current Milestones
2000	South Line Phase 1 RT Board Certifies EIR FTA Issues Record of Decision	Current Milestones
2003	RT Opens South Line Phase 1 for Revenue Service RT Submits Phase 2 "New Starts" Criteria Report to FTA	Current Milestones
2004	RT Board Terminates Phase 2 at Cosumnes River College & Adds Morrison Creek Station RT Board Rejects Maintenance Facility Options Along Phase 2 RT Completes Fleet Management Plan 2003 - 2013 RT Submits Phase 2 "New Starts" Criteria Report to FTA FTA Approve New Starts Baseline (TSM) Alternative	Current Milestones
2005	RT Receives Authorization to Enter Preliminary Engineering	Current Milestones
2007	RT / FTA Circulate SDEIS/SDEIR	Current Milestones
2008	FTA / RT Distribute SFEIS/SFEIR RT Board Certifies SFEIR FTA Issues Record of Decision FTA Authorizes Final Design	Future Milestones
2009 - 2010	RT Develops Final Design RT / FTA Sign Full Funding Grant Agreement	Future Milestones
2010 - 2012	LPAP2 Construction	Future Milestones

S-2 PURPOSE AND NEED

The Purpose and Need statement summarized below and detailed in Chapter 1 identifies and describes the transportation problem(s) that the proposed action is intended to address and specifies the underlying purposes of and need for the proposed action. The proposed action, summarized in Section *S-4-3,* is the *4.3-mile* LPAP2 LRT extension of the Sacramento LRT system into Southern Sacramento, with four LRT stations and associated facilities (e.g., park-and-ride lots/structure) and amenities.

The South Sacramento Corridor is one of the fastest growing areas of metropolitan Sacramento. Improving public transit services to provide faster, more convenient access between the South Corridor and downtown Sacramento as well as to other corridor activity centers is the primary purpose of the South Sacramento Corridor Phase 2 project.

Meeting this primary project purpose would also address the following related needs:

- Enhance regional connectivity through expanded, interconnected LRT services along the primary travel corridors in Sacramento County, by connecting the project area with Interstate 80 (I-80) east (existing Northeast LRT Line), US 50 (existing Folsom LRT Line with extensions), and State Route 99 (SR 99)/I-5.
- Accommodate future travel demand in the corridor by increasing transit capacity and expanding modal options (by considering LRT and other enhanced transit services along with conventional transit).
- Reduce the growth in increasing traffic congestion on SR 99 and I-5 between downtown Sacramento and the communities of Elk Grove, Laguna Creek, and Laguna West, and on the major north-south arterials in South Sacramento, such as Franklin Boulevard and Bruceville Road.

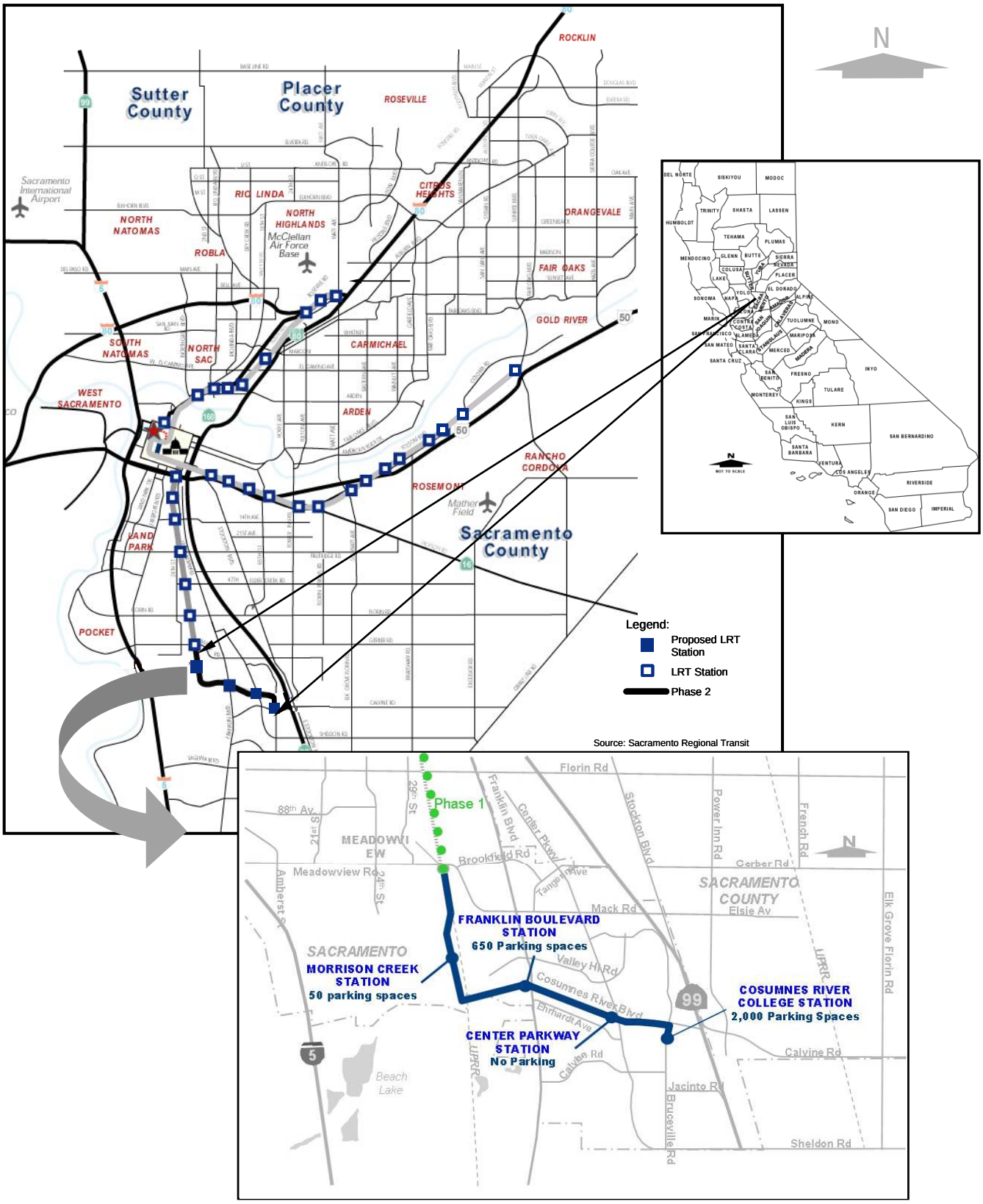
- Improve regional air quality by reducing auto emissions.
- Improve mobility options to employment, education, medical, and retail centers for corridor residents, in particular low-income and ethnic minority populations and provide a mobility option to the use of congested highways.
- Support local economic and land development goals by increasing transit service to current and future corridor activity centers.

Figure 1.1-1 depicts major activity centers in the South Sacramento Phase 2 Corridor. Figure S-1 shows the location of the proposed project. The South Sacramento Corridor is located within one of the fastest-growing urban areas in the State of California and the nation. The Sacramento consolidated metropolitan statistical area experienced a 21 percent increase in population between 1990 and 2000[1], and regional population growth is projected to continue at a high rate for the foreseeable future. Within the South Sacramento Phase 2 area (i.e., the area south of Meadowview and Mack Roads comprising the area most directly served by the alternatives under consideration in this document), the number of households is projected to increase from 82,440 in 2000 to *179,100* in *2030*, *an* increase of *117* percent.[2] Employment in this same area is expected to increase by *185* percent, from 36,820 to *104,800*, over the same period.[3] RT is working closely with the City of Sacramento and other local jurisdictions to implement its Transit for Livable Communities (TLC) program designed to focus new development around transit stations. The TLC program is an important part of RT's planning for the South Sacramento Corridor.

The levels of population and job growth projected for the corridor and region are likely to adversely affect corridor transportation systems. Travel forecasts indicate that person trip demand in the South Sacramento Corridor Phase 2 Area will grow by *167* percent between 2000 and *2030*. Neither the highway network nor the transit system will be able to accommodate this projected future travel demand without major improvements.

The major north-south freeways in South Sacramento – I-5 and SR 99 – are the critical freeway links in the roadway network and the most affected by corridor growth. Traffic volumes are projected to increase substantially throughout the length of both highways as the area grows. The projected growth in traffic will produce a steady deterioration in highway travel conditions in coming years. I-5 is currently below capacity between Meadowview and Laguna, but severe congestion is projected for *2030* operations south of Meadowview Road. SR 99, which is currently over capacity, was widened to accommodate High Occupancy Vehicle (HOV) lanes from Elk Grove Boulevard north to the Sacramento Central City during the 1990s; no additional improvements are planned for this section of SR 99 over the next 20 years.[4] By *2030*, SR 99 will suffer severe congestion during peak periods over the length of the corridor. Major arterials serving South Sacramento will also experience increasing congestion as the area continues to develop, and a combination of transportation network improvements will be necessary to meet future travel demand in South Sacramento. The use of alternative modes, including public transit, will be important in meeting this need.

[1] U.S. Census Bureau.
[2] Sacramento Area Council of Governments (SACOG) statistics used for preparation of the *2006* Metropolitan Transportation Plan and used in the travel demand modeling summarized in Chapter 3.
[3] Ibid.
[4] DKS, 2005



South Sacramento Corridor Phase 2 Project

SOUTH SACRAMENTO CORRIDOR
Figure S-1

RT proposes to improve its transit services substantially in South Sacramento and elsewhere. The South Line LRT Phase 1, which opened to service in September, 2003, was the highest priority transit improvement project in the region. Express bus demand from Elk Grove to downtown Sacramento is currently running over capacity. The overloading of express buses is likely to increase due to the ongoing rapid growth in the area fueling increased automobile commuting to downtown Sacramento jobs.

Current and projected bus ridership emphasizes the need for additional transit service, particularly on exclusive right-of-way. This is because the biggest obstacle to realizing projected transit ridership is likely to be the problems faced by buses operating in mixed flow traffic on congested roadways. Bus travel times will increase (and likely discourage transit use) unless buses can operate apart from the mixed-flow traffic stream. Travel time studies have shown that bus transit trips between major activity centers in the South Sacramento corridor would typically be five to 30 minutes longer than transit trips using exclusive right-of-way, such as the proposed LPAP2 LRT Extension.

Increasing congestion and slowing travel times for both auto and transit threaten to worsen regional air quality. Metropolitan Sacramento currently is an Environmental Protection Agency designated non-attainment area for ozone. Automobiles are responsible for 70 percent of this air pollution. The Sacramento Metropolitan Air Quality Management District's adopted *Air Quality Attainment Plan* and Sacramento County's *General Plan* both include the development of light rail and increased use of alternative-fuel vehicles as major clean air policy objectives. The South Corridor Phase 2 Project would directly address these objectives.

S-3 REFINEMENTS TO THE PROJECT AND EIS/EIR

Refinements have been made to the Project and EIS/EIR since the Draft EIS/EIR was published. These refinement include

- ***Movement of the light rail alignment off of the Morrison Creek Levee.*** *In its comment letter on the SDEIS/SDEIR, the City of Sacramento Utilities Department, which maintains the Morrison Creek levee, stated that the light rail alignment should not be located on the levee. After meetings with the Utilities Department, the light rail alignment was moved to the west of the prior alignment shown in the SDEIS/SDEIR. The new alignment is on a new embankment that actually increases the size of the levee – called a "super levee." This new alignment moves the light rail off the existing levee but does require the acquisition of two homes and a portion of the back yard of a third home.*

- ***Addition of a Grade Separation (light rail flyover) over Cosumnes River Boulevard.*** *In its comment letter on the SDEIS/SDEIR, the California Public Utilities Commission requested that a grade separation be provided for the light rail line over Cosumnes River Boulevard. The requested grade separation is included as part of the project in this SFEIS/SFEIR.*

- ***Updating of traffic data****. In its comment letter on the SDEIS/SDEIR, the City of Sacramento stated that the data used to evaluate traffic should be more recent than what is contained in the SDEIS/SDEIR. In response, Year 2007 traffic counts were taken, and the traffic analysis in Chapter 3, Volume I, has been revised using this more current traffic information.*

- ***Supplemental Air Emissions Assessment.*** *In its comment letter on the SDEIS/SDEIR, the Sacramento Metropolitan Air Quality Management District requested that its new construction emissions model be applied to the project. In addition, the City of Sacramento requested in its comment letter on the SDEIS/SDEIR that the traffic information/counts be updated. Section 4.3,*

Air Quality and 5.2.3 – Air Quality (Construction) – have been updated to reflect the results of the new emissions model and the air emissions associated with the new traffic levels.

- ***Supplemental Noise/Vibration Assessment.*** *In its letter regarding the SDEIS/SDEIR, the U.S. EPA noted that the Federal Transit Administration (FTA) has more recent noise/vibration criteria than those used for the SDEIS/SDIR. The noise/vibration analysis has been updated to reflect these criteria. Based on this new analysis, the extent and height of noise wall barriers required to mitigate the impacts has been reduced. The new locations and heights of the noise walls identified in this SFEIS/SFEIR still fully mitigate the noise impacts to below the FTA criteria and below RT's more stringent criteria.*
- ***Refinements/updates to Construction Schedule.*** *The Construction schedule has been revised to reflect the current status of the proposed project – See Chapter 5, Volume I.*
- ***Revised Project Capital Costs.*** *The capital costs for the TSM and LPAP2 alternatives have been revised to reflect more recent unit costs, the current status of the project design, and the revised construction schedule. The refined costs have been assigned to the anticipated year of expenditure under the revised construction schedule, and inflation rates have been applied, providing a year-of-expenditure cost estimate for the TSM and the LPAP2.*
- ***Revisions to the SEIS/SEIR in Response to Public Comments on the SDEIS/SDEIR.*** *Other revisions/refinements have been made in this Final EIS/EIR in response to public comments received on the SDEIS/SDEIR. Volume II of this SFEIS/SFEIR contains the comments given on the SDEIS/SDEIR and responses to these comments. As indicated in Volume II, responses at times led to revision to sections of the SFEIS/SFEIR. All refinements and revisions to the SDEIS/SDEIR are identified in this SFEIS/SFEIR in italics*

S-4 ALTERNATIVES EVALUATED IN THE *SFEIS/SFEIR*

Three alternatives are evaluated in this *SFEIS/SFEIR,* as described below.

S-4.1 No-Action Alternative

The No-Action Alternative consists of highway and transit systems existing in the South Sacramento Corridor as of year 2000, plus planned and programmed improvements to the year *2030* as contained in the adopted *2006* Metropolitan Transportation Plan (MTP). It represents future conditions against which the transportation, environmental, and community impacts of the other alternatives are compared.

Major South Corridor roadway improvements in the *2027* MTP include HOV lanes and additional park-and-ride lots along I-5, from Elk Grove Boulevard to Downtown Sacramento. These improvements will provide travel alternatives, improved auto travel times, and additional transit amenities, especially for residents of Laguna and Elk Grove, and those living nearer I-5. Other major roadway system improvements identified in the *2027* MTP are the City of Sacramento's proposed widening of CRB between Bruceville Road and Franklin Boulevard, the extension of CRB from its western terminus at Franklin Boulevard to I-5 (expected to be completed by 2008), and the widening of Bruceville Road ultimately to three lanes in each direction between Sheldon Road and CRB (to be completed by 2010).

The *2027* MTP transit improvements within the South Sacramento Corridor that were incorporated into the No-Action Alternative are as follows:

- Continued expansion of Capitol Corridor intercity train service to 16 daily trains to the Bay Area.
- Commuter rail service between Dixon and Auburn using the Union Pacific (UP)/Amtrak facilities.
- Light rail extended north from Downtown Sacramento to Natomas Town Center and the Sacramento Airport.
- Light rail extended east from Northeast Line to Antelope in Sacramento County.
- Light rail extended to city of Folsom (opened October 2005) and to Amtrak station in Downtown Sacramento.
- Implementation of express LRT service to Downtown Sacramento from Folsom and Watt/I-80.
- Light rail extended west from Downtown Sacramento to West Sacramento.
- Bus service increased substantially above current levels, with concomitant bus fleet expansion from the current 230 buses to 400 buses by *2030*.
- Bus rapid transit implemented in three commute corridors, including Stockton Boulevard, Watt Avenue, and Sunrise Boulevard.
- Expansion of bus and van service regionwide, including an increase in service for elderly and disabled persons.
- Additional community circulator vans or shuttles that serve neighborhoods, commercial areas, and jobs centers throughout the day at reduced fares.

Although contained in the *2027* MTP, the LPAP2 is not included in the No-Action Alternative, given that it is the proposed action being evaluated in this *SFEIS/SFEIR.* Figure 2.2-1 and Table 2.2-1 summarize transit service in the South Sacramento Corridor for the No-Action Alternative.

S-4.2 Transportation Systems Management (TSM) Alternative

The Transportation Systems Management (TSM) Alternative consists of transit improvements that are lower in capital cost than the proposed LPAP2. Consistent with FTA guidance, these improvements generally represent the “best that can be done” to improve transit in the corridor without building the rail project. This alternative would replace the LPAP2 LRT extension and associated bus service with lower-cost line-haul and feeder bus routes, by including the following additions compared to the No-Action Alternative:

- Direct express bus service via SR-99 HOV lanes, connecting from a new CRC transit center (with 1,400 new parking spaces) to Downtown Sacramento to enhance drive-access transit opportunities in the LPAP2 Corridor.
- Direct express bus service via Interstate 5 HOV lanes, connecting from the Laguna West community to Downtown Sacramento. The existing park-and-ride lot in Laguna West was sized to accommodate parking demand for this service.
- A high-frequency, trunkline bus route connecting the Elk Grove/Lent Ranch area to CRC and the Meadowview LRT Station via Bruceville Road, Cosumnes River Boulevard and Franklin Boulevard.
- The planned transit center at CRC would be improved to enhance bus-to-bus and park-and-ride lot access at this transit center. Other improvements to bus-to-LRT transfers at the Meadowview LRT station were added.

- Transit priority treatment along Stockton Boulevard in the corridor, affecting Route 50E. RT is also implement transit priority along Watt Avenue and Sunrise Avenue in addition to downtown Sacramento as part of a system-wide approach to transit priority, so transit priority would be part of the No-Action Alternative as well.

Figure 2.3-1 shows the South Sacramento Corridor transit network proposed under the TSM Alternative. Table 2.3-1 lists the starting headways for the new bus services identified to "replace" the LPAP2 LRT extension under this alternative.

Rail operations under the TSM Alternative would consist of the existing Sacramento LRT system with other LRT and rail improvements as identified in the *2027* Metropolitan Transportation Plan but without the South Corridor Phase 2 extension. Note that the TSM Alternative includes all the other LRT extensions in the *2027* MTP – that is, the Downtown Natomas Airport Extension and the proposed LRT extensions to West Sacramento and Antelope, as included in the No-Action Alternative.

S-4.3 Locally Preferred Alternative Phase 2 (LPAP2)

The proposed action is the Locally Preferred Alternative Phase 2 (LPAP2), an extension of the current LRT system that would implement the second phase of the South Sacramento Corridor LRT extension. Light rail vehicles would operate generally at 10-minute average headways during peak hours of service and have a maximum speed of 55 mph. The LPAP2 consists of approximately 4.3 miles of dual LRT tracks from the existing Meadowview Road station to Cosumnes River College. Figure S-2 shows the general alignment.

The detailed alignment is illustrated in Figures 2.4-3 through 2.4-18. From the Meadowview Station, the track alignment would continue south on the west side of the Union Pacific Railroad (UPRR) right-of-way to Morrison Creek, where it would jog west then south remaining on the west side of the creek. North of the Cosumnes River Boulevard Extension, the alignment would, turn east crossing Morrison Creek, the UPRR, and Union House Creek on aerial structure. From there the alignment would continue east on the north side of the Cosumnes River Boulevard Extension (a roadway project to be completed by others) crossing Franklin Boulevard and Center Parkway along the north edge of Cosumnes River Boulevard. After crossing Center Parkway the alignment *would remain along the north edge and then cross over CRB on a flyover bridge and* would turn south on the west side of Bruceville Road to terminate at Cosumnes River College. Design Options for LPAP2 crossings at Meadowview Road *and* Franklin Boulevard are described in Section 2.4.3, Detailed Description of LPAP2 Alignment.

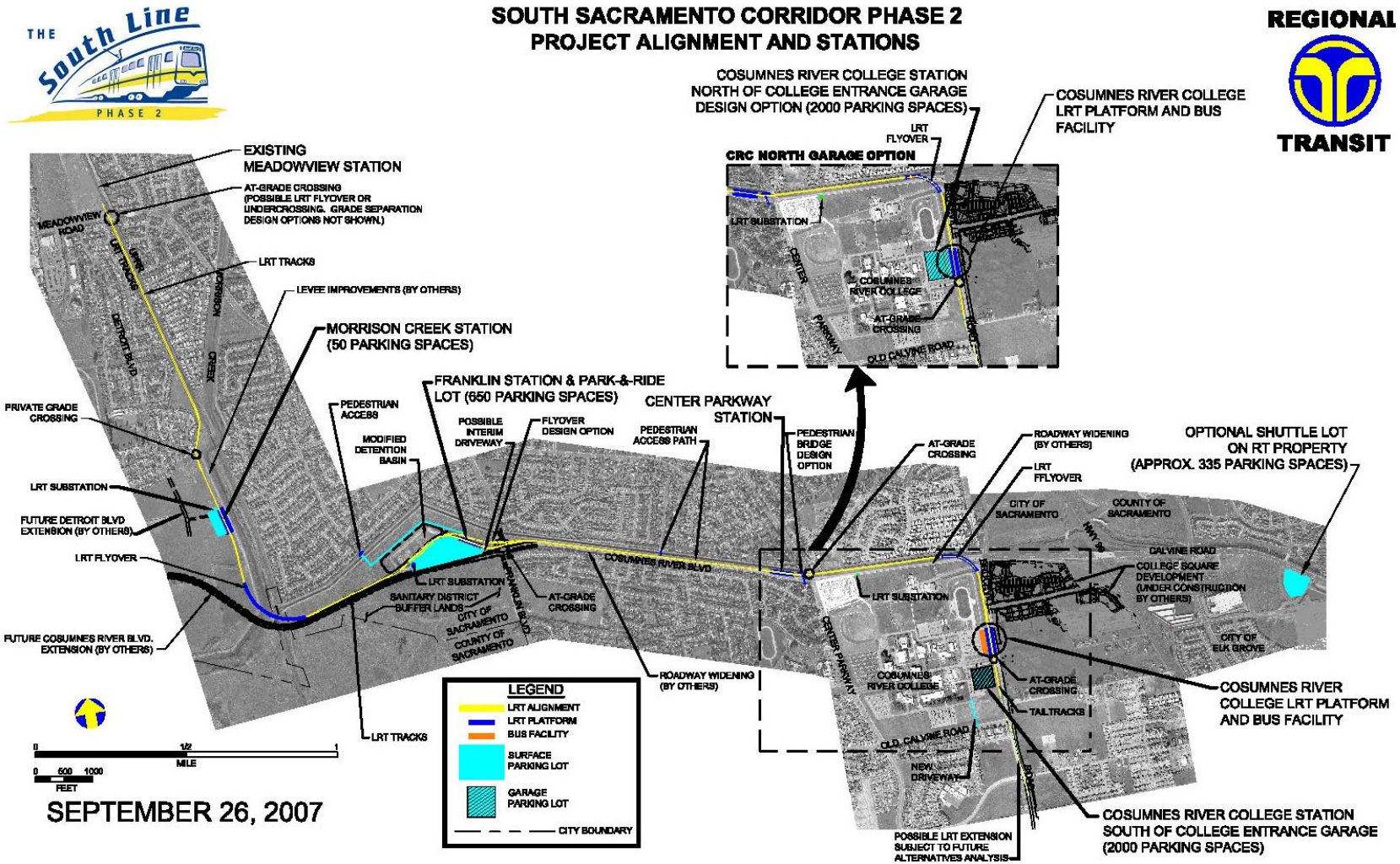
The LPAP2 includes four stations:

1. Morrison Creek Station (with PNR lot for 50 spaces);
2. Franklin Boulevard Station (with PNR lot with 650 spaces);
3. Center Parkway Station, north of Cosumnes River Boulevard west of the Center Parkway intersection; and
4. Cosumnes River College, immediately north of the College's east entrance (with PNR structure with 2,000 spaces).

RT planners *have and* will *continue to* work with local planners and jurisdiction to encourage transit oriented development around the Morrison Creek and Cosumnes River College stations.

Figure S-2: Locally Preferred Alternative Phase 2

Proposed Light Rail Transit (LRT) Alignment and Station Locations



Feeder bus service would be oriented to serve stations on the extension. The LPAP2 also includes four Traction Power Substations:

- On the north boundary of the Morrison Creek Station.
- In the southwest corner of the Franklin Station park-and-ride lot.
- On the southeast corner of CRB and Center Parkway or a site 600 feet east.
- In the vicinity of the tail tracks at CRC.

Grade-separated pedestrian/bike crossings are proposed at the Franklin and Center Parkway stations. A grade separation for the light rail line is under consideration for Meadowview Road, Franklin Boulevard, *but is included over* Cosumnes River Boulevard. Vehicle maintenance for the LPAP2 LRT vehicles would occur at RT's central maintenance facility. RT has acquired additional LRT vehicles to operate on the LPAP2.

S-5 SUMMARY OF ENVIRONMENTAL IMPACTS, DESIGN REQUIREMENTS/ RT PRACTICES, AND PROPOSED MITIGATION MEASURES

Table S-1 presents the long term environmental impacts and proposed mitigation measures for the TSM and LPAP2 Alternatives. Table S-2 presents the short-term (i.e. construction) impacts and mitigation measures. For a full description of impacts and mitigation, see Chapters 3, 4 and 5. All proposed mitigation measures are included in project cost estimates.

Many impacts of the TSM and LPAP2 alternatives would be addressed through design requirements and RT practices that are required by regulations, current standards and guidelines or are already part of RT's existing project development and construction procedures. These design requirements and RT practices are identified for each impact category and summarized in Tables S-2 and S-3 because compliance with these practices would minimize or avoid project impacts, precluding the need for formal mitigation measures. In all cases RT's construction documents would require the use of appropriate RT Practices and proposed mitigation measures listed in this environmental document.

Table S-2: Summary of Long-Term Impacts, Design Requirements/RT Practices, and Proposed Mitigation Measures

Impact Category/ Section in *SFEIS/SFEIR*	**No-Action Alternative**	**Transportation Systems Management (TSM) Alternative**	**Locally Preferred Alternative Phase 2 (LPAP2)**
Transportation and Traffic Chapter 3	Not implementing the TSM or LPAP2 would not yield the increased transit use and decreased roadway congestion.	Increased Transit Use: The TSM Alternative is projected to increase year 2030 weekday ridership by 3,400 trips (linked trips) over the No-Action Alternative. Decreased Roadway Congestion: TSM Alternative will reduce Average Daily Traffic by 100 to 1,400 more vehicles on SR 99, north of Sheldon Road, than the No-Action Alternative (in *2030*). Travel Time Savings: The drive-access-transit time improvement of the TSM Alternative compared with the No-Action Alternative ranges from 2 to 18 minutes (in 2030). Impact on Intersections: Under the TSM Alternative, during the p.m. peak hour, operations would deteriorate from LOS C to D at *Bruceville Road and Cosumnes River College* in the City of Sacramento. Parking: This alternative is projected to reduce downtown parking demand by about 900 spaces (in 2025). Mitigation Measures: *TT-1* Add *a second* eastbound *left turn lane* and *add a shared through–right turn lane so the eastbound approach has two left turn* lanes*, one through-right turn lane and one dedicated right turn lane. This will improve the LOS* at the intersection *from D to C in* the *PM peak hour.*	Increased Transit Use: The LPAP2 is projected to increase year 2030 weekday ridership by 5,900 trips (linked trips) over the No-Action Alternative and by 2,500 trips over the TSM Alternative. These are new trips attracted to transit by the LPAP2; additional riders will transfer from buses to LRT but are not included in this total. Decreased Roadway Congestion: the LPAP2 would reduce Average Daily Traffic by 100 to 2,500 more vehicles on SR 99, north of Sheldon Road, than the No-Action Alternative (in *2030*). Travel Time Savings: the LPAP2 would improve drive-access-transit time from 17 to 29 minutes (in 2030) compared with the No-Action Alternative. Impact on Intersections: Under the LPAP2, operations at five intersections in the City of Sacramento *and one intersection in the County of Sacramento* are projected to *exceed thresholds.* Parking: The LPAP2 is projected to reduce downtown parking demand by about 1,300 spaces (in *2030*). Mitigation Measures: *T-1* *Center Parkway & CRB: add a second southbound left* turn lane *& provide overlap for all right turn phases. Mitigation requires widening bridge over Union House Creek which is included in* the *projects costs.*

Table S-2: Summary of Long-Term Impacts, Design Requirements/RT Practices, and Proposed Mitigation Measures

Impact Category/ Section in *SFEIS/SFEIR*	No-Action Alternative	Transportation Systems Management (TSM) Alternative	Locally Preferred Alternative Phase 2 (LPAP2)
			T-2 Franklin Boulevard & CRB: provide overlap for all right turn phases. *T-3 Bruceville Road & CRC: Add a second eastbound left turn lane & add a shared through–right turn lane.* *T-4 Bruceville Road & Old Calvine Road: provide overlap signal phasing on the right turn.* *T-5 CRC new South Access & Old Calvine Road: Signalize the intersection.* *T-6 Auberry Drive & Calvine Road: provide protected phasing for the northbound and southbound approaches.* *T-7 RT will implement crossing signal control measures at LRT grade crossings adjacent to stations. These would minimize the amount of time gates are down while LRT trains are stopped for loading and unloading passengers at stations before they cross the roadway. A timed delay mechanism will be installed that activates the crossing gates just prior to the train departing the station platform.* *T-8 RT will implement "near side" crossing signal control measures at the intersections of Center Parkway and CRB, Franklin Boulevard and CRB, and Bruceville Road and Cosumnes River College to provide additional safety.* *T-9 Express trains not stopping at a near side station would have equipment to bypass the timed delay.*

Table S-2: Summary of Long-Term Impacts, Design Requirements/RT Practices, and Proposed Mitigation Measures

Impact Category/ Section in *SFEIS/SFEIR*	No-Action Alternative	Transportation Systems Management (TSM) Alternative	Locally Preferred Alternative Phase 2 (LPAP2)
			Impacts at these intersections would *be reduced to below the thresholds with the*se *mitigation measures.* *2012 Intersection Mitigation Measures:* *T-10* *Center Parkway & CRB: add a second southbound left turn lane and provide overlap for all right turn phases and restripe the eastbound approach to one left, one through and one through right.* *T-11* *Bruceville Road & CRB: provide overlap for all right turn phases.* *T-12* *Bruceville Road & Sheldon Road: provide overlap for all right turn phases.*
Aesthetics Section 4.1	No impact.	Visual changes associated with construction of one PNR lot would be consistent with the changing urban scene. Mitigation Measures: *V&A-2* RT will incorporate landscaping into the final design to soften views of PNR lots. *V&A-3* RT will control potential light and glare by directing lighting associated with proposed PNR lots, onto the premises of each facility and away from surrounding land uses.	New LRT facilities would introduce visual changes that would be perceived by motorists, residents and business occupants within the project corridor and would add more or less to the visual elements of the urban scene, depending on the design options at each location. Mitigation Measures: *V&A-1* RT will invite public participation regarding station and noise wall design during the final design phase of the project. *V&A-2* RT will incorporate landscaping into the final design to soften views of LPAP2 LRT stations, PNR lots, substations and the optional shuttle lot. *V&A-3* RT will control light and glare by directing lighting associated with LRT facilities onto the premises of each facility and away from surrounding land uses.

Table S-2: Summary of Long-Term Impacts, Design Requirements/RT Practices, and Proposed Mitigation Measures

Impact Category/ Section in *SFEIS/SFEIR*	**No-Action Alternative**	**Transportation Systems Management (TSM) Alternative**	**Locally Preferred Alternative Phase 2 (LPAP2)**
Agriculture Section 4.2	No impact.	*No impact to farmland* Mitigation Measures: None required.	The LPAP2 would require approximately *5.6* acres of farmland *(in addition to 19.1 acres of SRCSD Bufferlands used for cattle grazing)* for construction of the LPAP2. These areas of farmland are not under Williamson Act contract and are located adjacent to urbanized areas. Most of the farmland area that would be taken for the project is zoned for uses other than agriculture. Form NRCS-CPA-106 has been submitted to the NRCS. Following their review, a total site farmland assessment criteria score will be determined for the project. Based on federal regulation 7 CFR 658.4, sites receiving a total score of less than 160 points shall be given a minimal level of consideration for protection and no additional sites need be evaluated. Mitigation Measures: None required.
Air Quality Section 4.3	Not implementing the TSM or LPAP2 would not yield the reduction in air emissions shown for the TSM and LPAP2 Alternatives.	Regional criteria pollutant emissions (CO, ROG, NOx, SOx, and PM_{10}) are projected to decrease in comparison to the No-Action Alternative. Small-localized increases in CO would result, but are not anticipated to exceed the State or federal one- and eight-hour standards. The CO emissions at the PNR lot and PM10 emissions (from idling of buses) would not exceed State or federal standards. Mitigation Measures: None required.	Regional criteria pollutant emissions (CO, NOx, SOx, and PM10) are projected to decrease when compared to the No-Action Alternative, by amounts comparable to (or better than) the TSM Alternative. Small localized increases in CO would result, but are not anticipated to exceed the State or federal one- and eight-hour standards. The CO emissions at PNR lots and PM10 emissions (from idling of buses at stations) would not exceed State or federal standards. Mitigation Measures: None required.

Table S-2: Summary of Long-Term Impacts, Design Requirements/RT Practices, and Proposed Mitigation Measures

Impact Category/ Section in *SFEIS/SFEIR*	**No-Action Alternative**	**Transportation Systems Management (TSM) Alternative**	**Locally Preferred Alternative Phase 2 (LPAP2)**
Biological Resources Section 4.4	No impact.	No impact to wetlands or other waters of the U.S. Up to 2.0 acres of habitat suitable for western burrowing owl would be affected. The western burrowing owl is a federal and California species of concern. Mitigation measures: *B-5; B-6* Permanent impacts to western burrowing owl burrows and foraging habitat will be mitigated through the purchase of credits at a CDFG-approved mitigation bank.	Loss of 0.3*11* acres of jurisdictional wetlands for the LPAP2. Up to 0.14 acres of seasonal wetlands that provide suitable habitat for vernal pool fairy shrimp, midvalley fairy shrimp, vernal pool tadpole shrimp, and California linderiella; 0.04 acres of suitable habitat for western pond turtle and giant garter snake; and between 0.70 and 63.34 acres of nesting and foraging habitat for 13 special-status bird species would be affected. *Possible loss of Valley oaks (Quercus lobata), interior live oak (Quercus wislizenii), and blue oak (Quercus douglasii) from SRCSD Bufferlands. Trees planted in 1995 as part of the Trail of Trees effort.* Mitigation measures: *B-1* *Compensate for impacts to vernal pool crustacean habitat through purchase of the equivalent of 2.26 acres of preservation credits, and 0.14 acre of creation/restoration credits from a USFWS-approved conservation bank, or combination of banks.* *B-2* *Transplant directly affected elderberry shrubs and purchase the appropriate number of beetle habitat credits at a USFWS-approved conservation bank prior to ground breaking.* *B-3* *Purchase equivalent of 9.823 acres of giant garter snake habitat credits from a USFWS-approved conservation bank.* *B-4* Consult with SRCSD Bufferlands manager to explore opportunities to compensate for impacts to nesting and foraging habitat for special-status bird species.

Table S-2: Summary of Long-Term Impacts, Design Requirements/RT Practices, and Proposed Mitigation Measures

Impact Category/ Section in *SFEIS/SFEIR*	No-Action Alternative	Transportation Systems Management (TSM) Alternative	Locally Preferred Alternative Phase 2 (LPAP2)
			B-5;B-6 Permanent impacts to western burrowing owl burrows and foraging habitat and Swainson's hawk foraging habitat will be mitigated through the purchase of credits at a CDFG-approved mitigation bank. *B-7* *Provide a qualified arborist to survey potentially affected trees. To extent possible, avoid removal of native oaks, mature native riparian trees, and any other protected trees. Develop and implement a mitigation plan, in accordance with the applicable City ordinances, to compensate for removal of protected trees. Compensate for loss of protected trees pursuant to the City of Sacramento Heritage Tree Ordinance.* *B-8* *Will obtain all necessary permits pertaining to affected waters of the U.S. The permitting process would also require compensation for project-related impacts.* *B-9* Purchase mitigation credits in an agency-approved wetland mitigation bank or an in lieu fee.
Cultural Resources Section 4.5	No impact.	No archaeological resources appear eligible for listing in the NRHP or the CRHR. Because much of the APE has been covered over with pavement or other obstructions, however, the survey could not conclude with certainty that there are no unrecorded cultural remains within the APE. Areas in which such remains may exist have been identified. No historic architectural resources appear eligible for listing in the NRHP or CRHR, or are included in any local list of historic resources.	No archaeological resources appear eligible for listing in the NRHP or the CRHR. Because much of the APE has been covered over with pavement or other obstructions, however, the survey could not conclude with certainty that there are no unrecorded cultural remains within the APE. Areas in which such remains may exist have been identified. No historic architectural resources appear eligible for listing in the NRHP or CRHR, or are included in any local list of historic resources.

Table S-2: Summary of Long-Term Impacts, Design Requirements/RT Practices, and Proposed Mitigation Measures

Impact Category/ Section in SFEIS/SFEIR	No-Action Alternative	Transportation Systems Management (TSM) Alternative	Locally Preferred Alternative Phase 2 (LPAP2)
		Mitigation Measures: *H&C-1* During construction in identified areas, monitoring will be conducted by a qualified professional archaeologist and/or a member of the local Native American community. The monitor(s) will have the ability to temporarily stop any work in an area where archaeological materials or human remains are uncovered long enough to assess the finds and, in the case of human remains, to follow the stipulations set out in the State Health and Safety Code (Section 7050.5). Such provisions will be in the construction contracts. *H&C-2* If unanticipated archaeological resources are encountered during construction, they would be addressed in consultation with the Office of Historic Preservation (OHP) or in accordance with an archaeological treatment plan to be developed in consultation with OHP. Such provisions will be in the construction contracts.	Mitigation Measures: *H&C-1* During construction in identified areas, monitoring will be conducted by a qualified professional archaeologist and/or a member of the local Native American community. The monitor(s) will have the ability to temporarily stop any work in an area where archaeological materials or human remains are uncovered long enough to assess the finds and, in the case of human remains, to follow the stipulations set out in the State Health and Safety Code (Section 7050.5). Such provisions will be in the construction contracts. *H&C-2* If unanticipated archaeological resources are encountered during construction, they would be addressed in consultation with the Office of Historic Preservation (OHP) or in accordance with an archaeological treatment plan to be developed in consultation with OHP. Such provisions will be in the construction contracts.
Electromagnetic Fields (EMF) and Electromagnetic Interference (EMI) Section 4.6	No impact.	No impact.	Present evidence suggests that any increased health risks from EMF exposures attributable to light rail improvements would be very small. The LPAP2 would generate EMF, which could interfere with the effective performance of electronics and electrical equipment. Mitigation Measures: *EMF-1* The potential for EMI effects can be minimized by ensuring that all electronic equipment is operated with a good electrical ground and that proper

Table S-2: Summary of Long-Term Impacts, Design Requirements/RT Practices, and Proposed Mitigation Measures

Impact Category/ Section in *SFEIS/SFEIR*	**No-Action Alternative**	**Transportation Systems Management (TSM) Alternative**	**Locally Preferred Alternative Phase 2 (LPAP2)**
			shielding is provided for electronic system cords, cables, and peripherals. *EMF-2* Specialized components, such as filters, capacitors and inductors that can also reduce EMI susceptibility of certain systems will be installed, as appropriate.
Geology, Soils and Seismicity Section 4.7	No impact.	The risk of fault rupture in the project area appears very low. The proposed facilities would, however, be exposed to a risk of substantial ground shaking, which can impose loads on structures and earth embankments. Some soils may be susceptible to seismically induced liquefaction and settlement, which could affect design and service of the alternatives. Mitigation Measures: All geologic hazard impacts will be fully addressed by design requirements. Therefore, no mitigation is required.	The risk of fault rupture in the project area appears very low. The proposed facilities would, however, be exposed to a risk of substantial ground shaking, which can impose loads on structures and earth embankments. Some soils may be susceptible to seismically induced liquefaction and settlement, which could affect design and service of the alternatives. Mitigation Measures: All geologic hazard impacts will be fully addressed by design requirements. Therefore, no mitigation is required.
Hazardous Wastes Section 4.8	No impact.	Construction activities may be affected by releases of hazardous materials from known or previously unidentified sites. Clearing/grubbing/excavation may expose or encounter hazardous materials.	• *Construction activities may be affected by releases of hazardous materials from known or previously unidentified sites. Clearing/grubbing/excavation may expose or encounter hazardous materials.* • Contaminated groundwater may be encountered. • Dewatering during trenching or excavating may change or amplify local hydraulic gradients and draw groundwater contamination into the trench or excavation. • New tracks and passenger LRT service would be introduced into a segment of the existing UPRR corridor with existing freight rail service. Safety issues associated with any hazardous materials transport on freight trains would not increase or decrease and would remain the responsibility of the UPRR.

Table S-2: Summary of Long-Term Impacts, Design Requirements/RT Practices, and Proposed Mitigation Measures

Impact Category/ Section in *SFEIS/SFEIR*	**No-Action Alternative**	**Transportation Systems Management (TSM) Alternative**	**Locally Preferred Alternative Phase 2 (LPAP2)**
		Mitigation Measures: *HW-3* Contractors will incorporate procedures into a construction management plan describing how they will monitor for subsurface contamination. *HW-4* Prepare and implement a contingency plan for handling and disposing of contaminated soil and groundwater. *HW-6* Perform Phase 2 site investigations where indicated. *HW-8* Remediation and/or disposal of all materials deemed to be hazardous.	Mitigation Measures: *HW-1* *Exposed soil in the median or on the shoulder of highways and primary traffic corridors that are more than 20 years old will be tested for lead prior to beginning construction.* *HW-2* The *three buildings* subject to demolition will be inspected (and tested as necessary) for asbestos containing materials and lead based paints. *HW-3* Contractors will incorporate procedures into a construction management plan describing how they will monitor for subsurface contamination. *HW-4* Prepare and implement a contingency plan for handling/disposing of contaminated soil and groundwater. *HW-5* *Additional site-specific information will be collected regarding hazardous materials use and hazardous waste generation for those properties that would be acquired for right-of-way or support facilities.* *HW-6* Perform Phase 2 site investigations where indicated. *HW-7* All contaminated materials encountered will be evaluated in the content of applicable local state, and federal regulations and/or guidelines governing hazardous wastes. Remediation and/or disposal of all materials deemed to be hazardous. *HW-8* *All materials deemed to be hazardous will be remediated and/or disposed of following applicable regulatory agency regulations and/or guidelines.*
Hydrology,	No impact.	No long-term groundwater impacts are anticipated. Runoff	From Morrison Creek to Union House Creek, and from

Table S-2: Summary of Long-Term Impacts, Design Requirements/RT Practices, and Proposed Mitigation Measures

Impact Category/ Section in *SFEIS/SFEIR*	No-Action Alternative	Transportation Systems Management (TSM) Alternative	Locally Preferred Alternative Phase 2 (LPAP2)
Floodplain and Water Quality Section 4.9		from PNR lot would be directed to the stormwater system, and eventually to receiving waters. Mitigation Measures: *WQ-4* Parking lot pavement, catch basins, and storm drains will be cleaned regularly. *Solid waste will be collected from facilities on a regular basis.*	Franklin Boulevard to Center Parkway, a flood control project (by others), currently under construction, will eliminate 100-year flood hazards. From Union House Creek to Franklin Blvd., the LPAP2 line would be constructed on a fill embankment above the 100-year flood elevation. Culverts through the embankment would convey runoff/flood flows. The Franklin PNR lot would be constructed above the 100-year flood elevation. The south berm of a large detention basin at Franklin Station would be modified. Flood storage reduction would be avoided. Runoff from the LPAP2 would be negligible. Mitigation Measures: *WQ-1* *Develop final floodplain mitigation plan in consultation with ACOE, the Central Valley Flood Protection Board, and SAFCA.* *WQ-2* *In the unlikely event the SSCS project is delayed and floodplain protection is not in place, mitigation measures will be incorporated into the LPAP2 design to minimize impacts due to potential flooding.* *WQ-3* For fill in 100-year floodplain either (1) excavate compensating floodplain storage equal to the amount removed, or (2) pay a mitigation fee to SAFCA.

Table S-2: Summary of Long-Term Impacts, Design Requirements/RT Practices, and Proposed Mitigation Measures

Impact Category/ Section in *SFEIS/SFEIR*	**No-Action Alternative**	**Transportation Systems Management (TSM) Alternative**	**Locally Preferred Alternative Phase 2 (LPAP2)**
			WQ-4 Parking lot pavements, catch basins, and storm drains will be cleaned regularly. Solid waste will be collected from facilities on a regular basis.
Land Use and Planning Section 4.10	The No-Action Alternative would support a long-term dispersed pattern of development in the South Sacramento Corridor.	The TSM Alternative would require the acquisition of approximately 16.7 acres of land to construct one bus park-and-ride (PNR) lot within the study area. Approximately 4.0 acres of non-residential would be acquired. Design Requirements/RT Practices: RT will coordinate with the City and County of Sacramento and the City of Elk Grove to ensure that project facilities would be consistent with land use planning processes and zoning ordinance controls. Mitigation Measures: None required.	An estimated 53.6 to 71.2 acres would be required for construction of the LPAP2 alignment, stations, PNR lots, replacement college parking, and optional shuttle lot. Approximately 14.6 acres of Cosumnes River College land *and* 19.1 acres of SRCSD bufferlands would be converted to public right-of-way. An additional 8.9 acres would come from the UPRR. Design Requirements/RT Practices: RT will coordinate with the City and County of Sacramento to ensure that project facilities would be consistent with land use planning processes and zoning ordinance controls. RT will work closely with local jurisdictions to encourage transit oriented development around appropriate stations consistent with RT's ongoing TLC program. RT will work with SRCSD to ensure that project facilities are compatible with SRCSD's *Land Use Management Plan*. Mitigation Measures: None required.
Mineral and Energy Resources Section 4.11	Direct energy consumption would be highest for the No-Action Alternative.	Although transit vehicle miles of travel (VMT) increase, these increases are more than offset by a corresponding decrease in auto/truck VMT as travelers shift to transit and drive less. Net energy consumption for vehicle operations (i.e., direct energy consumption) is lower than the No-Action Alternative and higher than the LPAP2.	Although transit vehicle miles of travel (VMT) increase with the LPAP2, these increases are more than offset by a corresponding decrease in auto/truck VMT as travelers shift to transit and drive less. Energy consumption for vehicle operations (both total and direct energy consumption) is lowest for the LPAP2.

Table S-2: Summary of Long-Term Impacts, Design Requirements/RT Practices, and Proposed Mitigation Measures

Impact Category/ Section in SFEIS/SFEIR	No-Action Alternative	Transportation Systems Management (TSM) Alternative	Locally Preferred Alternative Phase 2 (LPAP2)
		Similarly, when total system energy is considered, the TSM Alternative consumes less energy than the No-Action Alternative and slightly more energy than the LPAP2. Design Requirements/RT Practices: Facilities and equipment will be designed and specified to ensure energy efficiency. Mitigation Measures: None required.	Overall it can be concluded that the LPAP2 would have a negligible impact on transportation system energy consumption for vehicle operations. Auto/truck travel would remain the dominant transportation mode in the region and the changes in total VMT and energy consumption would be relatively small from a system perspective. Design Requirements/RT Practices: Facilities and equipment will be designed and specified to ensure energy efficiency. Mitigation Measures: None required.
Noise and Vibration Section 4.12	No impact.	No impacts. The TSM Alternative consists of additional bus service and construction of one park and ride lot. These improvements are not expected to generate any noise and vibration impacts approaching or exceeding the FTA's thresholds.	Noise FTA noise impacts along the LPAP2 alignment would vary depending on the design options selected. Noise impacts along the full LPAP2 alignment would vary from *348 (57 "Moderate"* and *291* "Severe) to *378 (53 "Moderate"* and *325* "Severe"). Design Requirements/RT Practices: Maintain track and vehicles regularly to reduce noise levels from vehicles. Mitigation Measures: *N&V-1* Noise barriers will be constructed to mitigate noise impacts in compliance with FTA *and RT* criteria. *N&V-2* *Sound insulation could be considered for residences near the Meadowview Road At-Grade Option and N. Laguna Drive, south of CRB.* *N&V-3* RT will coordinate mitigation with SAFCA, ACOE, and City of Sacramento to address barrier needs of

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Impact Category/ Section in *SFEIS/SFEIR*	**No-Action Alternative**	**Transportation Systems Management (TSM) Alternative**	**Locally Preferred Alternative Phase 2 (LPAP2)**
			South Sacramento Corridor Phase 2, flood conrol, and CRB Widening and Extension projects. *N&V-4 Other potential mitigation measures include minimizing the wheel impacts at crossovers and various approaches, implementing an ongoing rail grinding program along with the recommended wheel profile to reduce the incidence of wheel squeal.* *N&V-5 Bell sound levels at rail/roadway crossings will be set to minimum sound levels allowed by the CPUC. RT will specify that bells with easily adjustable volumes and adjustable ring rates be installed.* Vibration: Vibration impacts along the full LPAP2 alignment would *be the same for all* design options selected, with the number of homes affected *being 29.* Mitigation Measures: *N&V-6* Ballast mats *would be used to reduce vibration levels in sensitive areas.*
Population, Housing and Environmental Justice Section 4.13	No impact.	Property Acquisitions and Displacements: Approximately 4.0 acres of non-residential property would be acquired. Neighborhoods and Businesses: Additional bus services	Property Acquisitions and Displacements: No business relocation would be required. *Two single-family homes would be acquired in the Morrison Creek area.* If selected, the Center Parkway Pedestrian Overcrossing Option would require relocation of one single-family home. Relocation assistance would be provided consistent with the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 and RT policy. Neighborhoods and Businesses: The LPAP2 service would

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Impact Category/ Section in *SFEIS/SFEIR*	**No-Action Alternative**	**Transportation Systems Management (TSM) Alternative**	**Locally Preferred Alternative Phase 2 (LPAP2)**
		would improve local and regional linkages among neighborhoods, businesses and community facilities in comparison to the No-Action Alternative. Environmental Justice: Improved bus service and one new bus PNR lot would be provided. There would not be a disproportionate distribution of these benefits to certain groups. There would be no adverse impacts or disproportionate distribution of adverse impacts to low-income or minority groups. Mitigation Measures: None required.	improve local and regional linkages among neighborhoods, businesses and community facilities with improved travel times in comparison to the No-Action and TSM Alternatives. Environmental Justice: The LPAP2 service would improve access to regional employment, education, medical, and retail centers for low-income and minority populations. There would not be a disproportionate distribution of these benefits to certain groups. There would be no adverse impacts or disproportionate distribution of adverse impacts to low-income or minority groups. Mitigation Measures: None required.
Public Services and Facilities Section 4.14	No impact.	Ten community facilities (including recreation facilities) would realize direct benefits of improved bus service. Enhanced bus service from the Calvine/SR 99 PNR to the Meadowview Road LRT Station and express bus service from Elk Grove and the CRC transit center would facilitate access between the study area and community facilities located downtown and in other regional activity centers. Mitigation Measures: None required.	Ten community facilities (including recreation facilities) would realize direct benefits of improved transit access as a result of the LPAP2. Extending LRT service would also improve accessibility to community facilities in downtown Sacramento and other regional activity centers. Mitigation Measures: None required.
Parks & Recreation Section 4.15	No impact.	Four park and recreational facilities would realize direct benefits of improved bus service. Enhanced bus service from the Calvine/SR 99 PNR to the Meadowview Road LRT Station and express bus service from Elk Grove and the CRC transit center would facilitate access between the study area and park and recreational facilities located downtown and in other regional activity centers.	Four park and recreational facilities would realize direct benefits of improved transit access. The LPAP2 service would also improve accessibility to park and recreational facilities in downtown Sacramento and other regional activity centers. The *LRT bridge over CRB* would incorporate part of the *CRC College stadium* berm in the abutment. There would be no adverse impact on access to or operations and use of the stadium under either the at-grade or flyover options.

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Impact Category/ Section in SFEIS/SFEIR	No-Action Alternative	Transportation Systems Management (TSM) Alternative	Locally Preferred Alternative Phase 2 (LPAP2)
		Mitigation Measures: None required.	Mitigation Measures: *None Required.*
Safety & Security Section 4.16	No impact.	Increased bus services and a new PNR lot would require increased security services. The alternative would not expose children to disproportionate environmental health or safety risk. Mitigation Measures: *TS-1* RT security services would extend to include increased bus services.	New rail stations would create activity centers and PNR lot traffic, with potential for safety and/or security incidents. Large parking areas would increase the risk of vandalism to vehicles. Circulation of autos and pedestrians in PNR lots would create potential for auto-pedestrian conflicts. The reduction of corridor auto traffic is expected to have a beneficial impact on motor vehicle accident rates and resulting injuries. The LPAP2 tracks and stations would be adjacent to an active freight railroad and would traverse high volume roadways that require crossings by pedestrians and vehicular traffic, increasing the potential for accidents. The alternative would not expose children to disproportionate environmental health or safety risk. At-grade rail crossings would be signalized and gated and would comply with Public Utilities Commission regulations. Mitigation Measures: *S-1* Work with emergency service providers to develop alternative sources and adjust service areas and destinations as necessary to maintain emergency service coverage and response times following implementation of the new LPAP2 service. *S-2* Provide safety and security services by increasing contract security services and assigned law enforcement personnel. *S-3* Expand fire safety and emergency response training to include five districts that will be responsible for providing these services. *S-4* Invite public participation regarding station design details during the final design phase of the project

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Impact Category/ Section in SFEIS/SFEIR	No-Action Alternative	Transportation Systems Management (TSM) Alternative	Locally Preferred Alternative Phase 2 (LPAP2)
			to identify and address safety and security concerns.
Utilities Section 4.17	No impact.	The proposed park-and-ride lot may require minor utility relocations or new utility services, potentially affecting existing and planned utilities. Affected utilities would be relocated after consultation with their owners. It is anticipated that any required utility relocations could be managed with only short-term disruptions to utility service. Design Requirements/RT Practices: Careful and periodic coordination with all utility providers will continue to identify potential conflicts and formulate strategies to avoid potential problems. If disruptions to utility service are required, they will be restricted in time duration and geographic extent. Careful scheduling of these disruptions and prior notification of adjacent properties that would be affected by temporary service disruptions will mitigate the impact. Mitigation Measures: None required.	The construction of light rail tracks could affect underground and above-ground utilities throughout the alignment. To minimize or eliminate interruption in utility service to customers, a set of detailed plans would be submitted to utility providers for their review and comment prior to the onset of any relocation work. Some utilities will be moved to the edges of the LPAP2 LRT right-of-way. If right-of-way is not available, some utilities would be relocated to easements in adjacent properties. A PGE gas line between Meadowview Road and Morrison Creek will be relocated from the west side of the UPRR right-of-way to the Detroit Boulevard right-of-way. A branch of this line will require and easement through private property. Underground gas, water and sanitary sewer utilities crossing the trackway would be provided with additional protection including minimum depth of ground cover and possibly steel casings in accordance with state and federal pipeline safety laws. Design Requirements/RT Practices: Careful and periodic coordination with all utility providers will continue during the preliminary engineering, final design, and construction stages of the LPAP2 to identify any potential conflicts and formulate strategies to overcome potential problems. If disruptions to utility service are required, they would be restricted in time duration and geographic extent. Careful scheduling of these disruptions and prior notification of adjacent properties that would be affected by temporary service disruptions will mitigate the impact. Mitigation Measures: None required.

Table S-3: Summary of Short-Term Impacts, Design Requirements/RT Practices, and Proposed Mitigation Measures

Impact Category/ Section in *SFEIS/SFEIR*	No-Action Alternative	Transportation Systems Management (TSM) Alternative	Locally Preferred Alternative Phase 2 (LPAP2) Alternative
Aesthetics Section 5.2.1	No impact.	Construction equipment would introduce a temporary visual change to the area, including stockpiling of soils and materials, use/staging of heavy equipment, and possible night-time lighting. Mitigation Measures: *CA-1* The contractor will be required to maintain the site in an orderly manner, removing trash, waste, and securing equipment and vehicles at the close of each day's operation. *CA-2* To reduce glare from nighttime lighting, RT will require contractor to direct lighting onto the immediate construction area and away from residences and traffic lanes.	Construction equipment would introduce a temporary visual change to the area, including stockpiling of soils and materials, use/staging of heavy equipment, and possible night-time lighting. Mitigation Measures: *CA-1* The contractor will be required to maintain the site in an orderly manner, removing trash, waste, and securing equipment and vehicles at the close of each day's operation. *CA-2* To reduce glare from nighttime lighting, RT will require contractor to direct lighting onto the immediate construction area and away from residences and traffic lanes. *CA-3* *To reduce dust, the contractor would be required to use water trucks during grading to keep the ground moist.*
Agriculture Section 5.2.2	No impact.	It is not anticipated that construction activities would disturb agricultural land, crops or soils. Mitigation Measures: None required	It is not anticipated that construction activities would disturb agricultural land, crops or soils. Mitigation Measures: None required
Air Quality Section 5.2.3	No impact.	Construction would generate short-term emissions of dust, fumes, equipment exhaust, pollutants and other air contaminants. PM10 would be the air pollutant of greatest concern. Under the "worst-case" construction scenario, *construction* emissions are *not* anticipated to exceed the SMAQMD and federal thresholds. *However, mitigation measures are recommended to reduce construction emissions.*	Construction would generate short-term emissions of dust, fumes, equipment exhaust, pollutants and other air contaminants. PM10 would be the air pollutant of greatest concern. Construction impacts were evaluated based on a "worst-case" construction scenario in which track construction, station construction, grade separation, and bridge structure construction would occur concurrently, which is highly unlikely. Under this

Table S-3: Summary of Short-Term Impacts, Design Requirements/RT Practices, and Proposed Mitigation Measures

Impact Category/ Section in *SFEIS/SFEIR*	No-Action Alternative	Transportation Systems Management (TSM) Alternative	Locally Preferred Alternative Phase 2 (LPAP2) Alternative
		Mitigation Measures: *CAQ-1* RT practices include site-sweeping, site-wetting, washing or sweeping site-access points and covering or watering on-site stockpiles. *CAQ-8* Operations on unpaved surfaces will be suspended when winds exceed 25 mph. *CAQ-9* Traffic speeds *on unpaved roads* will be limited to 15mph. *CAQ-10* Operations would be suspended during first and second stage smog alerts. *CAQ-11* Truck loading zones will be maintained in the construction area. *CAQ-12* Temporary traffic control will be provided.	assumption, *construction* emissions are *not* anticipated to exceed the SMAQMD and federal thresholds. *However, mitigation measures are recommended to reduce construction emissions.* Mitigation Measures: *CAQ-1 Construction area and vicinity will be swept and watered at least twice daily.* *CAQ-2 Unpaved roads, parking and staging areas will be watered at least once every two hours of active operations.* *CAQ-3 Site access points will be swept/washed within 30 minutes of visible dirt deposition.* *CAQ-4 On-site stockpiles of debris or dirt will be enclosed, covered or watered at least twice daily.* *CAQ-5 All haul trucks hauling materials will be covered and will maintain at least two feet of freeboard.* *CAQ-6 Haul trucks will have the capacity of no less than 12.75 cubic yards.* *CAQ-7 At least 80 percent of inactive disturbed surface areas will be watered on a daily basis when there is evidence of wind-driven fugitive dust.* *CAQ-8 Operations on any unpaved surfaces will be suspended when winds exceed 25 mph.* *CAQ-9 Traffic speeds on unpaved roads will be limited to 15 miles per hour.*

Table S-3: Summary of Short-Term Impacts, Design Requirements/RT Practices, and Proposed Mitigation Measures

Impact Category/ Section in *SFEIS/SFEIR*	No-Action Alternative	Transportation Systems Management (TSM) Alternative	Locally Preferred Alternative Phase 2 (LPAP2) Alternative
		CAQ-13 Best efforts will be used to limit truck idling to no more than two minutes. *CAQ-14* Non-toxic soil stabilizers will be applied to inactive construction areas. *CAQ-15* Submit to SMAQMD for approval a plan to achieve a project-wide fleet-average reduction of roughly 20% for NO_X and approximately 45% for PM10 (compared to the most recent CARB fleet average at time of construction). *CAQ-16* Submit to SMAQMD an inventory of all off-road construction equipment, equal to or greater than 50 horsepower, that would be used 40 or more hours during any part of construction phase. Update and submit the inventory monthly. *CAQ-17* Off-road diesel-powered equipment emissions will not exceed 40% opacity for more than three minutes in any one hour, or else it will be repaired immediately and the SMAQMD will be notified within 48 hours. A visual survey of all in-operation equipment will be made at least weekly, and a monthly summary will be submitted.	*CAQ-10 Operations on any unpaved surfaces will be suspended during first and second stage smog alerts.* *CAQ-11 Truck loading zones will be maintained in the construction area.* *CAQ-12 Temporary traffic control will be provided during all phases of construction activities to improve traffic flow.* *CAQ-13 Best efforts will be used to limit truck idling to no more than two minutes.* *CAQ-14 Non-toxic soil stabilizers (according to manufacturers' specifications) will be applied to all inactive construction areas.* *CAQ-15 A plan subject to approval by the SMAQMD will be prepared to show that heavy-duty off-road vehicles used during construction would achieve a project-wide fleet-average reduction of approximately 20 percent for NO_x and approximately 45 percent for PM_{10} when compared to most recent CARB fleet average at time of construction.* *CAQ-16 A comprehensive inventory of all off-road construction equipment, equal to or greater than 50 horsepower, that would be used an aggregate of 40 or more hours during any portion of the construction phase will be submitted to the SMAQMD.* *CAQ-17 Emissions from all off-road diesel-powered equipment used during construction will not exceed 40 percent opacity for more than three minutes in any one hour.*

Table S-3: Summary of Short-Term Impacts, Design Requirements/RT Practices, and Proposed Mitigation Measures

Impact Category/ Section in *SFEIS/SFEIR*	No-Action Alternative	Transportation Systems Management (TSM) Alternative	Locally Preferred Alternative Phase 2 (LPAP2) Alternative
Biological Resources Section 5.2.4	No impact.	Construction of PNR lots may disturb non-native grassland that provide suitable habitat for the western burrowing owl. No wetland areas would be affected. Natural resources may be adversely affected by construction dust, construction equipment emissions, increased runoff and soil erosion, and construction noise. Mitigation Measures: *CB-17* Where possible, protect by a 50-foot buffer zone (ESA) with exclusionary fencing habitat for vernal pool fairy shrimp, Midvalley fairy shrimp, vernal pool tadpole shrimp, and California linderiella. *CB-23* Pre-construction survey of all project affected aquatic habitat no more than 24 hours prior to instream construction or disturbance of riparian vegetation. If western pond turtles are found, on-site monitoring and possible relocation shall be implemented. *CB-24* Construction in GGS habitat is preferably from May 1 to October 1. If between October 2 and April 30 USFWS may require additional measures.	Approximately 0.15 acre of wetlands/waters would be temporarily disturbed at Morrison Creek and 0.05 acre of wetlands/waters at Morrison Creek/Union House Creek. Construction activities and related impacts may disturb vernal pool, riparian and non-native grassland natural communities that provide suitable habitat for up to 19 special-status species including four invertebrates, two reptiles and 13 bird species. There is no confirmed evidence that any or all of these species are present in the project area or would be present at the time of construction. All sensitive habitat and wetland areas would be identified for avoidance during project design. Mitigation Measures: *CB-1* *Include a copy of the Biological Opinion within solicitations for design and construction, making the primary contractor responsible for implementation.* *CB-2* *Implement measures consistent with Best Management Practices (BMPs), including Storm Water Pollution Prevention Plan (SWPPP) and Water Pollution Control Program (WPCP) to minimize effects to giant garter snake and prevent pollution of streams, waterways, and other bodies of water during construction, to prevent sedimentation from entering Environmentally Sensitive Areas (ESAs), and to reduce erosion, dust, noise, and other deleterious aspects of construction related*

Table S-3: Summary of Short-Term Impacts, Design Requirements/RT Practices, and Proposed Mitigation Measures

Impact Category/ Section in *SFEIS/SFEIR*	No-Action Alternative	Transportation Systems Management (TSM) Alternative	Locally Preferred Alternative Phase 2 (LPAP2) Alternative
		CB-25 Where possible, protect giant garter snake (GGS) habitat by a 200-foot buffer zone (ESA) with exclusionary fencing. *CB-26* Best management practices for water quality shall be implemented. *CB-28* Survey for GGS 24 hours prior to construction. *CB-30* A qualified, USFWS-approved biological monitor shall be present during construction within suitable habitat. If a snake is encountered, all construction activities in the immediate area shall be halted until appropriate corrective measures are implemented. *CB-41* Pre-construction survey for western burrowing owls and burrows within 330 feet no more than two weeks before construction. *CB-42* If active burrows are located, a no-disturbance buffer will be established around each active burrow. The size of the buffer will be determined through CDFG. *CB-43* If adverse effects to occupied burrows are unavoidable, the owls shall be passively relocated using techniques approved by CDFG.	*activities. BMPs may include, but are not limited to, silt fencing, temporary berms, restrictions on cleaning equipment in or near ESAs, installation of vegetative strips, and temporary sediment disposal. Runoff from dust control and hazardous materials will be retained on the construction site and prevented from flowing into the ESAs.* *CB-3 Clearing and grubbing procedures that specify that only trees and plants designated for removal shall be removed.* *CB-4 Excavation techniques would ensure stability of subsurface materials as well as the retention of excavated materials within the construction areas.* *CB-5 Construction within wetlands would be avoided during the rainy season.* *CB-6 Materials and fluids generated by construction activities would be placed at least 100 feet from wetland areas or drainages until they could be disposed of at a permitted site.* *CB-7* Post-construction, remove all temporary fill/ debris. Restore disturbed areas to pre-project conditions, using native grass seed mixes. *CB-8,9* Install high visibility fencing around habitats of federally listed species to identify and protect designated ESAs. *CB-10* A qualified, USFWS-approved biological monitor shall be present during construction within suitable habitat. If a snake is encountered, all construction activities in the

Table S-3: Summary of Short-Term Impacts, Design Requirements/RT Practices, and Proposed Mitigation Measures

Impact Category/ Section in *SFEIS/SFEIR*	No-Action Alternative	Transportation Systems Management (TSM) Alternative	Locally Preferred Alternative Phase 2 (LPAP2) Alternative
			immediate area shall be halted until appropriate corrective measures are implemented. *CB-11 Implement a Worker Environmental Awareness Training Program for construction personnel to be conducted by the USFWS-approved biologist.* *CB-12 The number and size of access roads and staging areas, and the total area of project activities will be restricted to the minimum necessary for the duration of construction activities.* *CB-13 All food-related trash items must be disposed of in closed containers and removed at the end of each work day.* *CB-14 A post-construction walkthrough will be conducted to assess whether any damage occurred to vegetation within buffer areas. Damage may include accidental cutting of vegetation or visible physical damage to roots, stems, and leaves. If damage is observed, vegetation within the buffer areas will be restored with appropriate native plant species.* *CB-15 RT will maintain and monitor the project site for one (1) year following the completion of construction and restoration activities.* *CB-16 Measures will be taken by the contractor to avoid the introduction of new noxious weeds and the spread of weeds previously documented at the project area.*

Table S-3: Summary of Short-Term Impacts, Design Requirements/RT Practices, and Proposed Mitigation Measures

Impact Category/ Section in *SFEIS/SFEIR*	No-Action Alternative	Transportation Systems Management (TSM) Alternative	Locally Preferred Alternative Phase 2 (LPAP2) Alternative
			Special-Status Wildlife ***Vernal pool fairy shrimp, Midvalley fairy shrimp, Vernal pool tadpole shrimp, and California linderella*** *CB-17* Where possible, protect by a 50-foot buffer zone (ESA) with exclusionary fencing habitat for vernal pool fairy shrimp, Midvalley fairy shrimp, vernal pool tadpole shrimp, and California linderiella. ***Valley Elderberry Longhorn Beetle*** *CB-18 Prior to construction, RT shall conduct a survey to assess the status of existing elderberry shrubs within the project site.* *CB-19 Construction shall be prohibited within 100 ft. of elderberry plants during beetle emergence and mating period.* *CB-20 No application of herbicides, insecticides, and/or other chemical agents shall occur within 100 feet of elderberry plants or where they might drift of wash into the area of elderberry plants.* *CB-21 Protective fencing shall be established around all shrubs that are not removed prior to initiating and construction activities on the site.* *CB-22 Post-construction walkthrough will be conducted to assess whether any damage occurred to vegetation within the buffer areas.* ***Western Pond Turtle*** *CB-23* Pre-construction survey of all project affected aquatic habitat no more than 24 hours prior to

Table S-3: Summary of Short-Term Impacts, Design Requirements/RT Practices, and Proposed Mitigation Measures

Impact Category/ Section in *SFEIS/SFEIR*	No-Action Alternative	Transportation Systems Management (TSM) Alternative	Locally Preferred Alternative Phase 2 (LPAP2) Alternative
			instream construction or disturbance of riparian vegetation. If western pond turtles are found, on-site monitoring and possible relocation shall be implemented. ***Giant Garter Snake*** *CB-24* Construction in GGS habitat is preferably from May 1 to October 1. If between October 2 and April 30 USFWS may require additional measures. *CB-25* *Where possible, giant garter snake habitat will be protected by a 200-foot buffer zone.* *CB-26* *Best management practices for water quality will be implemented during construction.* *CB-27* Any dewatered GGS habitat shall remain dry for at least 15 consecutive days after April 15 and prior to excavating or filling. *CB-28* Survey for GGS 24 hours prior to construction. *CB-29* *Appropriate netting will be used for erosion control and other purposes to ensure that the giant garter snake does not get trapped or become entangled.* *CB-30* *A USFWS-approved biological monitor shall be present during construction within suitable habitat.* *CB-31* *Clearing will be confined to the minimal area necessary to facilitate construction activities.* *CB-32* *Following completion of construction, all temporary fill and construction debris will be removed from the project and disturbed areas*

Table S-3: Summary of Short-Term Impacts, Design Requirements/RT Practices, and Proposed Mitigation Measures

Impact Category/ Section in *SFEIS/SFEIR*	No-Action Alternative	Transportation Systems Management (TSM) Alternative	Locally Preferred Alternative Phase 2 (LPAP2) Alternative
			will be restored to pre-project conditions. *CB-33 RT will compensate for project-related temporary impacts to giant garter snake habitat by purchasing the equivalent of 8.44 acres of giant garter snake habitat credits. All temporary effects will be compensated at a 1:1 ratio.* ***Nesting Migratory and Special-Status Birds, Including Raptors*** *CB-34* If construction or tree removal will occur between February and August, preconstruction surveys for migratory bird, raptor, or special-status birds nests will be conducted within 0.25 mile of the project area. *CB-35 Surveys shall be conducted no more than 30 days prior to the initiation of construction activities.* *CB-36* If active nests are found, consult with USFWS and CDFG to develop avoidance/minimization measures. *CB-37* Raptor or migratory bird nest trees shall be removed outside of the nesting season (February through August), or after nest is empty and adult and young birds leave the tree. *CB-38 All natural communities and wetland areas outside the construction zone that could be affected will be temporarily fenced off using high visibility fencing and designated as ESAs.*

Table S-3: Summary of Short-Term Impacts, Design Requirements/RT Practices, and Proposed Mitigation Measures

Impact Category/ Section in *SFEIS/SFEIR*	No-Action Alternative	Transportation Systems Management (TSM) Alternative	Locally Preferred Alternative Phase 2 (LPAP2) Alternative
			Swainson's Hawk *CB-39* Annual survey for Swainson's hawk nests from March-August 15. If nests are discovered, consult with CDFG. ***Western Burrowing Owl*** *CB-40* *In accordance with the Staff Report on Burrowing Owl Mitigation the following should be considered impacts; disturbance within 160 ft of an occupied burrow, destruction of occupied natural and artificial burrows, and destruction and/or degradation of foraging habitat adjacent (within 330 ft) of to an occupied burrow(s).* *CB-41* Pre-construction survey for western burrowing owls and burrows within 330 feet no more than two weeks before construction. *CB-42* If active burrows are located, a no-disturbance buffer will be established around each active burrow. The size of the buffer will be determined through CDFG. *CB-43* If adverse effects to occupied burrows are unavoidable, the owls shall be passively relocated using techniques approved by CDFG.
Cultural Resources Section 5.2.5	No impact.	Although not anticipated, construction activities could result in loss or degradation of previously undiscovered cultural resources. Mitigation Measures: *CC-1* *If cultural materials are unearthed during construction, work in the vicinity would be*	Although not anticipated, construction activities could result in loss or degradation of previously undiscovered cultural resources. Mitigation Measures: *CC-1* *If cultural materials are unearthed during construction, work in the vicinity would be*

Table S-3: Summary of Short-Term Impacts, Design Requirements/RT Practices, and Proposed Mitigation Measures

Impact Category/ Section in *SFEIS/SFEIR*	No-Action Alternative	Transportation Systems Management (TSM) Alternative	Locally Preferred Alternative Phase 2 (LPAP2) Alternative
		halted until a qualified archaeologist can assess their significance. *CC-2* *If unanticipated archaeological resources are encountered during construction, they would be addressed in consultation with OHP, in accordance with an archaeological treatment plan to be developed in consultation with OHP.*	*halted until a qualified archaeologist can assess their significance.* *CC-2* *If unanticipated archaeological resources are encountered during construction, they would be addressed in consultation with OHP, in accordance with an archaeological treatment plan to be developed in consultation with OHP.*
Employment Section 5.2.6	No impact.	Compared with the No-Action Alternative, the TSM Alternative would generate *230* on-site full-time construction positions (person years of employment [PYE]) and *370* total positions (PYE). Mitigation Measures: None required.	LPAP2 would generate *1,100* on-site full-time construction positions (PYE) and *1,700* total positions (PYE), as compared to the No-Action Alternative. Mitigation Measures: None required.
Geology, Soils and Seismicity Section 5.2.7	No impact.	Weak and/or compressible soils or expansive soil when present can adversely affect the PNR lot. Shallow groundwater could affect earthwork and construction and the service PNR lots. Soil erosion can damage existing structures and can discharge sediment to waterways. Mitigation Measures: *CG&S-1* Geotechnical studies in final design will incorporate requirements into the final design and construction requirements. Design requirements likely to be implemented include excavation and replacement (or treatment) of soil, use of synthetic material to reinforce weak soils and deep foundations.	Weak and/or compressible soils or expansive soil can adversely affect the structures, pavements and slabs on grade. Shallow groundwater could affect earthwork and construction and the service of floor slabs and roadbed/hardscape subjected to traffic load. Soil erosion can damage existing structures and can discharge sediment to waterways. Additional loads on existing slopes could result in slope instability. Mitigation Measures: *CG&S-1* Geotechnical studies in final design will incorporate requirements into the final design and construction requirements. Design requirements likely to be implemented include excavation and replacement (or treatment) of soil, use of synthetic material to reinforce weak soils and deep foundations, modification or re-grading of slopes, increased set-backs and clearance from slopes, vegetation of slopes,

Table S-3: Summary of Short-Term Impacts, Design Requirements/RT Practices, and Proposed Mitigation Measures

Impact Category/ Section in *SFEIS/SFEIR*	No-Action Alternative	Transportation Systems Management (TSM) Alternative	Locally Preferred Alternative Phase 2 (LPAP2) Alternative
			and lining of channels.
Hazardous Wastes Section 5.2.8	No impact.	Previously unidentified contamination may be encountered. Mitigation Measures: *CHW-1* Walk-through site reconnaissance will be conducted for each of the site areas to identify any additional evidence of contamination. *CHW-2* A review will be conducted of the remediation status of the sites listed in Table 4.8-1. If remediation activities will be complete before construction of the project, then no further mitigation will be necessary. If remediation would not be completed prior to project construction, then an alternate mitigation plan will be prepared and implemented. *CHW-3* A site specific evaluation will be made of any known and suspected contaminated sites that would be distributed by construction operations before any soil is removed from affected areas for construction, using the following procedure: 1) implementation of a Worker Health and Safety Plan; 2) preparation of a site specific work plan specifying the proposed location for surface samples or soil borings or trenches; 3) soil boring or trenching and sample collection; 4) laboratory analysis of samples; and 5) preparation of a findings and recommendations report.	Previously unidentified contamination may be encountered. Mitigation Measures: *CHW-1* Walk-through site reconnaissance will be conducted for each of the site areas to identify any additional evidence of contamination. *CHW-2* A review will be conducted of the remediation status of the sites listed in Table 4.8-1. If remediation activities will be complete before construction of the project, then no further mitigation will be necessary. If remediation would not be completed prior to project construction, then an alternate mitigation plan will be prepared and implemented. *CHW-3* A site specific evaluation will be made of any known and suspected contaminated sites that would be distributed by construction operations before any soil is removed from affected areas for construction, using the following procedure: 1) implementation of a Worker Health and Safety Plan; 2) preparation of a site specific work plan specifying the proposed location for surface samples or soil borings or trenches; 3) soil boring or trenching and sample collection; 4) laboratory analysis of samples; and 5) preparation of a findings and recommendations report.

Table S-3: Summary of Short-Term Impacts, Design Requirements/RT Practices, and Proposed Mitigation Measures

Impact Category/ Section in SFEIS/SFEIR	No-Action Alternative	Transportation Systems Management (TSM) Alternative	Locally Preferred Alternative Phase 2 (LPAP2) Alternative
		CHW-4 If the site-specific evaluations determine that contaminants are present, RT will determine the type and extent of contamination and will prepare and implement a remediation plan to avoid risks to public health and safety. *CHW-5* RT will notify the State Department of Toxic Substances Control, Sacramento County Environmental Health Department and the local fire department of any contaminants encountered during construction.	*CHW-4* If the site-specific evaluations determine that contaminants are present, RT will determine the type and extent of contamination and will prepare and implement a remediation plan to avoid risks to public health and safety. *CHW-5* RT will notify the State Department of Toxic Substances Control, Sacramento County Environmental Health Department and the local fire department of any contaminants encountered during construction.
Hydrology, Floodplain and Water Quality Section 5.2.9	No impact.	Construction activities would increase the sediment load in stormwater and disturb one or more acres of land. Mitigation Measures: *CHF&Q-1* The contractor will prepare a SWPPP identifying Best Management Practices to reduce water quality impacts. *CHF&Q-3* If groundwater is encountered, dewatering will be conducted and contaminated effluent disposed of per applicable regulations.	Construction activities would increase the sediment load in stormwater and disturb one or more acres of land. Modification of the berm of Franklin Station detention basin could result in the temporary loss of flood storage. Mitigation Measures: *CHF&Q-1* The contractor will prepare a SWPPP identifying Best Management Practices to reduce water quality impacts. *CHF&Q-2* RT will coordinate with SRCSD and the City of Sacramento regarding impacts to the detention basin and to maintain flood storage during construction. *CHF&Q-3* If groundwater is encountered, dewatering will be conducted and contaminated effluent disposed of per applicable regulations.

Table S-3: Summary of Short-Term Impacts, Design Requirements/RT Practices, and Proposed Mitigation Measures

Impact Category/ Section in *SFEIS/SFEIR*	**No-Action Alternative**	**Transportation Systems Management (TSM) Alternative**	**Locally Preferred Alternative Phase 2 (LPAP2) Alternative**
Land Use Section 5.2.10	No impact.	No impact.	No impact.
Mineral and Energy Resources Section 5.2.11	No impact.	Minerals: No important minerals have been identified in the project area. Energy Resources: Energy use would represent a small portion of the total energy consumed in the region. Mitigation Measures: None required.	Minerals: No important minerals have been identified in the project area. Energy Resources: Construction energy requirements are greater than for the TSM Alternative, but not considered substantial, since, energy use for the project would represent a small portion of the total energy consumed in the region. Mitigation Measures: None required.
Neighborhoods and Businesses Section 5.2.12	No impact.	Construction traffic could temporarily disrupt traffic near the new PNR lot. Grading and paving would result in construction noise and vibration, air emissions, and visual changes. These impacts are expected to be very localized and none would have substantial impacts on the neighborhoods or businesses. Mitigation Measures: *CN&B-1* RT practices for noise and vibration, air quality, transportation and aesthetics are in the respective sections of Chapter 5. No further mitigation is indicated.	Construction traffic would temporarily affect study area neighborhoods due to street closures, rerouting of transit and vehicular traffic, and movements of construction equipment, materials and vehicles. There would be construction noise and vibration, air emissions, and visual changes. Impacts would localized, temporary and intermittent; none would substantially affect neighborhoods or local businesses. Mitigation Measures: *CN&B-1* RT practices for noise and vibration, air quality, transportation, and aesthetics are in the respective sections of Chapter 5. No further mitigation is indicated.

Table S-3: Summary of Short-Term Impacts, Design Requirements/RT Practices, and Proposed Mitigation Measures

Impact Category/ Section in *SFEIS/SFEIR*	No-Action Alternative	Transportation Systems Management (TSM) Alternative	Locally Preferred Alternative Phase 2 (LPAP2) Alternative
Noise and Vibration Section 5.2.13	No impacts.	Temporary noise during construction of the park-and-ride (PNR) lot may adversely affect nearby residents. Mitigation Measures: *CN&V-1* Include specific residential property line noise limits in the construction specifications for this project, and *CN&V-2* Perform noise monitoring during construction to verify compliance with the limits. *CN&V-4* Vibration impacts will be mitigated by including numeric limits in the construction specifications, monitoring vibration, and requiring the contractor to follow the specified limits.	Temporary noise during construction of new tracks, stations, and traction power substations may adversely affect nearby residents. Most severe conditions would occur if construction was concurrent with that of the CRB Widening, CRB Extension and levee system improvement projects (by others). Mitigation Measures: *CN&V-1* Include specific residential property line noise limits in the construction specifications for this project. *CN&V-2* Perform noise monitoring during construction to verify compliance with the limits. *CN&V-3 Assure that a complaint resolution procedure is in place to rapidly address any problems that may develop.* *CN&V-4* Vibration impacts will be mitigated by including numeric limits in the construction specifications, monitoring vibration, and requiring the contractor to follow the specified limits.
Parks & Recreation Section 5.2.14	No impact.	The construction of the PNR facility would have no impact on park and recreational facilities in the area.	Construction could involve temporary detours or street closures but are expected to have little or no impact on access to local parks and recreational and facilities. Construction at the Cosumnes River College Stadium berm would not affect access to or operations of the recreational facility.

Table S-3: Summary of Short-Term Impacts, Design Requirements/RT Practices, and Proposed Mitigation Measures

Impact Category/ Section in *SFEIS/SFEIR*	No-Action Alternative	Transportation Systems Management (TSM) Alternative	Locally Preferred Alternative Phase 2 (LPAP2) Alternative
			Mitigation Measures: None required.
Public Services and Facilities Section 5.2.15	No impact.	The construction of the PNR facility would have no impact on parks, recreation and public services and facilities in the area.	Construction could involve temporary detours or street closures but are expected to have little or no impact on access to local public services and facilities. Emergency vehicles would need to observe any short-term road closures and temporary construction detours. Mitigation Measures: *CPS-1* RT will coordinate with local emergency service providers in developing detour plans. *CPS-2* Emergency service providers would be provided advance notice of road closures and detour routes.
Safety and Security Section 5.2.16	No impact.	Construction activities could expose construction workers, local residents, and employees to potential safety hazards. Mitigation Measures: *CS-1* RT will require the contractor submit a safety plan in advance of construction to ensure procedures for the safety of construction workers, local residents, and employees during construction of the TSM Alternative. *CS-2* Fencing and lighting of construction and staging areas, and recognized safety practice requirements for the utilization of heavy equipment and the movement of construction materials would be implemented to contain construction activities and avoid accidents.	Construction activities could expose construction workers, local residents, and employees to potential safety hazards. Mitigation Measures: *CS-1* RT will require the contractor submit a safety plan in advance of construction to ensure procedures for the safety of construction workers, local residents, and employees during construction of the LPAP2 Alternative. *CS-2* Fencing and lighting of construction and staging areas, and recognized safety practice requirements for the utilization of heavy equipment and the movement of construction materials would be implemented to contain construction activities and avoid accidents.

Table S-3: Summary of Short-Term Impacts, Design Requirements/RT Practices, and Proposed Mitigation Measures

Impact Category/ Section in *SFEIS/SFEIR*	No-Action Alternative	Transportation Systems Management (TSM) Alternative	Locally Preferred Alternative Phase 2 (LPAP2) Alternative
Transportation/ Traffic Section 5.2.17	No impact.	Rail and Bus Transit: No impacts on transit services anticipated.	Rail Services: Construction of the connections of existing LRT tracks with new LPAP2 tracks could affect on-going revenue service. To avoid disruption of current LRT operations, construction of these connections will be scheduled during non-revenue hours. Bus Services: Construction of grade crossings would involve closure of cross streets for 24 to 48 hours at a time, temporarily rerouting some bus routes. <u>Mitigation Measures</u>: Coordinate construction with other major work in the vicinity. Grade-crossing construction that requires street closure will be scheduled so only one crossing in an area is affected at one time Provide the public and transit users advance notice of proposed transit reroutes and any other changes in stops and service. Construction of at-grade crossings will take place during non-peak periods whenever possible, including at night and at normal work hours in residential areas. RT will notify local residents and businesses in advance of proposed construction activity.

Table S-3: Summary of Short-Term Impacts, Design Requirements/RT Practices, and Proposed Mitigation Measures

Impact Category/ Section in *SFEIS/SFEIR*	No-Action Alternative	Transportation Systems Management (TSM) Alternative	Locally Preferred Alternative Phase 2 (LPAP2) Alternative
		Vehicular Traffic: Traffic in the vicinity of the PNR lot could be disrupted by construction equipment and traffic. Mitigation Measures: *CT-3,8* *RT will coordinate with the City or County to provide advance public notice of traffic detours.* *CT-7* Contractors will prepare and implement traffic handling plans.	Vehicular Traffic: Traffic could be disrupted by construction equipment and traffic. Construction of LPAP2 improvements would require street closures for 24 to 48 hours at several locations and rerouting of vehicular traffic. Mitigation Measures: *CT-1* *RT will coordinate construction with other major public or private construction projects within a one-mile radius.* *CT-2* *Grade-crossing construction would only occur so that one crossing in an area is affected at a time.* *CT-3,8* RT will coordinate with the City or County to provide the public advance notice of proposed traffic detours and their duration. *CT-4* *Construction of at-grade crossings will take place during non-peak periods whenever possible.* *CT-5* *RT will notify local residents and businesses in advance of proposed construction activity using techniques identified in the project's public involvement program.* *CT-6* *RT will communicate and coordinate with the CRC and Los Rios Community College District regarding the time of any street closures during construction of the LPAP2, with particular attention to peak student travel periods.* *CT-7* *Contractors will be required to prepare and implement traffic handling plans approved by the cities of Sacramento and Elk Grove or Sacramento County.*

Table S-3: Summary of Short-Term Impacts, Design Requirements/RT Practices, and Proposed Mitigation Measures

Impact Category/ Section in *SFEIS/SFEIR*	No-Action Alternative	Transportation Systems Management (TSM) Alternative	Locally Preferred Alternative Phase 2 (LPAP2) Alternative
		Parking: Construction workers for the park-and-ride lot would be expected to park on-site. No substantial impact anticipated. Mitigation Measures: *CT-9* Provisions will be incorporated into the construction contracts to avoid parking impacts to residential areas or businesses requiring on-street parking.	Parking: Construction workers for the park-and-ride lots would be expected to park on-site. No substantial impact anticipated. Mitigation Measures: *CT-9* Construction contracts will include provisions to avoid parking impacts to residential areas or businesses requiring on-street parking.
Utilities Section 5.2.18	No impact.	Construction activities may encounter unexpected utilities within the project right-of-way. Relocations of affected utilities will be the responsibility of RT and may require short-term, limited interruptions of service. Mitigation Measures: *CU-1* *RT will continue close coordination with all utility providers during construction to identify any potential conflicts and formulate strategies to overcome potential problems.* *CU-2* *A set of detailed plans will be submitted to utility providers for their review and comment prior to the onset of any relocation work.* *CU-3* Schedule any service interruptions in advance and ensure appropriate notification to users.	Construction activities may encounter unexpected utilities within the project right-of-way. Relocations of affected utilities will be the responsibility of RT and may require short-term, limited interruptions of service. Mitigation Measures: *CU-1* *RT will continue close coordination with all utility providers during construction to identify any potential conflicts and formulate strategies to overcome potential problems.* *CU-2* *A set of detailed plans will be submitted to utility providers for their review and comment prior to the onset of any relocation work.* *CU-3* Schedule any service interruptions in advance and ensure appropriate notification to users.

S-6 SUMMARY OF CAPITAL COSTS

Total capital costs for the TSM Alternative, escalated to the year of expenditure, are estimated to be $53,067,000. These costs include contingencies, engineering, and reserve. The principal components of the TSM Alternative are new buses and construction of a park-and-ride lot at Cosumnes River College.

Total capital costs for the LPAP2 (base case), escalated to the year of expenditure, are estimated to be $269,920,000, which is $216,853,000 more than the estimated TSM Alternative costs. Table S-3 presents capital costs for the principal components of the LPAP2. See Section 2.6 for costs of project options (such as grade separations) which would add to the project costs.

Table S-4: LPAP2 Capital Cost Estimate by Cost Category

Element	Cost Estimate (Year of Expenditure dollars)
Guideway and Track Elements	$43,974,000
Stations, Stops, Terminals, Intermodal	$44,886,000
Support Facilities: Yards, Shops, Administration	$0
Sitework & Special Conditions	$61,822,000
Systems	$30,044,000
ROW, Land, Existing Improvements	$14,929,000
Vehicles	$0
Professional Services	$42,094,000
Unallocated Contingency	$32,171,000
Finance Charges	$0
Total Project Cost	**$269,920,000**

Source: RT Financial Forecasting Model, September 2007.
Notes: Construction costs include 15% to 30% contingencies.
ROW costs include 25% contingency.

Capital costs for both the TSM and LPAP2 alternatives include the cost of mitigation measures, contingencies, engineering and reserves. Additional vehicles will not be acquired as part of the LPAP2 Project. Vehicle maintenance for LRT vehicles would occur at RT's central maintenance facility at Academy Way. A new maintenance facility will not be required for the LPAP2 Project.

S-7 OPERATING AND MAINTENANCE COSTS

RT's projected 2030 annual operating and maintenance costs with the LPAP2 is $275.2 million (2007 $'s). The LPAP2 operating costs are expected to be approximately $1.03 million lower than the costs for the TSM Alternative (FY 2007 $).

S-8 FINANCIAL ANALYSIS AND EVALUATION

The LPAP2 is estimated to cost approximately *$270* million to construct in Year of Expenditure (YOE) dollars. Full funding for the project has been identified from a variety of sources (Table S-4): State Transportation Improvement Program (STIP) funds, Traffic Congestion Relief Program (TCRP) funds, Congestion Mitigation and Air Quality Improvement (CMAQ) funds, community facilities district funds, transit fee district funds, Measure A sales tax/developer fee funds, and FTA Section 5309 New Starts funds. The project is included in the financially constrained SACOG Metropolitan Transportation Plan (MTP). The funding assumptions used for the project and for the RT system as a whole are consistent with the assumptions used in the MTP.

Table S-5: Identified Capital Funding for the LPAP2 Project

Funding Source	Amount (Year of Expenditure dollars)	Percent of Total Funding
CMAQ	$7,100,000	*2.6%*
Laguna Community Facilities District	*$803,250*	*0.3%*
Vineyard Fee District	*$3,989,286*	*1.5%*
STIP	*$4,307,000*	*1.6%*
Measure A Sales Tax/Developer Fee	*$52,760,464*	*19.5%*
TCRP/STIP	$66,000,000	*24.5%*
Section 5309 New Starts	*$134,960,000*	50.0%
Total	*$269,920,000*	100%

Source: RT Financial Forecasting Model, *September 2007, updated July 2008.*

If the LPAP2 were not constructed, and the TSM Alternative were implemented instead, the TSM Alternative would be funded entirely from STIP, CMAQ, and local sources.

The primary funding sources for RT's current bus, LRT, paratransit, and regional rail operations include the following:

- Sacramento County Measure A (one-half cent sales tax),
- The Local Transportation Fund component of the State Transportation Development Act (TDA--one-quarter cent of the State's 7.25 percent sales tax),
- State Transit Assistance Program Funds,
- Measure A funds from the City of Folsom per a trade of state capital dollars,
- City contributions of TDA to pay for RT services,
- Special service (e.g., shuttles, events) revenues,
- Fare revenues,
- Federal Section 5307 formula funds,
- Federal Section 5309 Fixed Guideway funds, and
- Other sources (e.g., advertising, interest earnings).

To fund the operation of the LPAP2, RT would use a mix of funds from these sources.

The financial analysis indicates that RT has the financial capacity to build, operate and maintain the LPAP2, while continuing to operate and maintain the existing transit system. This conclusion is not unqualified, however. As with any financial forecast, there is risk in the uncertainty of future economic conditions. Also, there is some risk that the additional operating and capital funding needed to extend the service may not be identified in the near term.

S-9 ISSUES TO BE RESOLVED / AREAS OF CONTROVERSY

A review of the environmental impacts and mitigation measures for the project alternatives are provided in Chapters 3, 4, and 5 and summarized in this summary and in Chapter 6. As shown in these chapters, adverse environmental impacts are mitigated for the project alternatives and there appear to be no remaining issues to be resolved or areas of controversy.

CHAPTER 1: PURPOSE OF AND NEED FOR TRANSPORTATION IMPROVEMENTS

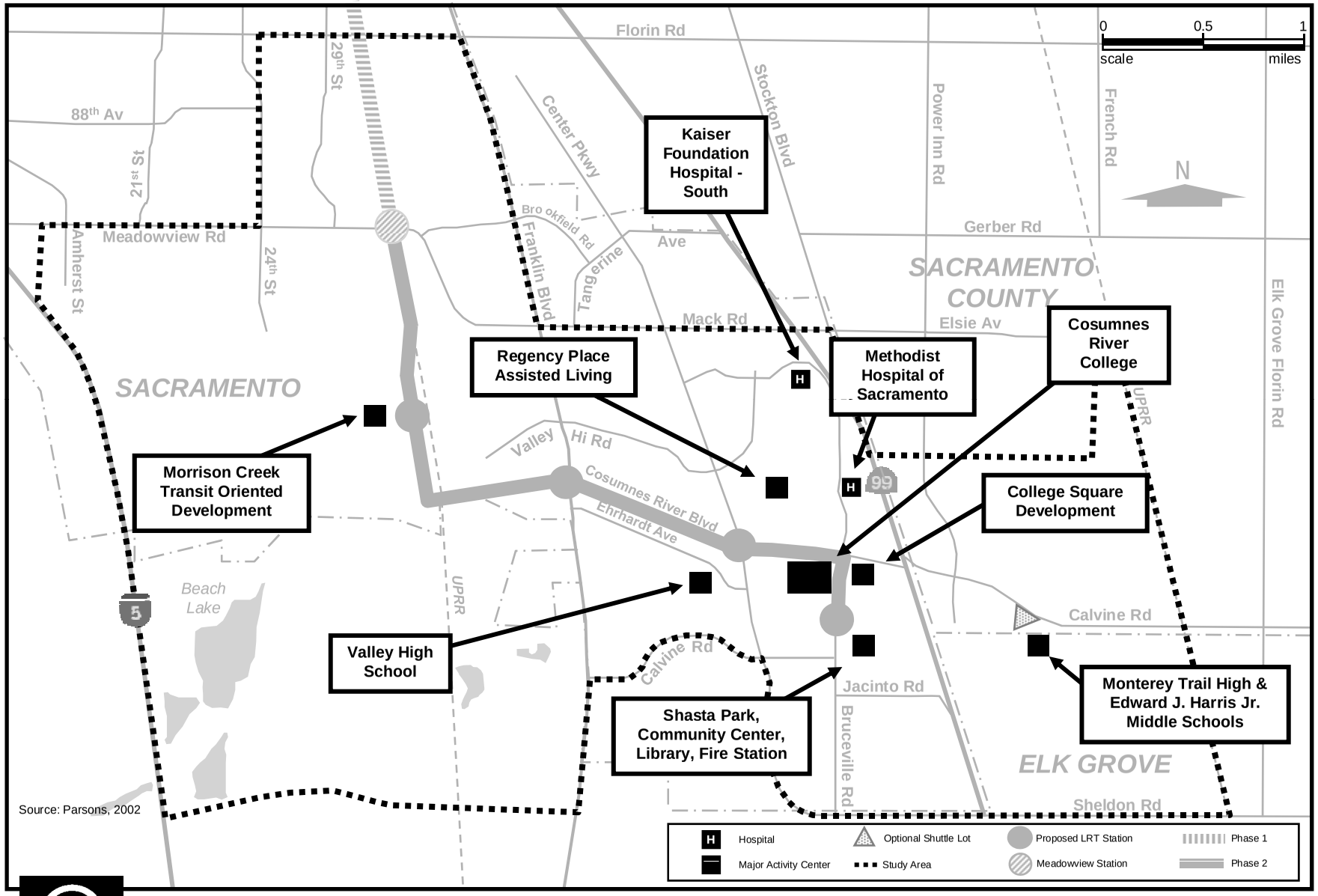
A Purpose and Need statement identifies and describes the transportation problem(s) that a proposed action is intended to address and specifies the underlying purposes of and need for the proposed action. In this case, the proposed action is the Locally Preferred Alternative Phase 2 (LPAP2) Light Rail Transit (LRT) extension of the Sacramento LRT system 4.3 miles into Southern Sacramento, with four LRT stations and associated facilities (e.g., park-and-ride lots) and amenities. As a fundamental requirement of the National Environmental Policy Act (NEPA), the Purpose and Need statement provides a basis and tool for evaluation of alternatives to the proposed action and the basis and framework for decision-making regarding the proposed action. This purpose and need statement also addresses the CEQA Guidelines Section 15124 (b) provision for a statement of project objectives.

1.1 PURPOSE OF THE PROPOSED ACTION

The purpose of the LPAP2 LRT extension is to improve public transit services in the fast-growing South Sacramento Corridor to provide faster, more convenient access between South Sacramento and downtown Sacramento as well as to other corridor activity centers.

Meeting this primary project purpose would also address the following related purposes that were developed from the original goals and objectives of the South Sacramento Corridor, as defined in the original corridor environmental document. Subsection 7.7.1, Goals and Objectives, presents a comprehensive set of the original goals and objectives from the 1994 *South Sacramento Corridor AA/DEIS/DEIR.*

- Enhance regional connectivity through expanded, interconnected LRT services along the primary travel corridors in Sacramento County, by connecting the project area with Interstate 80 (I-80) east (existing Northeast LRT Line), US 50 (existing Folsom LRT Line with extensions), and State Route 99 (SR 99)/I-5.
- Accommodate future travel demand in the corridor by increasing transit capacity and expanding modal options (by considering LRT and other enhanced transit services along with conventional transit).
- Reduce the growth in increasing traffic congestion on SR 99 and I-5 between downtown Sacramento and the communities of Elk Grove, Laguna Creek, and Laguna West, and on the major north-south arterials in South Sacramento, such as Franklin Boulevard and Bruceville Road.
- Improve regional air quality by reducing auto emissions.
- Improve mobility options to employment, education, medical, and retail centers for corridor residents, in particular low-income and ethnic minority populations and provide a mobility option to the use of congested highways.
- Support local economic and land development goals by increasing transit service to current and future corridor activity centers. Figure 1.1-1 depicts major activity centers in the South Sacramento Phase 2 Corridor.



Regional Transit

South Sacramento Corridor Phase 2 Project

MAJOR ACTIVITY CENTERS IN THE SOUTH SACRAMENTO PHASE 2 CORRIDOR

Figure 1.1-1

Extending LRT service south from the South Sacramento Corridor Phase 1 terminus at Meadowview Road would provide much needed additional capacity to address an anticipated growth in corridor person trips of over 50 percent by the year *2030*. When operations begin in or around *2012*, the service would connect South Sacramento residents with approximately 39 miles of LRT lines serving the north, east, and south sections of Sacramento County, thereby enhancing direct public transit access to other regional activity centers. Future extensions could expand the LRT network further, from Downtown Sacramento north to the Sacramento Airport and from the LPAP2 LRT line south into Elk Grove. In the long term, the light rail system is planned to extend across the County line into neighboring Placer and Yolo Counties.

The project would complement and expand existing travel choices in South Sacramento. As a competitive alternative to the private auto (in terms of both the cost and time for travel reliability), LPAP2 would divert auto trips from heavily traveled roadways and ease traffic congestion, in particular on SR 99 and I-5. By allowing more trips to be made on transit to the downtown Sacramento commercial and office core, the growth in parking requirements would lessen and circulation impacts would be less severe. A secondary effect of reduced traffic, roadway congestion, and parking requirements would be a decrease in auto emissions and concomitant improvement in air quality in what is already a severe non-attainment area for ozone, carbon monoxide, and particulate matter.

The LRT Project is expected to generate 2,535 new transit trips and 2,273 hours of user benefit (on an average weekday). It will improve air quality in a region currently designated as a severe non-attainment area for ozone and moderate non-attainment area for PM_{10} under the federal Clean Air Act

Improved transit service (increased capacity and more reliable service) to Cosumnes River College would directly serve a community college, residential areas, the College Marketplace Development, and other commercial development. Improved service on the corridor could intercept trips on SR 99 at the Cosumnes River College. It would improve access to the State, County, and City office district and to adjoining retail and entertainment/convention districts in downtown Sacramento. Improved access is also an important precondition for shaping land uses and successfully focusing business development that leads to increased employment opportunities.

Evaluation of the project with respect to the project purpose and related needs above and the goals and objectives referenced below is included in Section 7.7, Evaluation of Alternatives. This project purpose is consistent with the goals and objectives described in the *South Sacramento Corridor AA/DEIS/DEIR*, published in September 1994, and with the *Sacramento Regional Transit Multi-Corridor Study* published in September 2001. The project conforms to stated policies of the City of Sacramento and the County of Sacramento. Both entities promote transit as a key feature for orderly and sustainable growth. The *Sacramento County General Plan* supports transit-oriented development based upon implementation of future light rail lines and transit stops. The South Sacramento Corridor Project and other elements of the Sacramento Regional Transit District's rail program are included in the *Sacramento County General Plan*, the Sacramento Area Council of Government's (SACOG's) *Metropolitan Transportation Plan*, and the California State Transportation Improvement Program.[1]

[1] The *General Plan* was adopted by County Board Resolution No. 93-1577 on December 15, 1993; an update affecting several elements was begun in 2001 with a three-year schedule to completion. The most recent *Metropolitan Transportation Plan* (MTP) was adopted in July 2002. The MTP process identifies regional transportation improvement projects for the State Transportation Improvement Program (STIP), which is updated biannually.

1.2 NEED

The South Sacramento Corridor is located within one of the fastest-growing urban areas in the State of California and the nation. According to the U.S. Census, the Sacramento consolidated metropolitan statistical area population grew from 1.5 million to 1.8 million, a 21 percent increase between 1990 and 2000. The South Sacramento Corridor has been a primary focus of metropolitan growth and includes major development and redevelopment opportunities that are expected to attract a large share of future population and employment activity.

1.2.1 South Sacramento Corridor

Metropolitan Sacramento is divided by the Sacramento and American Rivers. The Sacramento River runs generally north-south and is the boundary between Sacramento County on the east and Yolo County on the west. The American River runs generally east-west and separates southern from northern Sacramento.

The "South Sacramento Corridor" is defined as the area east of the Sacramento River and south of the Downtown Sacramento within Sacramento County. The eastern boundary of the corridor is approximately Elk Grove-Florin Road and Watt Avenue, expanding to the Cosumnes River in the vicinity of Elk Grove, and the southern limit is roughly Kammerer Road. The corridor, shown in Figures 1.2-1 and 1.2-2, includes both incorporated and unincorporated areas. The City of Sacramento and the City of Elk Grove are the incorporated areas. Unincorporated communities include Fruitridge, Florin, and Laguna Creek.

The South Sacramento Corridor is subdivided into two subareas for data tabulation purposes. The Phase 1 subarea lies north of Meadowview and Mack Roads, and corresponds to the South Sacramento Corridor Phase 1 light rail extension (open for revenue service in 2003). The Phase 2 subarea lies south of Meadowview and Mack Roads, and constitutes the area most directly served by the alternatives under consideration in this document.

1.2.2 Current and Future Population and Employment

The South Sacramento Phase 2 Corridor is the fastest growing portion of Sacramento County. Elk Grove, at the south end of the corridor, is the fastest growing community in California, and the Sacramento Region is the third fastest growing region in the state. As shown in Figure 1.2-3, total households in the Phase 2 Corridor are projected to more than double from 82,400 in Year 2000 to 179,100 by 2030. Employment is projected to grow even faster, increasing from 36,800 in Year 2000 to over 104,800 by Year 2030.

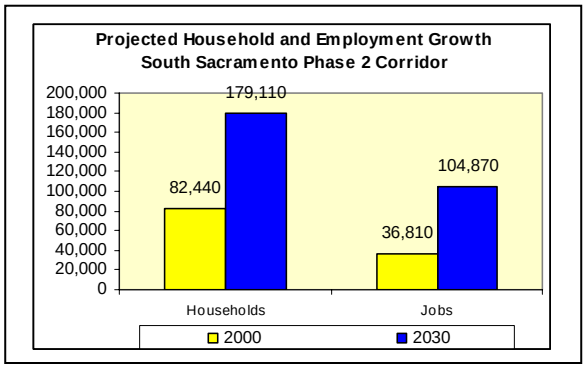
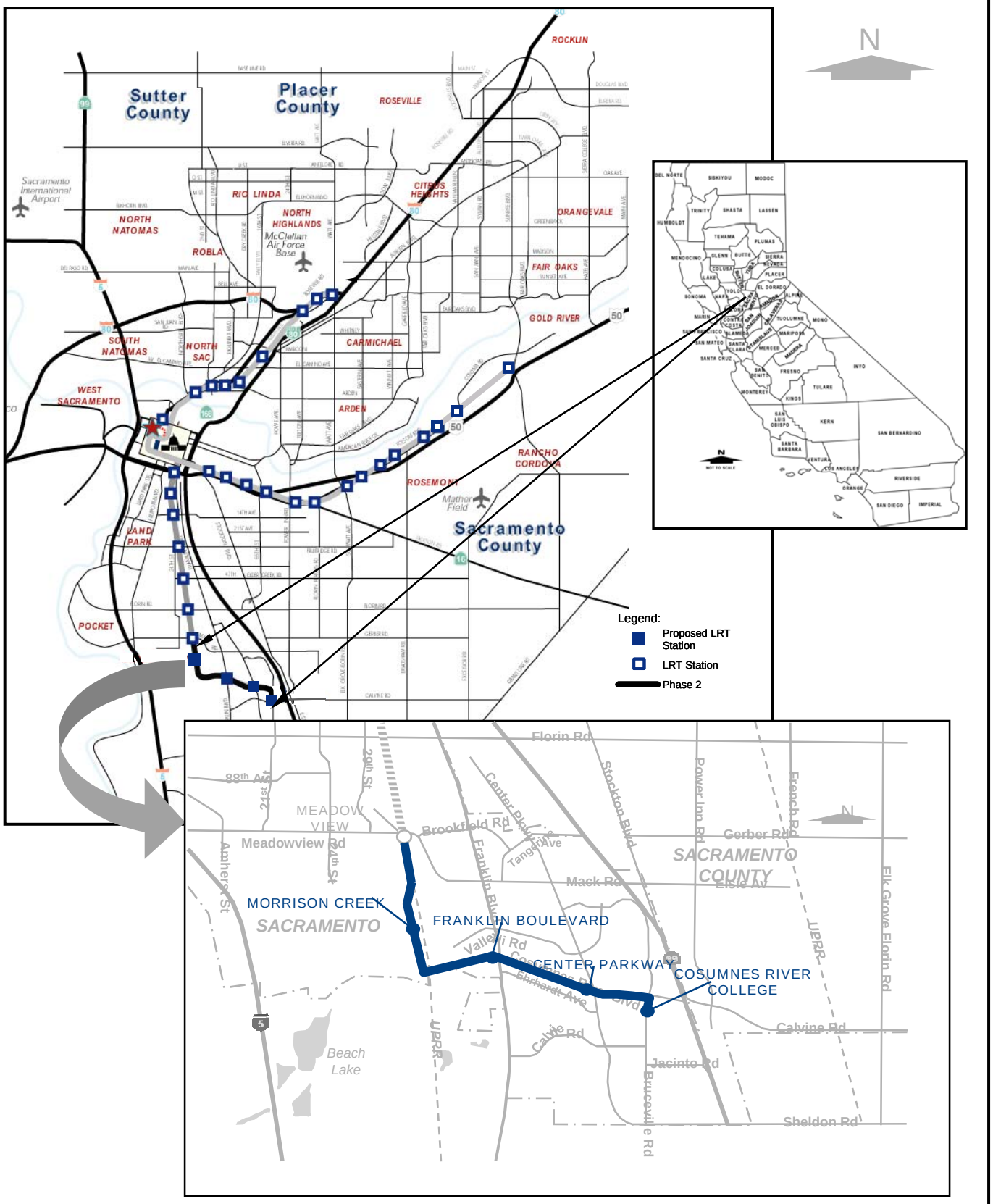


Figure 1.2-3: Growth in Corridor

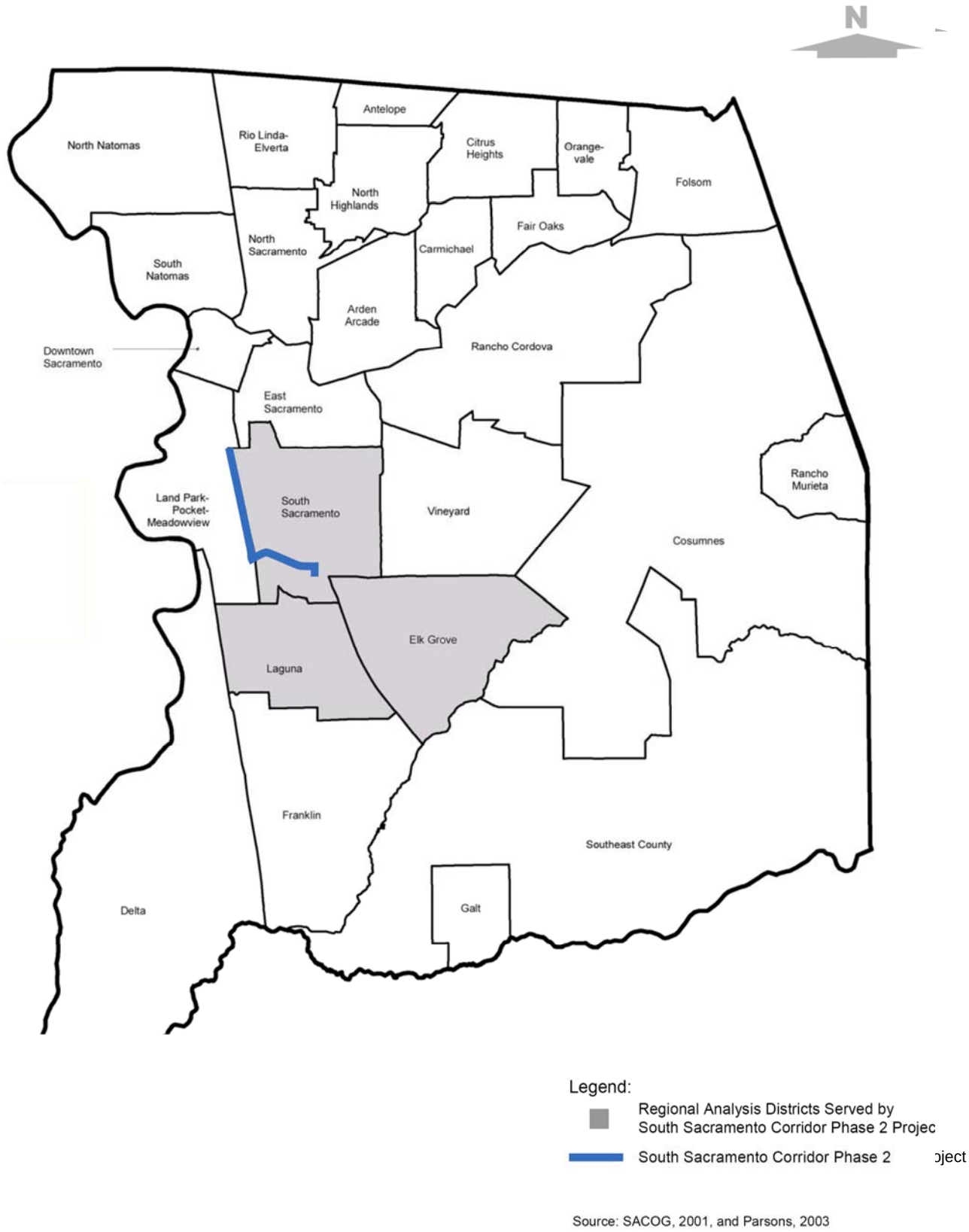
In addition, employment in Downtown Sacramento – a primary destination for Phase 2 Corridor residents – is expected to increase by 55 percent (over 30,000 jobs) between 2000 and 2030, with 289,000 new person trips to Downtown added over this period. *This increase in jobs attracts over 156, 000 new person trips to the CBD Core with more than 22 percent produced from the South Corridors.*



Regional Transit

South Sacramento Corridor Phase 2 Project

SOUTH SACRAMENTO CORRIDOR
Figure 1.2-1



South Sacramento Corridor
Phase 2 Project

SACRAMENTO COUNTY
REGIONAL ANALYSIS DISTRICTS
Figure 1.2-2

Meanwhile, City of Sacramento parking policies continue to purposefully restrict the growth of downtown's parking supply as per the Central City Parking Master Plan's specific objective as stated by the City Council; ensuring that parking supply and rates support transit, other alternative modes, and air quality. These policies result in parking demand growth outpacing increases in supplied parking. The anticipated outcomes are parking cost increases and shifts in parking supply from all-day (employee) parking to short-term (business and visitor) parking; both of which serve to make transit more attractive. To illustrate this trend, the City raised parking prices by 25% (from $1.00 to $1.25 per hour) on all Pay-&-Display stations and at all traditional parking meters, and raised parking citation fines by $5.00 as of July 1 2008. The LRT Project helps to alleviate this by reducing the need for downtown parking by 1,300 spaces over the No Build alternative and by 900 spaces over the TSM alternative. Given the planned provision of park-and-ride facilities along the alignment (particularly the 2,000-space parking garage at CRC just off of Route 99, a major parallel facility for travel downtown), a significant level of travel-time benefits are attributable to this market. Approximately 10 percent of travel-time benefits are for trips destined for the corridor itself, with reverse-commute trips ending at CRC representing the largest single corridor market.

Table 1.2-1 summarizes population and employment trends in the South Sacramento Corridor and in the rest of the Sacramento region.

Table 1.2-1: Current and Future Households and Employment

Geographic Area	2000	% of Total	*2030*	% of Total	Growth	% Growth
Households						
South Sacramento Corridor						
Phase 1 Area	58,710	9.0%	*73,730*	6.5%	*15,020*	*25.6%*
Phase 2 Area	82,440	12.7%	*179,110*	*15.8%*	*96,670*	*117.3%*
Total Corridor	141,150	21.7%	*252,840*	*22.3%*	*111,690*	*79.1%*
Downtown Area						
CBD Core	3,470	0.5%	*4,910*	*0.4%*	*1,440*	*41.5%*
Rest of Downtown	13,630	2.1%	*19,400*	*1.7%*	*5,770*	*42.3%*
Downtown Total	17,100	2.6%	*24,310*	*2.1%*	*7,210*	*42.2%*
Rest of Region	493,320	75.7%	*854,890*	*75.5%*	*361,570*	*73.3%*
Total Region	**651,570**	**100.0%**	***1,132,040***	***100.0%***	***480,470***	***73.7%***
Employment						
South Sacramento Corridor						
Phase 1 Area	*45,810*	*5.7%*	*60,260*	*4.3%*	*14,450*	*31.5%*
Phase 2 Area	*36,820*	*4.6%*	*104,870*	*7.5%*	*68,050*	*184.8%*
Total Corridor	*82,630*	*10.3%*	*165,130*	*11.8%*	*82,500*	*99.8%*
Downtown Area						
CBD Core	*55,010*	*6.9%*	*85,000*	*6.1%*	*29,990*	*54.5%*
Rest of Downtown	*35,740*	*4.5%*	*49,100*	*3.5%*	*13,360*	*37.4%*
Downtown Total	*90,750*	*11.3%*	*134,100*	*9.6%*	*43,350*	*47.8%*
Rest of Region	*629,050*	*78.4%*	*1,101,010*	*78.6%*	*471,960*	*75.0%*
Total Region	***802,430***	***100.0%***	***1,400,240***	***100.0%***	***597,810***	***74.5%***

Source: SACOG, data used for preparation of the 2006 Metropolitan Transportation Plan.

The Phase 2 subarea is expected to experience a more substantial residential and employment growth. Households are projected to increase from 82,440 in Year 2000 to *179,110* in Year *2030*, *an* increase of about *117.3* percent. Employment is projected to increase from 36,820 to *104,870*, *an* increase of *68,050* or *184.8* percent, over the same time period.

1.2.3 Current and Future Travel Demand

Person trip demand in the LPAP2 subarea is expected to grow by approximately *124* percent between 2000 and *2030* as shown in Table 1.2-2. Trips that have at least one trip end in the subarea are expected to total *1.9* million per day by *2030*. Over *65* percent of these will be totally within the subarea. Of the rest, the majority will have the other end in the South Sacramento Corridor Phase 1 subarea, or U.S. 50 corridor. The existing highway and transit systems will not be able to accommodate this growth in travel demand without significant improvements.

Table 1.2-2: Person Trip Demand in South Sacramento Corridor

SSCP2 Trips to/from...	HBW	All Other	Total	% of Total
Year 2000				
LPAP2 Area	33,679	445,639	479,318	56.5%
Downtown Sac.	20,325	17,914	38,239	4.5%
SSCP1 Area	18,409	116,812	135,221	15.9%
Watt I-80	9,917	15,864	25,781	3.0%
Folsom/US-50	31,635	61,068	92,703	10.9%
All Other Corridors	28,112	48,407	76,519	9.0%
Total	142,077	705,704	847,781	100.0%
Year *2030*				
LPAP2 Area	*111,376*	*1,169,244*	*1,280,620*	*67.3%*
Downtown Sac.	*33,148*	*30,242*	*63,390*	*3.3%*
SSCP1 Area	*28,560*	*179,277*	*207,837*	*10.9%*
Watt I-80	*11,956*	*23,545*	*35,501*	*1.9%*
Folsom/US-50	*50,090*	*126,744*	*176,834*	*9.3%*
All Other Corridors	*50,463*	*87,789*	*138,252*	*7.3%*
Total	*285,593*	*1,616,841*	*1,902,434*	*100.0%*
Percent Increase				
LPAP2 Area	*230.7%*	*162.4%*	*167.2%*	
Downtown Sac.	*63.1%*	*68.8%*	*65.8%*	
SSCP1 Area	*55.1%*	*53.5%*	*53.7%*	
Watt I-80	*20.6%*	*48.4%*	*37.7%*	
Folsom/US-50	*58.3%*	*107.5%*	*90.8%*	
All Other Corridors	*79.5%*	*81.4%*	*80.7%*	
Total	*101.0%*	*129.1%*	*124.4%*	

Source: DKS Associates, *2008*

Travel forecasts show that nearly three-quarters of all travel time benefits generated by the LPAP2 LRT Extension project are attributable to commuters destined for downtown Sacramento, with LRT

providing service on a dedicated right-of-way that is competitive with express bus travel times on congested highway facilities for such trips.

1.2.3.1 FREEWAY AND ARTERIAL TRAFFIC

Freeways will be required to handle most of the corridor's travel growth and the region has committed to a series of freeway improvements (see Section 2.2.3). Four major freeways serve South Sacramento. North-south facilities include I-5 and SR 99, both providing access to the south and west sides of downtown Sacramento. East-west facilities include Business 80 and US 50. Business 80 runs along the south side of downtown Sacramento and is coincident with SR 99 and US 50 until these facilities diverge approximately one mile east of the downtown. Business 80 turns north, SR 99 turns south, and US 50 continues to the east.

Because they run north-south through the entire length of the corridor, I-5 and SR 99 are the critical freeway links in the South Sacramento roadway network and the most affected by corridor growth. I-5 is currently a 10-lane facility north of Business 80, six lanes south to Laguna Boulevard, then four lanes to the County line. Existing average daily traffic south of Meadowview Road is *115,000* vehicles per day (See Table 1.2-3).

Table 1.2-3: LPAP2 Project Current and Projected Traffic Congestion on I-5 and SR 99 No-Action Alternative

Location	Year 2000			Year *2030*			Increase
	Count ADT	Lanes Mixed Flow (HOV)	LOS/ V/C	Projected ADT	Lanes Mixed Flow (HOV)	LOS/ V/C	Percent Growth
SR 99							
Florin to Mack	*165,000*	4(2)	F *1.72*	*205,400*	4(2)	F *1.96*	*24%*
Mack to Calvine	*136,000*	4(2)	F *1.42*	*175,700*	4(2)	F *1.68*	*29%*
Calvine to Sheldon	*132,000*	4(2)	F *1.38*	*152,900*	4(2)	F *1.46*	*16%*
Sheldon to Laguna	*122,000*	4(2)	F *1.27*	*149,000*	4(2)	F *1.42*	*22%*
I-5							
Florin to Meadowview	*107,000*	6(*2*)	D *0.79*	*162,900*	6(2)	F *1.13*	*52%*
Meadowview to Laguna	*115,000*	6(0)	*E 0.96*	*172,400*	6(0)	F *1.44*	*50%*

Source: DKS Associates, *2007*.

Traffic volumes are projected to increase substantially throughout the length of I-5 as the area grows. By *2030*, average daily traffic will be on the order of *172,000* vehicles south of Meadowview Road, a *50* percent increase. The rapid growth in traffic expected between Meadowview Road and Laguna Boulevard is a direct reflection of the considerable residential and employment growth projected for the area and southern Sacramento County in general.

SR 99 will experience similar patterns of traffic growth by *2030*. This facility is six lanes between Florin Road and Elk Grove Boulevard, including two high occupancy vehicle (HOV) lanes, one in each direction. Access to this freeway within the corridor area is primarily via interchanges at Mack Road and Cosumnes River Boulevard/Calvine Road. The average daily traffic volume on SR 99 south of

Cosumnes River Boulevard/Calvine Road is about *136,000* vehicles per day. SR 99 traffic is projected to reach *175,700* vehicles daily south of Cosumnes River Boulevard/Calvine Road in *2030*, a *29* percent increase.

The projected growth in traffic will produce a steady deterioration in conditions in coming years. I-5 is currently below capacity between Meadowview and Laguna, but severe congestion is projected for *2030* operations south of Meadowview. SR 99 is currently over capacity. During the 1990s, SR 99 was widened to accommodate High Occupancy Vehicle (HOV) lanes from Elk Grove Boulevard north to the Sacramento Central City. However, no additional improvements are planned for this section of SR 99 by *2030*. The projected increase in volumes will cause traffic congestion on SR 99 to expand to more hours of the day and extend southward to Elk Grove. By *2030*, SR 99 will suffer severe congestion during peak periods over the length of the corridor. Projected demand volume-to-capacity will exceed 1.0 (indicating more demand for travel than the roadway can physically accommodate) for all segments of I-5 and SR 99 in the study area. Freeway level of service (LOS) will be "F," reflecting low speeds and frequent delays due to queuing. This freeway congestion will cause traffic diversions to numerous parallel arterial roadways in the corridor and thereby add to the anticipated congestion levels along those roadways.

Major arterials serving South Sacramento will also experience increasing congestion as the area continues to develop. The widening of Bruceville Road and Cosumnes River Boulevard and other future roadway improvements will help accommodate projected growth although levels of service at some intersections will degrade to LOS D or E conditions even with the planned improvements.

1.2.3.2 PUBLIC TRANSIT SERVICES

RT proposes to improve its transit services substantially in South Sacramento and elsewhere. The South Line LRT Phase 1 was opened for service in September 2003. Table 1.2-4 shows current and projected future transit trips in the corridor. Transit boardings are expected to more than triple between 2000 and 2030, while linked transit trips are expected to grow by 130 percent.

Table 1.2-4: Transit Riders per Day in South Sacramento Corridor No-Action Alternative

All Transit Trips	2000	Projected 2030
Boardings	14,300	45,700
Linked Transit Trips	11,000	25,300

Source: DKS Associates, May 2004.
Note: Data shown is for No-Action Alternative, for more information see Tables 3.2-6 and 3.2-7.

Express bus demand from Elk Grove to downtown Sacramento is currently running over capacity. Review of April and May, 2002 ridership data for RT express lines 52, 59, and 60 indicated that lines 52 and 60 are running over their seated capacity per trip while line 59 is running at 80 percent of seated capacity. The overloading of express buses is likely to increase due to the ongoing rapid growth in the area fueling increased commuting to downtown Sacramento jobs

Given the expected highway congestion, these trip data emphasize the need for efficient transit service. The LPAP2 LRT Alternative's superior system continuity and operation on a separate guideway rather than on congested streets and freeways provide travel time savings over the bus-based TSM Alternative. Compared to the TSM Alternative, the LPAP2 provides transit travel time savings of 3 to 27 percent for trips to Downtown Sacramento from areas in the LPAP2 Corridor. System-wide travel time savings (calculated using FTA's SUMMIT software) show that the total travel time savings for the LPAP2, relative to a TSM Alternative, are 2,273 hours per weekday, or 668,262 hours per year.

Ninety-five percent of the time savings accrue to trips beginning in the LPAP2 Corridor. For trip destinations, 74 percent of the time savings accrue to trips ending in Downtown Sacramento; nine percent to trips ending in the LPAP2 Corridor; 10 percent to trips ending in the Phase 1 Corridor; and 6 percent to trips ending in the Folsom/ US 50 Corridor.

The biggest obstacle to realizing projected transit ridership is likely to be the problems faced by buses operating in mixed-flow traffic on congested roadways. Bus travel times will increase (and likely discourage transit use) unless buses can operate apart from the mixed-flow traffic stream. Access to HOV lanes may allow faster travel, but congested arterials feeding the major HOV facilities (e.g., SR 99) and within downtown Sacramento will continue to affect speeds adversely. Travel time studies have shown that bus transit trips between major activity centers in the South Sacramento Corridor would typically be five to 30 minutes longer than transit trips using exclusive right-of-way, such as the proposed LPAP2.

1.2.4 Air Quality

Increasing congestion and slowing travel times for both auto and transit threaten to worsen air quality in the region. Metropolitan Sacramento currently has the tenth worst air quality in the United States and is an Environmental Protection Agency designated non-attainment area for ozone. Automobiles are responsible for 70 percent of this air pollution.

Table 1.2-5 presents three years of data from the Sacramento – T Street and Del Paso Manor air monitoring stations to demonstrate pollution trends. SO_2 data are from the Del Paso Manor monitoring station; all other data are from the T Street station. The table also indicates federal and state standards for these pollutants, and where these pollutant standards have been exceeded.

As shown in Table 1.2-5, federal or State standards for carbon monoxide, nitrogen dioxide, or sulfur dioxide were not exceeded during the three-year period. The State one-hour ozone standard was exceeded from one to six times between 2004 and 2006. Federal standards for eight-hour ozone were exceeded zero to three times between 2001 and 2003; state ozone standards were exceeded two to six times during the same period. While the federal standard for PM_{10} was not exceeded, the State standard was exceeded from one to eight times between 2004 and 2006. In addition, the federal $PM_{2.5}$ annual concentration was exceeded in 2005 and 2006.

The Sacramento Metropolitan Air Quality Management District's adopted *Air Quality Attainment Plan* and Sacramento County's *General Plan* both include the development of light rail and increased use of alternative-fuel vehicles as major clean air policy objectives. The LPAP2 Project would directly address these objectives.

Table 1.2-5: Air Quality Standards, Ambient Measurements and Violations, in the Project Vicinity

Pollutant	Federal Standard	State Standard	Year	Maximum Level	Violation Days (Federal/State)
Ozone (O_3) 1 hour	N/A	0.09 ppm	2004 2005 2006	0.105 0.108 0.106	NA /1 NA /4 NA /6
Ozone (O_3) 8 hour	0.08 ppm	0.07 ppm	2004 2005 2006	0.075 0.087 0.090	0/NA 1/NA 3/NA
Particulates (PM_{10}) 24 hours	150 µg/m^3	50 µg/m^3	2004 2005 2006	58.0 55.0 111.0	0/1 0/4 0/8
Particulates ($PM_{2.5}$)	12 µg/m^3 – annual	35 µg/m^3 – 24 hr	2004 2005 2006	NA/52.5 12.5/63.8 12.9/54.0	NA/0 Yes/0 Yes/0
Carbon Monoxide (CO) 8 hour	9.0 ppm	9.0 ppm	2004 2005 2006	2.96 3.64 NA	0/0 0/0 0/0
Nitrogen Dioxides (NO_2)	0.053 ppm – annual	0.18 ppm – 1 hr	2004 2005 2006	0.017/0.072 0.016/0.071 0.016/0.077	0/0 0/0 0/0
Sulfur Dioxide (SO_2)	0.14 ppm – 24 hr	0.25 ppm – 1 hr	2004 2005 2006	0.003 0.003 0.002	0/ NA 0/ NA 0/ NA

Notes:
ppm = parts per million
µg/m^3 = micrograms per cubic meter
NA = not available
Violation days = number of days exceeding federal or State standard
Source: California Air Resources Board Website, July 2007.

By attracting more passengers to transit, the LRT Project leads to an improvement in air quality as shown in Table 1-2. The LRT Project will reduce criteria pollutants and precursor emissions, as well as greenhouse gases compared to the No Project and TSM Alternative. Reducing air pollution will help the Sacramento region address its severe (ozone) and moderate (PM_{10}) EPA air quality designations. The LRT Project will also reduce energy consumption by 11,542 million BTUs per year.

Table 1-2: Tons Per Year Reduction from LRT

Pollutant	Compared to No-Project	Compared to TSM
CO	–12.96	– 8.97
NOx	– 2.43	– 1.68
VOC	– 0.72	– 0.5
PM_{10}	– 0.30	– 0.21
$PM_{2.5}$	– 0.28	– 0.19
Greenhouse Gases (CO_2)	– 6,507.18	– 4,504.97

1.2.5 Other Needs

Transit improvements by themselves will not make a major impact on congestion and air quality unless combined with other efforts to change travel behavior. Some important steps, particularly germane to South Sacramento, that would enhance transit use and help meet the transportation needs of the corridor include:

- Better coordination of transportation services, especially improved system connectivity; and
- Land use planning supportive of transit use.

The LPAP2 Project facilitates both steps.

1.2.5.1 CONNECTIVITY

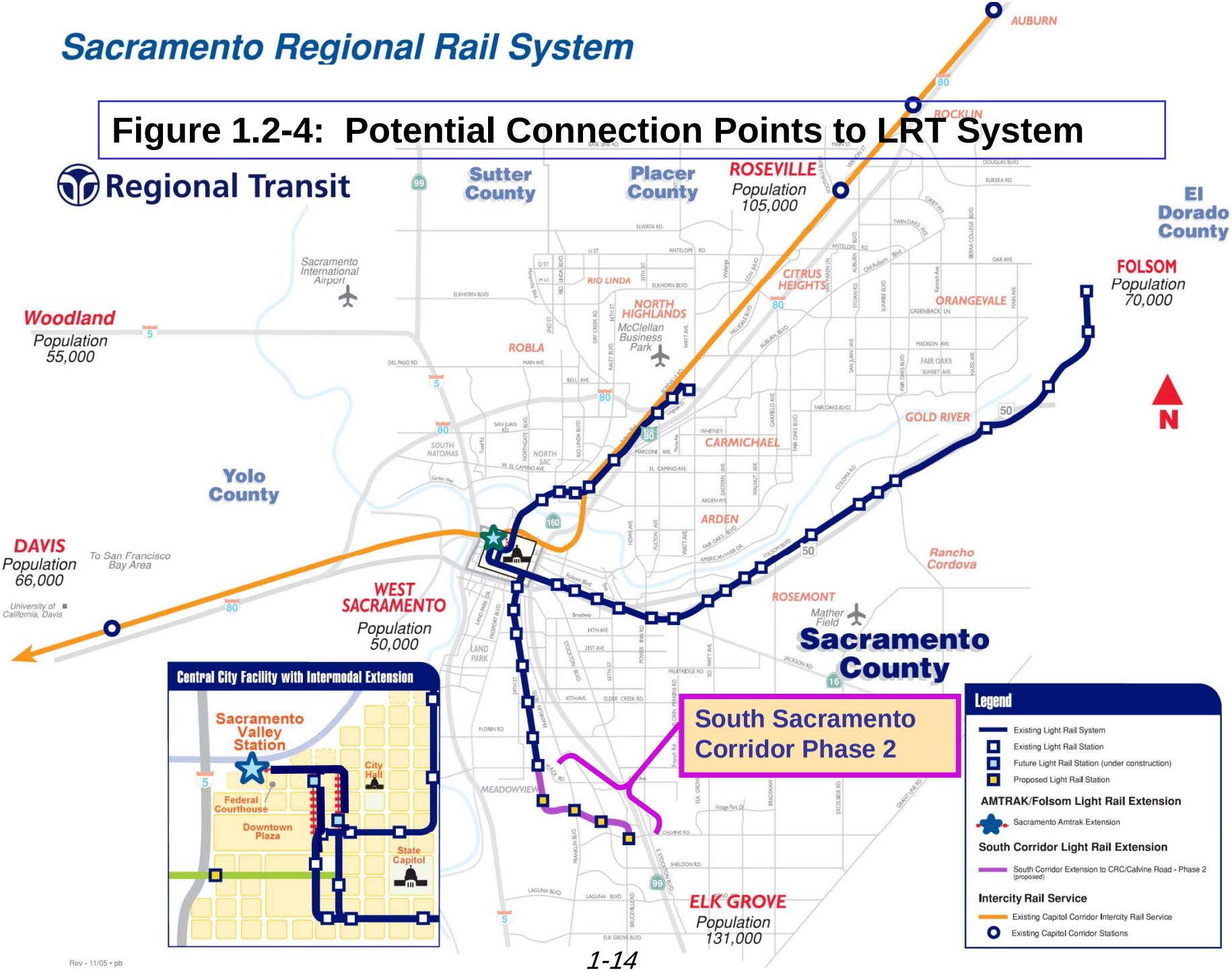
The LPAP2 Project would extend light rail service through areas with the highest existing and projected 2022 transit ridership in the region. South Sacramento residents would be connected directly with the present LRT network and its extensions to Folsom and the downtown Sacramento Intermodal Terminal. The Intermodal Terminal identified in the MTP will eventually offer connections to Amtrak, intercity rail and buses, commuter bus services, local bus service, paratransit service, and private shuttles and charters. Ultimately, the Sacramento rail system would provide critical linkages to the major employment and residential centers within three counties. Future extensions of the LRT network under consideration include service to Sacramento International Airport and the neighboring cities of Davis and Roseville. Davis includes the University of California at Davis campus, and Folsom and Roseville are growing communities, with major high technology employers. Figure 1.2-4 illustrates these potential connection points to the existing LRT. Good connectivity to mainline transit services is important for maintaining and expanding transit ridership. Without convenient network access, ridership in South Sacramento would be adversely affected by increased travel time requirements.

1.2.5.2 LAND USE PLANNING

Within the South Sacramento Corridor, considerable land is available for both residential and commercial/industrial development. Opportunities exist for infill development that would relieve pressure for the conversion of agricultural land and open space. For example, redevelopment is proposed for part of the UPRR yard adjacent to Sacramento City College and the SPRR yard on the north side of downtown Sacramento. Economic development/revitalization opportunities are under study along roadway corridors served by the proposed South Sacramento Corridor Project, e.g., along Broadway Avenue, Franklin Boulevard, Meadowview Road, and Stockton Boulevard. Transit is a tool to help shape urban development patterns, and fixed-guideway services offer more potential than bus-only services to influence future land uses.

Sacramento RT, working with local land use planners and local jurisdictions, has developed an aggressive Transit for Livable Communities (TLC) program. The TLC program is designed to encourage mixed use transit oriented development around new light rail stations and to encourage infill around existing stations.

Figure 1.2-4: Potential Connection Points to LRT System



The LPAP2 Project will support coordinated transportation and land use planning. The Project includes construction of a light rail station designed to serve proposed transit oriented development near the Morrison Creek Station. The Morrison Creek Station would be easily accessible by foot or bike and be designed to encourage transit use by residents of the new neighborhood. Other stations on the extension will also include convenient pedestrian access to further reduce vehicle trips and increase transit's attractiveness. RT planners have worked closely with land use planners from the City of Sacramento and property owners near the proposed LRT stations (Stone-Boswell near the Morrison Creek Station and College Square near the CRC Station) to pursue and promote transit oriented development in these LPAP2 station areas.

The City of Sacramento is currently developing their 2025 General Plan Update and a comprehensive community plan update for the areas currently covered by the Airport-Meadowview and the western part of the South Sacramento Community Plans. Issues being addressed include land use changes to promote transit-oriented development around light rail stations along the South Sacramento Corridor light rail extensions, a review of existing and proposed land uses to implement smart growth policies, and land use and transportation issues for undeveloped areas in the south part of the City. Other local and development plans and policies for the study area are described in Section 4.10.2.

CHAPTER 2: ALTERNATIVES

This chapter describes the three alternatives under consideration for the South Sacramento Corridor Phase 2 project: (1) the No-Action Alternative; (2) the Transportation Systems Management (TSM) Alternative, and (3) the Locally Preferred Alternative Phase 2 (LPAP2) -- Light Rail Transit (LRT) extension. The No-Action Alternative forms the basis for a thorough evaluation (as presented in Chapters 3, 4, and 5) of the impacts of the TSM and LPAP2 alternatives under the National Environmental Policy Act (NEPA) and the California Environmental Quality Act (CEQA). A comparison of the TSM and LPAP2 alternatives (as discussed in Chapters 3 and 7) provides the basis for the Federal Transit Administration's evaluation of the project's worthiness for federal funding under the "New Starts" Program.

2.1 BACKGROUND

Planning for the South Sacramento Corridor as an integral part of RT's LRT program began over 25 years ago. Segments of the Corridor were formally identified for future LRT extension as early as 1981, when, in response to a Sacramento City Council request, the RT Board conditionally adopted a resolution designating SR 148 (Cosumnes River Boulevard to Calvine Road) for future LRT extension. This resolution requested City staff to acquire additional right-of-way along Cosumnes River Boulevard (CRB) for LRT construction and to reserve and hold sites for park-and-ride lots at CRB/Calvine Road, CRB/Center Parkway, and CRB/Franklin Boulevard. In 1984, the Sacramento Area Council of Governments (SACOG) completed the *Sacramento LRT Extension Study Expanded LRT System Analysis*, which developed a list of prioritized projects to guide future LRT expansion efforts. This study identified the Meadowview, Laguna, Route 148, and Elk Grove extensions, portions of which generally follow the alignments of the South Sacramento Corridor Phase 1 (opened for service in September 2003), Phase 2 (the subject of the present SFEIS/SFEIR), and Phase 3, identified for future extension of the transit corridor. This study prioritized the Downtown Natomas Airport Extension and I-80/Antelope Corridors for near-term expansion of the LRT starter line from Watt Avenue/I-80 to Mather Field. The Meadowview, Calvine (former SR148/CRB), and Elk Grove corridors were prioritized for later development.[1]

In June 1987, RT's Board adopted SACOG's *Sacramento Light Rail Transit Extension Study Final Report*, which identified nine preferred alignments for light rail extensions including the Meadowview, Calvine, and Elk Grove extensions. The RT Board's adoption of these alignments was intended to enable preservation of rights-of-way in accordance with City and County of Sacramento planning processes, by depicting the alignments on the land use and circulation element maps of their respective general plans, and by adoption of policies "dedicating" these rights-of-way for LRT. In 1987, the RT Board unanimously passed a resolution "reaffirming Cosumnes River Boulevard as a preferred high capacity transit corridor." This resolution depicted the Meadowview LRT Extension (along the old Southern Pacific Railroad right-of-way) from downtown Sacramento, and thence eastward along Union House Creek within CRB to Calvine Road, key portions of which reflect the LPAP2 alignment under consideration in the present document.

[1] RT had acquired right-of-way for the "Meadowview Extension," which ran along the old Southern Pacific Railroad right-of-way west of Executive Airport, and the SACOG study preferred this extension to the Laguna alignment along the UPRR. The UPRR alignment was later identified as preferable in the 1994 AA/DEIS/DEIR.

The South Sacramento Corridor was identified as a candidate for a future extension of LRT during RT's 1991 *Sacramento Systems Planning Study*, which evaluated eight corridors in the greater metropolitan area for their potential to generate sufficient ridership to warrant future implementation of light rail or other forms of transit. On the basis of this study, RT proceeded to prepare Environmental Impact Reports (EIR) to enable preservation of right-of-way for the Downtown-Natomas Airport and Folsom Corridor LRT extensions, prepared a project-level EIR for extending the starter line to Sunrise/Gold River, and advanced the South Sacramento Corridor into conceptual engineering and environmental review.

On March 29, 1995, the RT Board of Directors adopted a Locally Preferred Alternative (LPA) for long-term development of LRT improvements in the South Sacramento Corridor. The Board's selection was based on a review of seven investment alternatives described in the 1994 *South Sacramento Corridor Alternatives Analysis/Draft Environmental Impact Statement/ Draft Environmental Impact Report* (AA/DEIS/DEIR). As part of this process, an extensive, multi-lingual public information process was conducted to provide the broader community with information regarding the project. The Citizens' Advisory Committee (CAC) voted unanimously in favor of supporting the light rail alternative in the UPRR alignment. On the basis of the technical analysis and environmental impact data developed during the AA/DEIR/DEIR phase, the recommendation of the CAC, and the results of the community outreach process, comments received on the circulated AA/DEIS/DEIR, the RT Board of Directors selected the 11.3-mile Locally Preferred Alternative on March 29, 1995 by resolution. Resolutions of support were passed by the Sacramento City Council and the Sacramento County Board of Supervisors. This designation identified the "LRT-Low/UPRR Alignment" as the preferred alignment for extension of LRT from downtown Sacramento southward to Calvine Road/Auberry Drive and thence to Elk Grove. The RT Board certified the Final EIR for this LPA on May 8, 1995 (Resolution No. 95-05-2356; see Appendix F).

In response to capital and operations funding constraints, the RT Board stated its intention to implement the South Corridor project in two phases. On August 28, 1995, the RT Board adopted the Interim Operable Segment, or first implementation phase of the project. The project was advanced to preliminary engineering and a project-specific draft and final Supplemental EIS/Subsequent EIR were prepared for the first phase of the project. Final design was completed in 2000, and the South Sacramento Corridor Phase 1 project, as completed in September 2003, extends from the 16th Street LRT station in downtown Sacramento along the UPRR corridor to Meadowview Road in South Sacramento.

Also in 2000, in its *Multi-Corridor Study*, RT re-evaluated the candidate corridors for future extensions of fixed-guideway transit. Nineteen corridors, including several alignment variations in the South Sacramento Corridor, were evaluated and rated for ridership potential, travel time competitiveness, system connectivity, environmental challenges, and other factors. This study confirmed the South Sacramento and Downtown/Natomas Airport Corridors in order as the top ranking high priority corridors for LRT extension.

Consistent with this planning to date, this SFEIS/SFEIR focuses on the environmental impacts of the second phase of the LPA adopted by the RT Board of Directors in 1995 and supplements the environmental evaluation contained in the 1994 AA/DEIS/DEIR. Specifically, it describes the current environmental setting, it recognizes current and recent planning activities and plans, and evaluates impacts from a more precisely defined Phase 2 project, including a description and evaluation of changes between that portion of the 1995 LPA that is now defined as LPAP2. This phase extends from Meadowview Road in South Sacramento along the previously designated alignment down the UPRR right-of-way and along CRB to Cosumnes River College (CRC) in the City of Sacramento. A new LRT station at Morrison Creek has been added to the previously defined LPA.

Table 2.1-1
South Sacramento Corridor Milestones

1981	RT Board Designates Cosumnes River Blvd. & Calvine Road for Right of Way Preservation	Current Milestones
1984	SACOG Completes *Sacramento LRT Extension Study - Expanded LRT System Analysis*	Current Milestones
1987	SACOG Issues *Sacramento Light Rail Transit Extension Study Final Report*	Current Milestones
1991	RT Completes *Sacramento Systems Planning Study*,	Current Milestones
1994	RT Board Certifies South Sacramento Corridor AA/DEIS/DEIR	Current Milestones
1995	RT Board Adopts Locally Preferred Alternative	Current Milestones
2000	South Line Phase 1 RT Board Certifies EIR FTA Issues Record of Decision	Current Milestones
2003	RT Opens South Line Phase 1 for Revenue Service RT Submits Phase 2 "New Starts" Criteria Report to FTA	Current Milestones
2004	RT Board Terminates Phase 2 at Cosumnes River College & Adds Morrison Creek Station RT Board Rejects Maintenance Facility Options Along Phase 2 RT Completes Fleet Management Plan 2003 - 2013 RT Submits Phase 2 "New Starts" Criteria Report to FTA Receives Recommended Rating FTA Approve New Starts Baseline (TSM) Alternative	Current Milestones
2005	RT Receives Authorization to Enter Preliminary Engineering	Current Milestones
2007	RT / FTA Circulate SDEIS/SDEIR	Current Milestones
2008	FTA / RT Distribute SFEIS/SFEIR RT Board Certifies SFEIR FTA Issues Record of Decision FTA Authorizes Final Design	Future Milestones
2009	RT Develops Final Design RT / FTA Sign Full Funding Grant Agreement	Future Milestones
2009 - 2011	LPAP2 Construction	Future Milestones

This SFEIR will be certified by the RT Board of Directors under CEQA, and the Federal Transit of Administration will issue a Record of Decision for the SFEIS. These actions will enable the design, development of funding agreements, and construction of the project. Table 2.1-1 summarizes the timeline for prior planning activities and shows anticipated future milestones.

Various alignments are under consideration to extend LRT to the City of Elk Grove as a third phase of the project. The present study does not evaluate these alignments, but engineering refinements for Phase 2 are being carried out so as not to preclude any viable alternatives that would be considered for the Phase 3 transit corridor. The Phase 3 alignments and options will be evaluated in a subsequent alternatives analysis and environmental evaluation.

2.2 NO-ACTION ALTERNATIVE

Both the National Environmental Policy Act (NEPA) and the California Environmental Quality Act (CEQA) require that an environmental document evaluate a No-Action Alternative in comparison with the proposed project. The No-Action Alternative consists of all currently planned and programmed (that is, funded) projects, except for the proposed project. In this case, the No-Action Alternative consists of those projects identified in the financially-constrained long-range Metropolitan Transportation Plan (MTP). This comprises the existing Sacramento regional highway and transit systems with improvements as identified in the MTP to the forecast year *2030*, except for the South Sacramento Corridor Phase 2 extension with its associated transit services and future high capacity transit options for the South Sacramento Corridor Phase 3.

2.2.1 Background Assumptions

In formulating future transit alternatives, the Federal Transit Administration (FTA) requires a definition of transportation facilities and services reasonably expected to be in place in the future analysis or forecast year. This common set of transportation system capacity and service levels is termed the "future baseline condition." The future baseline conditions are common to all alternatives.

The forecast year for this Supplemental *Final* Environmental Impact Statement/Subsequent *Final* Environmental Impact Report (SFEIS/SFEIR) is *2030*. Year *2030* baseline transportation conditions were developed in close coordination with SACOG. SACOG is the Metropolitan Planning Organization responsible for determining areawide population and employment forecasts, modeling regional travel demand, and formulating the MTP and Regional Transportation Improvement Program (RTIP), which feed into the State Transportation Improvement Program (STIP). SACOG drafted a *Metropolitan Transportation Plan for 2027*, which was adopted on July *2006*. Land use and employment forecasts, transportation network improvements, and other regional level assumptions used in developing the alternatives for this SFEIS/SFEIR were based on the information in the *2006* final draft MTP.

The purpose of comparing alternatives is to determine the merits of a new rail transit extension versus lower-cost transportation improvements. To isolate the differences attributable to the new rail alternative, future baseline conditions not directly attributable to the rail system are held constant across all alternatives. For this analysis, these conditions are the following:

- Population and employment growth forecasts for Sacramento area cities and unincorporated areas, as determined and approved by SACOG;
- Trip generation rates for different types of land uses;
- Linkages among origins and destinations for area trips;
- Area parking costs;
- Loading standards for bus and rail fleet vehicles; and
- Transit fares reflecting current RT fare policies for bus and LRT services.

The SACOG Sacramento Regional Travel Demand Model known as SACMET01 was used with these conditions to estimate Year 2030 travel forecasts for the South Sacramento Corridor Phase 2 project.[2] As part of the analysis the travel demand model was modified to improve its ability to estimate mode of access to transit in the corridor.

2.2.2 No-Action Alternative: Corridor Transit System

The major transit improvements included in the MTP reflect the System Expansion and Phasing Strategy that was developed in RT's *Multi-Corridor Study* and adopted by the RT Board of Directors in July 2001. The *2027* MTP transit improvements incorporated into the No-Action Alternative are as follows:

- Continued expansion of Capitol Corridor intercity train service to 16 daily trains to the Bay Area.
- Commuter rail service between Dixon and Auburn using the Union Pacific (UP)/Amtrak facilities.

[2] At times year 2030 travel forecasting results are provided based on recent updated countywide travel forecast results.

- Light rail extended north from Downtown Sacramento to Natomas Town Center and the Sacramento Airport.
- Light rail extended east from Northeast Line to Antelope in Sacramento County.
- Light rail extended to city of Folsom (opened October 2005) and to Amtrak station in Downtown Sacramento.
- Implementation of express LRT service to Downtown Sacramento from Folsom and Watt/I-80.
- Light rail extended west from Downtown Sacramento to West Sacramento.
- Bus service increased substantially above current levels, with concomitant bus fleet expansion from the current 230 buses to 400 buses by *2030*.
- Bus rapid transit implemented in three commute corridors, including Stockton Boulevard, Watt Avenue, and Sunrise Boulevard.
- Expansion of bus and van service regionwide, including an increase in service for elderly and disabled persons.
- Additional community circulator vans or shuttles that serve neighborhoods, commercial areas, and jobs centers throughout the day at reduced fares.

The total transit investment in the MTP is $7.3 billion, which includes both the LPAP2 and Phase 3 LRT extensions, neither of which is included in the No-Action Alternative. The LPAP2 LRT extension is the subject of this evaluation, and the Phase 3 transit corridor will be evaluated in a subsequent alternatives analysis and environmental evaluation.

Year *2030* transit networks for the SFEIS/SFEIR were adapted from the transit networks developed for the *2006* MTP. Public transit services in the model include the following:

- RT bus service;
- RT light rail transit;
- Folsom Stage Line local and commuter services;
- Roseville local and commuter services;
- University of California, Davis Medical Center shuttles;
- Yolobus (Yolo County Transit Authority) local and commuter/express services;
- California State University, Sacramento shuttles;
- UNITRANS – University of California, Davis and City of Davis transit;
- Placer County Transit; and
- El Dorado Transit local and commuter services.

Not included in the transit networks used for ridership modeling are elderly and handicapped services (for example, Paratransit, Inc. in Sacramento County) and other employer-based shuttles provided through local transportation management associations.

The Year *2027* MTP network was developed by layering several service modifications and increments over the MTP base year (that is, Year 2000) transit network. The layers are as follows:

- Service changes needed for the Phase 1 LRT line to Meadowview Road in the South Sacramento Corridor. Local bus lines were modified to feed the new Phase 1 LRT line. Most express buses from areas south and east of the Meadowview Road LRT terminus to Downtown Sacramento were retained.
- Service changes needed for the LRT extension to the City of Folsom. Local and express bus lines in the Folsom corridor were re-oriented to better feed the LRT stations on the Folsom LRT extension.
- New feeder bus services for the Downtown-Natomas-Airport, West Sacramento, and Antelope LRT extensions included in the MTP.
- "Bus Rapid Transit" services as conceptually defined in RT's 2001 Multi-Corridor Study were added in three corridors: Watt Avenue, Sunrise Avenue, and Stockton Boulevard. These service improvements consist of the following:
    - A series of 20 shuttles to provide community or neighborhood-level transit throughout the day. The services provide access from residential areas to neighborhood commercial areas, social services, civic facilities and transit centers, or from transit centers to employment areas. The services operate at reduced fare for short trips within communities; full fares are charged if shuttles are used to transfer to other fixed-route bus or LRT routes.
    - New fixed-route bus services in high-growth areas.
    - Reduced headways on some routes where justified by load factors.
    - Additional fleet on other routes to maintain headways in the face of growing congestion.

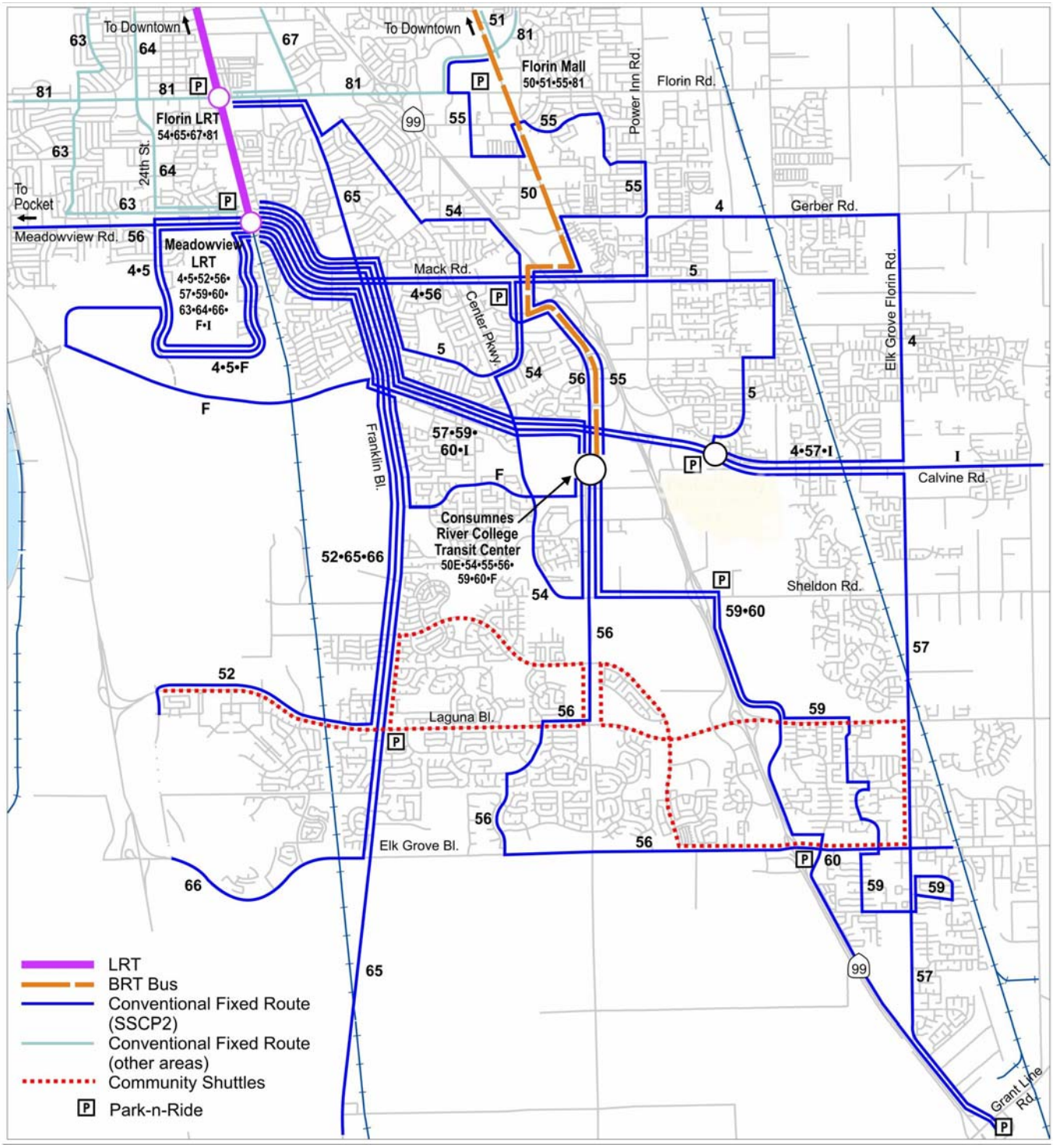
Figure 2.2-1 and Table 2.2-2 summarize transit service in the South Sacramento Corridor for the No-Action Alternative.

2.2.3 No-Action Alternative Highway Network Improvements

The South Sacramento Corridor roadway network is dominated by two major north-south routes: Interstate Highway 5 (I-5) and State Route 99 (SR 99). Mack Road/Meadowview Road, Laguna Boulevard, and Elk Grove Boulevard are the major east-west arterial connectors. The future baseline highway network was developed to reflect SACOG's current estimates of projects "fiscally committed" to the year *2030*. The *2006* MTP allocates a total of $22.5 billion in funding from all sources to a package of construction, operation, and maintenance projects for public transit, roadways, bicycle and pedestrian facilities, airports and ports, and other regional projects and programs. The construction of new roadways accounts for about one-third ($7.4 billion) of the total funding.

Major roadway projects in the South Sacramento Corridor that are included in the No-Action Alternative are listed in Table 2.2-3. Recently completed improvements include HOV lanes on SR 99 from Grant Line Road in Elk Grove to U.S. 50. This improvement provides travel alternatives on congested SR 99 for both carpoolers and for express buses.

Major South Corridor roadway improvements in the *2027* MTP include HOV lanes and additional park-and-ride lots along I-5, from Elk Grove Boulevard to Downtown Sacramento. These improvements will provide travel alternatives, improved auto travel times, and additional transit amenities, especially for residents of Laguna and Elk Grove, and those living nearer I-5.



Source: DKS Associates

South Sacramento Corridor Phase 2 Project

YEAR 2030 NO-ACTION ALTERNATIVE
Figure 2.2-1

Table 2.2-1: No-Action Alternative Transit Service in South Sacramento Corridor

Route	Existing Service[1]			No-Action Alternative		
		Headways		Headways		
	Description	Peak	Non	Peak	Non	Change from Existing
Southline LRT	South Sacramento Corridor Phase 1 LRT to Meadowview	15	15	10	15	Peak service frequency increased.
4	Meadowview-Gerber	60	60	20	60	Peak service frequency increased; Route extended west/south past Meadowview to serve 24th St./Delta Shores
5	Meadowview-Valley Hi	60	60	20	60	Peak frequency higher; Route extended west/south past Meadowview to serve 24th St./Delta Shores, and south past Florin HS to connect to Calvine.
50E	Stockton E-bus	15	15	10	15	Peak frequency higher; Route extended south to CRC transit center
52	Laguna/DT Express	40	N/A	20	60	Converted to feeder to Meadowview LRT; Service provided all day.
54	Center Parkway	40	60	20	30	Higher frequency all day
55	Scottsdale	60	60	20	30	Higher frequency all day
56	Elk Grove-Pocket	30	30	10	30	Peak frequency higher
57	Elk Grove-Florin Express	90	N/A	30	30	Converted to feeder, Elk Grove to Meadowview LRT; Service provided all day.
59	Elk Grove/DT Express	60	N/A	30	60	Same as above.
60	Elk Grove/DT PNR Express	60	N/A	30	60	Same as above.
65	Franklin South	60	60	30	30	Higher frequency all day
66	New--Elk Grove/DT Express	90	N/A	30	60	Converted to feeder, Laguna to Meadowview LRT
F	N/A	N/A	N/A	30	30	New route service Delta Shores, connecting Meadowview to CRC
I	N/A	N/A	N/A	30	60	New Calvine Road trunk line route to CRC

[1] Sacramento Regional Transit, "Bus-Rail Transit Integration Plan," September 2003.
Source: DKS Associates, April 2004.

Other major roadway system improvements identified in the *2027* MTP are the City of Sacramento's proposed widening of CRB between Bruceville Road and Franklin Boulevard, the extension of CRB from its western terminus at Franklin Boulevard to I-5 (expected to be completed by 2008), and the proposed widening of Bruceville Road to three lanes in each direction between Sheldon Road and CRB (partially completed).

According to current plans for the College Square Development, West Stockton Boulevard will be widened to a divided roadway into this development, and Cotton Lane may be extended westward, providing for a new intersection with Bruceville Road opposite the CRC entrance.

Table 2.2-2: Major Highway Improvements Programmed for South Sacramento Corridor to *2030*

Project	Description	Cost ($ 000's)	Completion Year
CAL17840	I-5 HOV Lanes, Elk Grove Blvd to Pocket	40,000	2014
CAL17840	I-5 HOV Lanes, Pocket to U.S. 50	100,000	2020
REG17350	I-5/Elk Grove Blvd Park-and-Ride Lot	500	2004
REG17340	I-5/Laguna Blvd Park-and-Ride Lot	500	2004
SAC20520	SR 99, Grant Line Interchange Reconstruction	31,000	2010
SAC19380	SR 99, Sheldon Road Interchange	31,176	2008
SAC23650	Bruceville Road, Widen to 4 Lanes from Sheldon to CRB	3,800	2007
SAC23650	Bruceville Road, Widen to 6 Lanes from Sheldon to CRB	6,000	2010
SAC19040	Calvine Road, Widen to 4 Lanes E. of Kingsbridge to Vineyard Road	7,363	2004
SAC15920	CRB, Widen to 4 lanes Center Pkwy to Bruceville	970	2008
SAC15930	CRB, Widen to 4 lanes Franklin to Center Pkwy	1,696	2008
SAC18380	CRB/I-5, Extend CRB to I-5 and Build Interchange	50,000	2008
SAC15660	Sheldon Road, Widen to 4 Lanes from Bruceville to Elk Grove-Florin	3,543	2007
SAC19160	Sheldon Road, Widen to 4 Lanes from Elk Grove-Florin to Waterman	1,264	2010
SAC17560	Sheldon Road, Widen to 6 Lanes from Bruceville to SR 99	1,000	2010
	Total Cost	$278,812	

Source: SACOG, Metropolitan Transportation Plan for 2025, May 15, 2002.

The widening and extension of CRB in the study area will improve auto access from the corridor to I-5, providing an alternative to travel on the heavily congested SR 99. The widening of Bruceville Road is also included in the No-Action Alternative.

2.3 TRANSPORTATION SYSTEMS MANAGEMENT (TSM) ALTERNATIVE

In evaluating proposed rail transit initiatives under its “New Starts” program, the Federal Transit Administration (FTA) requires a Transportation Systems Management (TSM) Alternative against which to assess the benefits and impacts of the new rail start in the forecast (future analysis) year. The TSM Alternative under the New Starts program is defined as the “best that can be done” to improve

transit services in the project corridor without a major capital investment in new infrastructure. The TSM Alternative must address the same transportation needs and deficiencies as identified for the proposed rail transit alternative, but would address these needs using lower-cost actions.

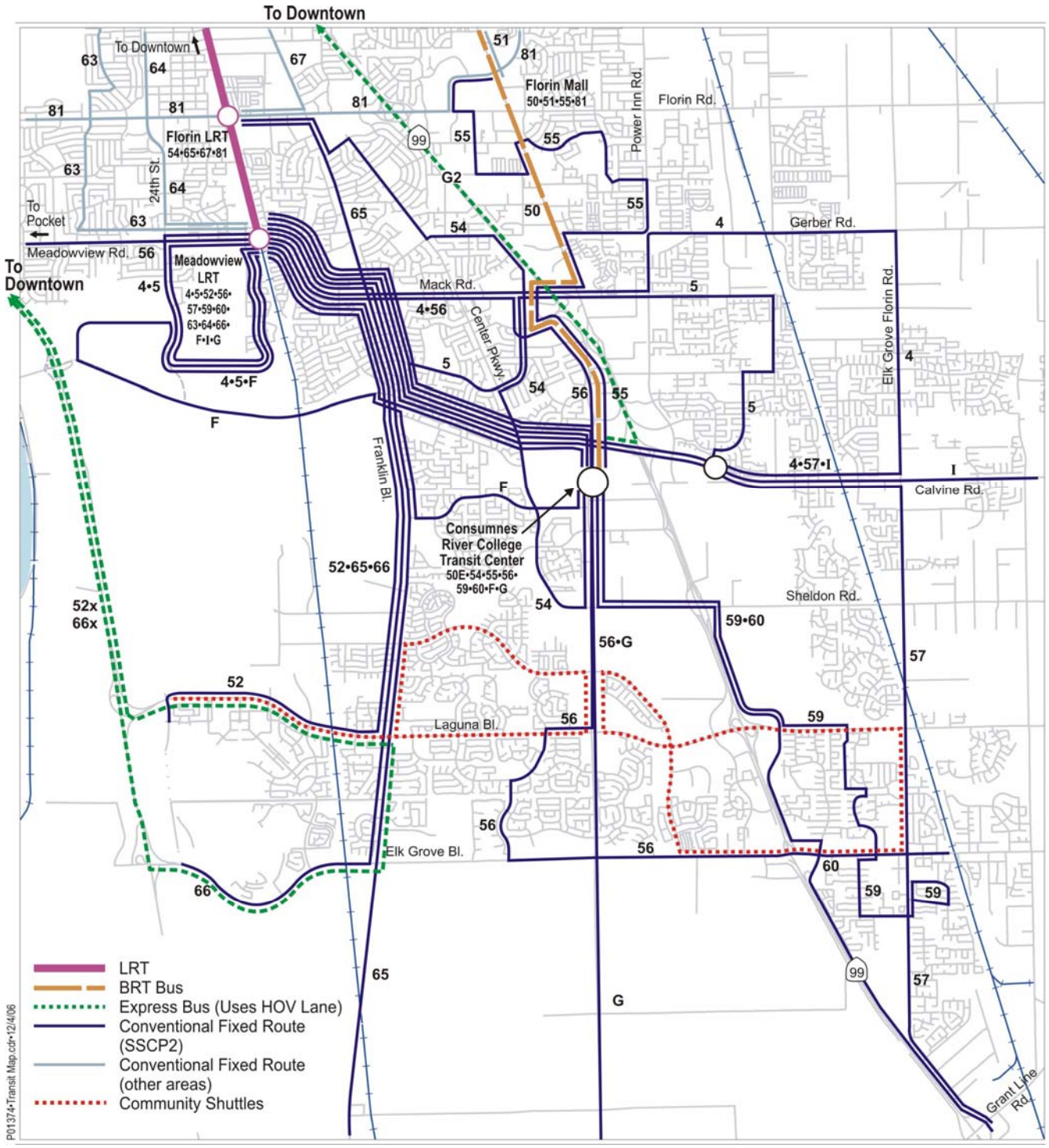
2.3.1 TSM Alternative Bus Service

As stated previously, the No-Action Alternative consists of the *2027* MTP, but without the LPAP2 LRT extension and its associated feeder bus services. For the TSM Alternative, therefore, lower-cost line-haul and feeder bus routes are added to the No-Action Alternative, to represent the best that can be done through lower-cost service improvements to accommodate transit travel demand without the LPAP2 LRT extension. The TSM Alternative includes the following additions, compared to the No-Action Alternative:

- Direct express bus service via SR-99 HOV lanes, connecting from the CRC transit center to Downtown Sacramento. A new park-and-ride lot (approximately 1,400 spaces at CRC) is also added, to enhance drive-access transit opportunities in the South Sacramento Corridor Phase 2.
- Direct express bus service via Interstate 5 HOV lanes, connecting from the Laguna West community to Downtown Sacramento. The existing park-and-ride lot in Laguna West was sized to accommodate parking demand for this service.
- A high-frequency, trunkline bus route connecting the Elk Grove/Lent Ranch area to CRC and the Meadowview LRT Station via Bruceville Road, CRB and Franklin Boulevard.
- An improved transit center at CRC to enhance bus-to-bus and park-and-ride lot access at this transit center. Other improvements to bus-to-LRT transfers at the Meadowview LRT station were added.
- Transit priority treatment along Stockton Boulevard in the corridor, affecting Route 50E. RT is also implement transit priority along Watt Avenue and Sunrise Avenue in addition to downtown Sacramento as part of a system-wide approach to transit priority, so transit priority would be part of the No-Action Alternative as well.

Figure 2.3-1 shows the South Sacramento Corridor transit network under the TSM Alternative. For the majority of the bus services, headways would be as presented for the No-Action Alternative. Table 2.3-1 lists the starting headways for the new bus services, and a comparison to the No-Action transit service. Outside of the South Sacramento area illustrated in Figure 2.3-1 and listed in Table 2.3-1, transit service reflects the *2027* MTP and no differences exist between the No-Action and TSM alternatives.

With the proposed bus service, the TSM Alternative addresses the same basic travel needs as the LPAP2, but utilizes lower-cost transit services in doing so. The specific needs include alleviating severe and ever-increasing traffic congestion on SR 99, which currently has recurring traffic congestion (Level of Service F) for one to two hours during both the morning and afternoon commute periods between Calvine and Florin roads. Projected increases in traffic volumes will cause congestion (Level of Service F) on SR 99 to expand to more hours of the day and extend southward to Elk Grove, and this congestion is expected to cause traffic diversions to several parallel arterial roadways in the corridor, thereby adding to anticipated congestion levels along these roadways.



N

Source: DKS Associates

South Sacramento Corridor Phase 2 Project

TRANSPORTATION SYSTEMS MANAGEMENT TSM ALTERNATIVE

Figure 2.3-1

Table 2.3-1: *2030* Transit Service in South Sacramento Corridor

Route	No-Action Alternative			Transportation Systems Management (TSM) Alternative		
	Description	Headways		Headways		Change from No-Action
		Peak	Non	Peak	Non	
Southline LRT	South Sacramento Corridor Phase 1 LRT to Meadowview	10	15	10	15	No difference.
4	Meadowview-Gerber	20	60	20	60	No difference.
5	Meadowview-Valley Hi	20	60	20	60	No difference.
50E	Stockton E-bus	10	15	10	15	Connects to new park-and-ride lot and transit center at CRC
52	Laguna LRT Feeder	20	60	30	60	Peak headway reduced
52X	Laguna Blvd.-Downtown Express (via I-5)	n/a	n/a	15	--	Direct service from northern Laguna West to Downtown added
54	Center Parkway	20	30	20	30	No difference.
55	Scottsdale	20	30	20	30	No difference.
56	Elk Grove-Pocket	10	30	10	30	No difference.
57	Elk Grove LRT Feeder	30	30	30	30	No difference.
59	Elk Grove LRT Feeder	30	60	30	60	No difference.
60	Elk Grove LRT Feeder	30	60	30	60	No difference.
65	Franklin South	30	30	30	30	No difference.
66	Laguna LRT Feeder	30	60	60	60	Peak headway reduced
66X	Elk Grove Blvd.-Downtown Express (via I-5)	n/a	n/a	15	--	Direct service from southern Laguna West to Downtown added
F	Delta Shores	30	30	30	30	No difference.
I	Calvine Trunkline	30	60	30	60	No difference
G	Trunkline route, Meadowview LRT to Elk Grove, via Franklin, CRB, and Bruceville Rd.	n/a	n/a	20	30	Route added
G2	CRC-Downtown Express (via SR-99)	n/a	n/a	20	60	Route added; 1,400 space park-and-ride added at CRC

Source: DKS Associates, August 2004.

Other needs include serving a number of special generators of transit trips in the corridor (see Figure 1.1-1). Among these are CRC, two hospitals, a new middle school, a new high school, two sports

stadiums, social services, civic facilities, community centers, and recreation facilities. By providing enhanced bus services, the TSM Alternative provides the same connections to these special trip generators as the LPAP2. Because the TSM Alternative would utilize bus service to do so, stops and alignments can be adjusted and refined to provide reduced walk distances to some of these facilities.

A certain amount of additional transferring (e.g., from the Phase 1 LRT stations to fixed route buses) is unavoidable in the TSM Alternative, given that the initial major transit investment in the corridor (i.e. the Phase 1 extension) has already been made in LRT. The need for coordinated, efficient transit can be met with the TSM Alternative through timed transfer facilities. Also, by retaining direct express bus service from Elk Grove to Downtown Sacramento, some commuters may face fewer required transfers than with the LPAP2.

By utilizing the existing HOV lanes on SR 99, the TSM Alternative will make use of an existing highway investment to reduce congestion on this roadway.

2.3.2 TSM Alternative Rail Transit Operations

The TSM Alternative consists of the existing Sacramento LRT system with other LRT and rail improvements as identified in the *2027* MTP but without the LPAP2 LRT extension. Note that the TSM Alternative includes all the other light rail extensions in the *2027* MTP – that is, the Downtown Natomas Airport Corridor LRT Extension, as well as the proposed LRT extensions to West Sacramento and Antelope, (in other words the same as for the No-Action Alternative).

2.3.3 TSM Alternative Highway Improvements

The highway and roadway network under the TSM Alternative would be the same as described under the No-Action Alternative.

2.3.4 TSM Alternative Transit Centers

A new transit center would be built at CRC and would include a 1,400 space park-and-ride lot. This lot would include landscaping. Criteria for the design of the new CRC transit center or enhancement to existing transit centers would include:

- Ensure pathways of access for the disabled;
- Create a pedestrian-supporting environment;
- Provide pedestrian and vehicular safety; and
- Minimize major environmental issues.

Typical passenger amenities at transit centers would include:

- Covered shelter with comfortable seating;
- Telephones for outgoing calls only;
- Landscaping;
- Lighting:
- Drinking fountains;
- Bicycle racks and lockers;
- Information displays; and
- Easy access for elderly and disabled passengers.

Design details and landscaping plans would be refined during the project's final design phase. The public will have the opportunity to review and comment upon design and architectural features of a new CRC transit center and enhancements to existing transit centers during this phase. RT will work closely with the public in order to identify critical transit center design issues early in the planning process and incorporate public input into transit center design.

2.4 LOCALLY PREFERRED ALTERNATIVE PHASE 2

The Locally Preferred Alternative Phase 2 (LPAP2) would extend LRT in a dual-track arrangement from the existing Phase 1 LRT terminus at Meadowview Road to a terminus in the vicinity of CRC, a distance of approximately 4.3 miles. It would include new LRT stations at Morrison Creek, Franklin Boulevard, Center Parkway, and CRC/College Square, and up to four new traction power substations along the alignment to link the light rail electrification system to the SMUD power grid. This section describes the LPAP2.

2.4.1 LPAP2 Highway Improvements

The highway and roadway network under the LPAP2 would be the same as described under the No-Action Alternative.

2.4.2 LPAP2 Transit Service

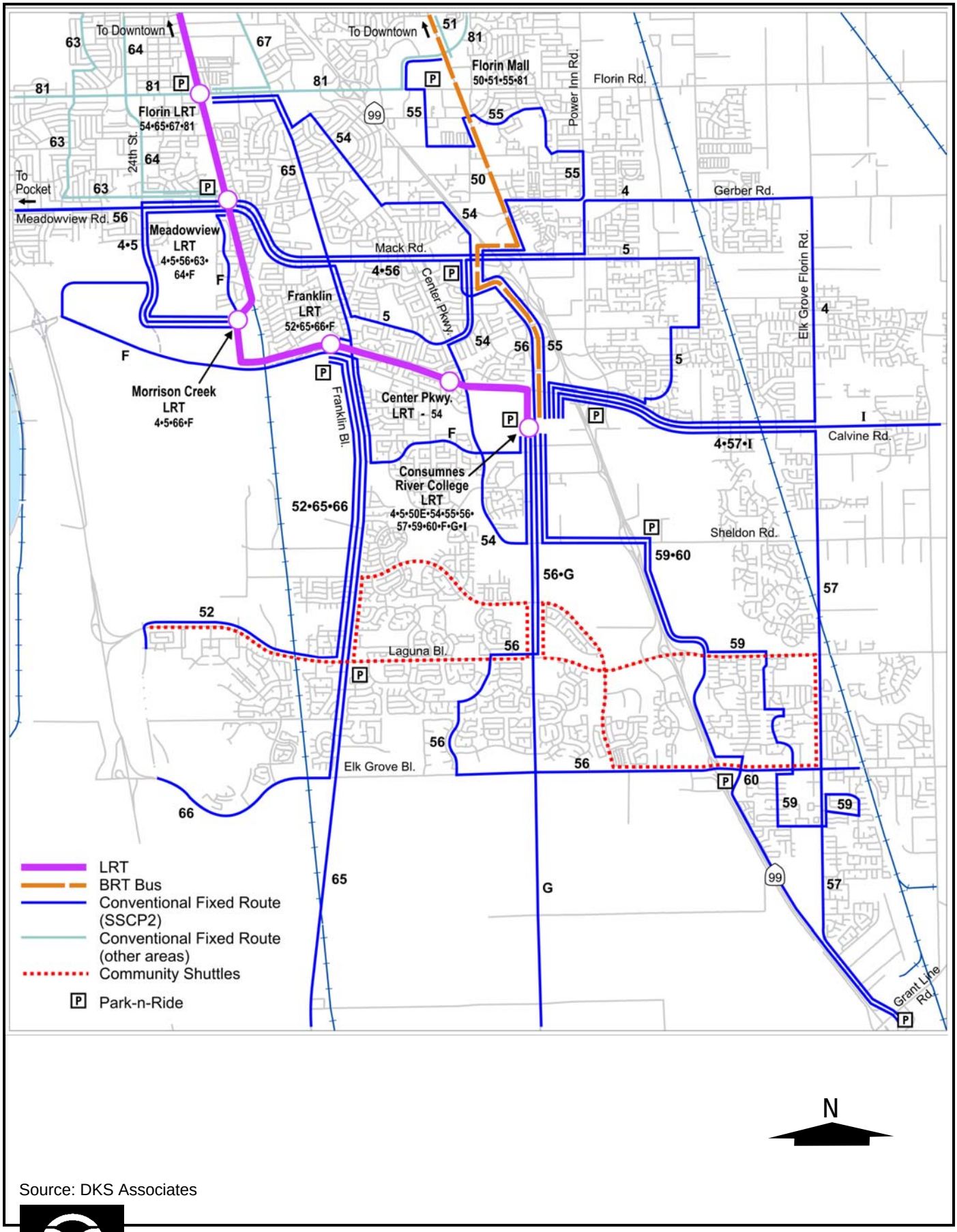
Figure 2.4-1 and Table 2.4-1 present the LPAP2 transit service. Under the LPAP2 all transit service was designed to provide improved connectivity between the South Line LRT service and the local bus service. For example as shown in Table 2.4-1, all express bus service would be replaced by local buses feeding the LRT. The following sections describe the LPAP2 in detail.

2.4.3 LPAP2 Alignment Description

Figure 2.4-2 shows the location of the proposed LPAP2, which consists of 4.3 miles of a dual light rail track alignment that would begin at the South Corridor Phase I Meadowview Station and continue south on the western side of and within the Union Pacific Railroad (UPRR) right-of-way. Existing UPRR facilities in this portion of the corridor consist of a single active freight line. The LRT tracks would be placed on the western side of the UPRR corridor with the first adjacent LRT track about 20 feet from the existing UPRR track. If the UPRR were to add a second track in the future, this track would be placed on the eastern side of the corridor. There is adequate space within the UPRR corridor to accommodate both the LRT and freight rail facilities.

The LPAP2 would jog to the west *out of the railroad right of way*, run south along the west side of Morrison Creek, turn east crossing Morrison Creek, the UPRR corridor and tracks, and Union House Creek on aerial structure, continue east staying north of the proposed extension of CRB (by others), and then cross Franklin Boulevard at grade to run along the north side of CRB (widened by others) and cross Center Parkway at grade; *approaching* Bruceville Road it would turn south crossing *over* CRB *on a flyover bridge* and run along the west side of Bruceville Road crossing *at*-grade the eastern entrance to CRC terminating north of Old Calvine Road.

The LRT would be designed for a maximum speed of 55 miles per hour (mph), although tight curves in some locations would require slower speeds. The two tracks would be spaced generally 14 feet apart and *23* feet in the UPRR portion of the alignment.



Source: DKS Associates

South Sacramento Corridor Phase 2 Project

LRT ALTERNATIVE
Figure 2.4-1

Figure 2.4-2: Locally Preferred Alternative Phase 2

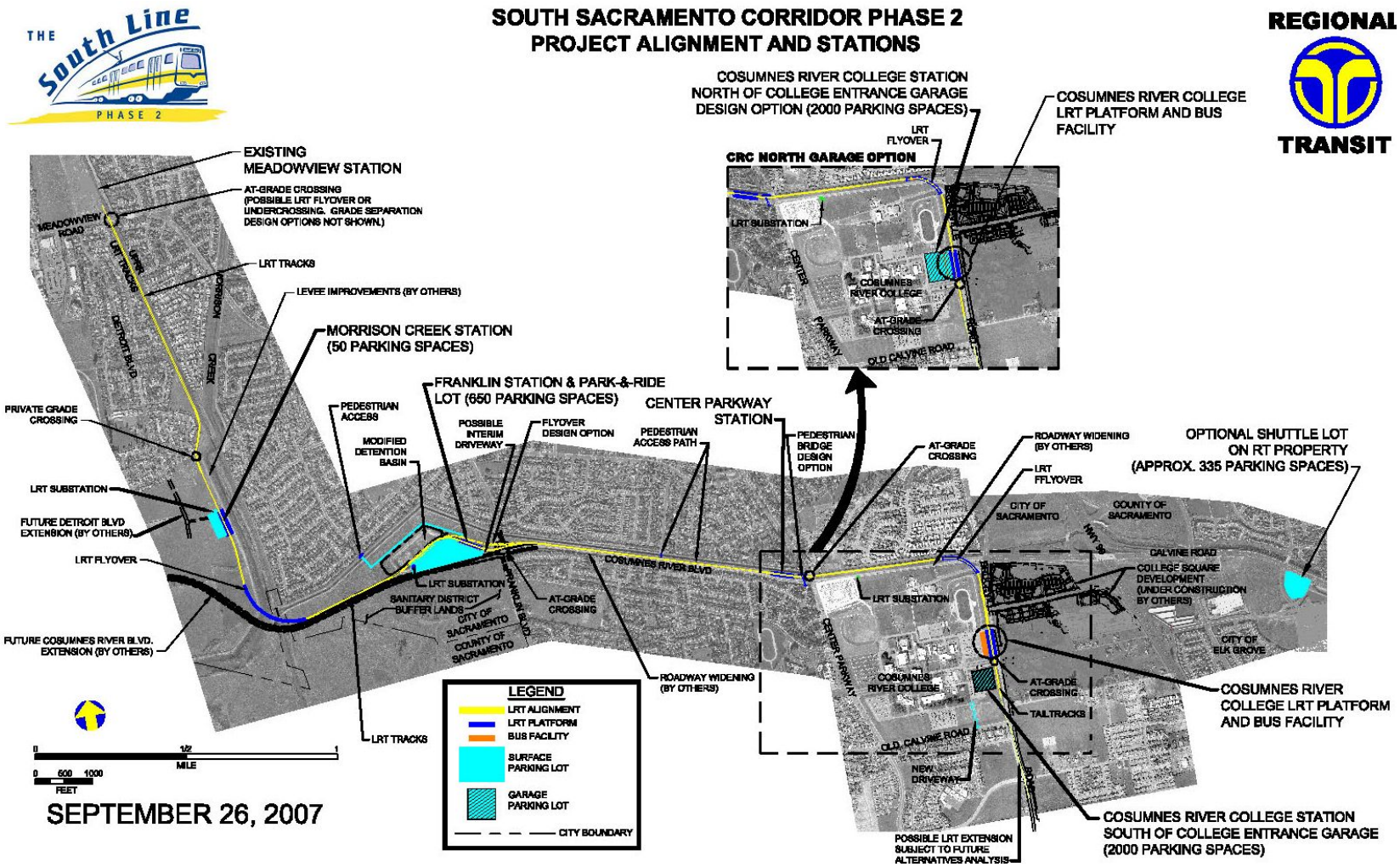


Table 2.4-1: LPAP2 Transit Service in South Sacramento Corridor

Route	TSM Alternative			LPAP2		
	Description	Headways		Headways		Change from TSM Alternative
		Peak	Off-Peak	Peak	Off-Peak	
Southline LRT	South Sacramento Corridor Phase 1 LRT to Meadowview	10	15	10	15	LRT extended to CRC, via Morrison Creek, Franklin and Center Parkway stations.
4	Meadowview-Gerber	20	60	20	60	Route extended to Morrison Creek LRT at north/west end.
5	Meadowview-Valley Hi	20	60	20	60	Route extended to CRC LRT at south/east end; route extended to Morrison Creek LRT at north/west end.
50E	Stockton E-bus	10	15	10	15	No difference.
52	Laguna LRT Feeder	30	60	20	60	Route truncated at Franklin LRT; peak service frequency increased.
52X	Laguna Blvd.-Downtown Express (via I-5)	15	--	n/a	n/a	Route deleted
54	Center Parkway	20	30	20	30	No difference.
55	Scottsdale	20	30	20	30	No difference.
56	Elk Grove-Pocket	10	30	10	30	No difference.
57	Elk Grove LRT Feeder	30	30	30	30	Route truncated at CRC LRT.
59	Elk Grove LRT Feeder	30	60	30	60	Route truncated at CRC LRT.
60	Elk Grove LRT Feeder	30	60	30	60	Route truncated at CRC LRT.
65	Franklin South	30	30	30	30	No difference.
66	Laguna LRT Feeder	60	60	30	60	Route truncated at Franklin LRT; peak service frequency increased.
66X	Elk Grove Blvd.-Downtown Express (via I-5)	15	--	n/a	n/a	Route deleted
F	Delta Shores	30	30	30	30	No difference.
I	Calvine Trunkline	30	30	30	30	Route truncated at CRC LRT.
G	Trunkline route, Meadowview LRT to Elk Grove, via Franklin, CRB River Parkway, and Bruceville Rd.	20	30	20	30	Route truncated at CRC LRT.
G2	CRC-Downtown Express (via SR-99)	10	--	n/a	n/a	Route deleted.

Source: DKS Associates, August 2004.

The LPAP2 alignment would be mostly at grade on existing ground or engineered fills. A bridge structure would be required to carry the LRT tracks over Morrison Creek, the UPRR corridor and tracks, and Union House Creek. There would also be *an LRT aerial flyover bridge over CRB near Bruceville Road*. At-grade LRT tracks within the *Center Parkway to Bruceville Road* part of the CRB corridor would be physically separated from adjacent automobile traffic by a concrete barrier. At-grade crossings would be protected by gates and warning signals in compliance with California Public Utilities Commission (CPUC) regulations.

Retaining walls would be required in *several* locations to minimize right-of-way impacts, avoid encroachment of embankments into adjacent properties, or protect existing power poles. These are identified on the figures and described in Section 2.4.4, Detailed Description of LPAP2 Alignment.

Finally, in order to identify the optimal LPAP2, several design options were evaluated in the initial project planning. This evaluation included consideration of additional stations, grade separations, alignment options (e.g. median or north side of CRB), and station locations. The resulting LPAP2 best meets the Project's Purpose and Needs at a reasonable cost and minimum impacts.

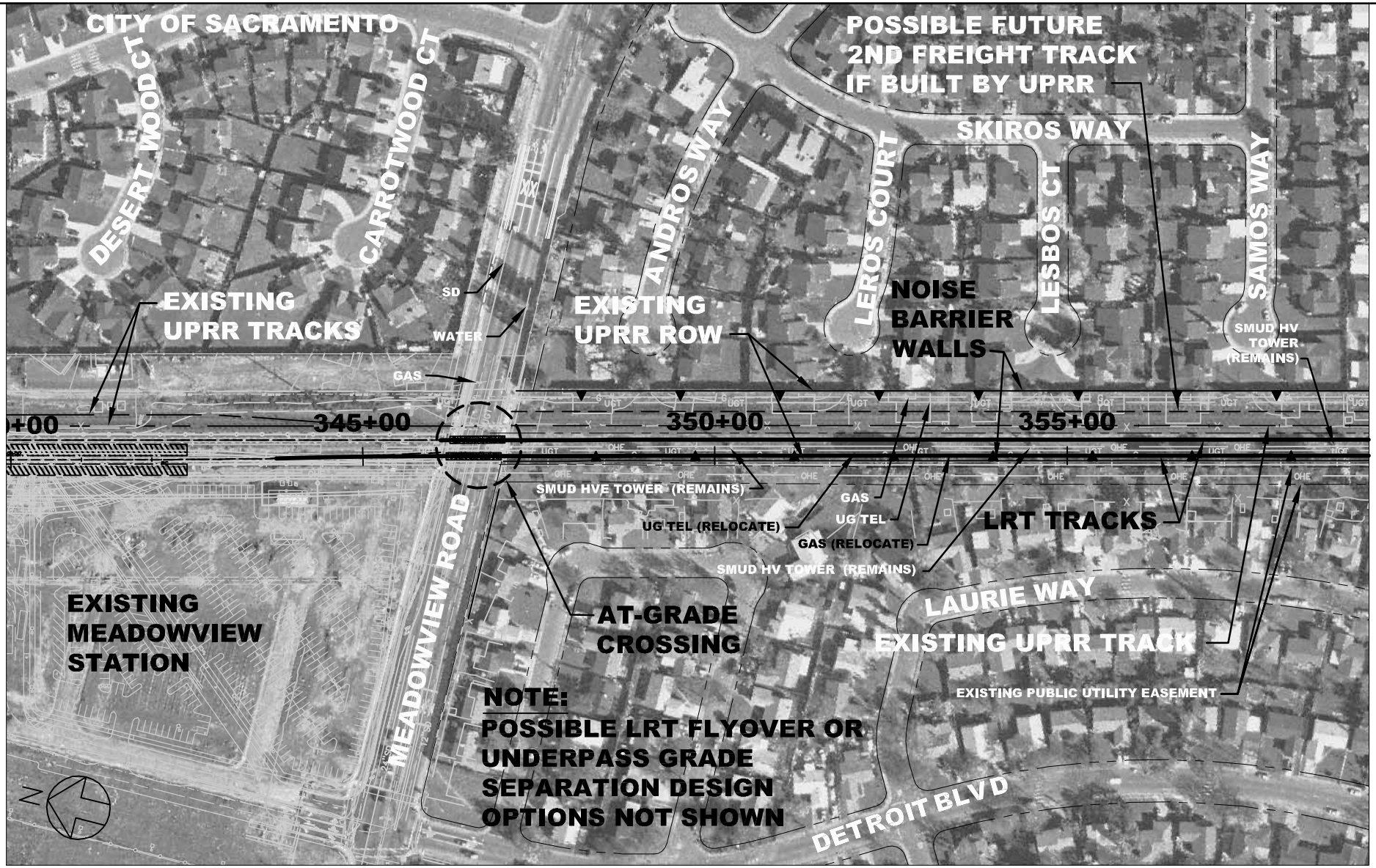
The following design options are still under consideration:

- Two *grade separation* options for crossing Meadowview Road: (1) depressed roadway (underpass), and (2) LRT flyover;
- LRT *grade separation* flyover of Franklin Boulevard;
- An optional pedestrian overpass across CRB to the Center Parkway Station;
- *A* parking *garage* option at the CRC Station *north of the main college entrance off of Bruceville Road*; and
- An optional parking shuttle lot at Calvine and Auberry Roads.

The grade separation options are under consideration because they would improve traffic operations, although they would add to the project cost. These design options are described in the appropriate sections below. The optional station pedestrian access facilities are being evaluated in terms of their environmental and community impacts and the provision of improved access to the LRT stations. The shuttle parking lot at Calvine/Auberry is being reviewed to determine the extent to which it would enhance transit services to the area east of SR 99.

2.4.4 Detailed Description of LRT Alignment

The following sections present a detailed description of the proposed LRT alignment, broken down into geographic segments, starting at Meadowview Road. Figures 2.4-3 through 2.4-*18* depict the proposed LRT alignment, related facilities, and right-of-way requirements, while Figures 2.4-*19* through 2.4-*22* show typical cross sections for the alignment and related facilities*, and Figures 2.4-23 through 2.4-26 show the stations and related pedestrian and vehicle access and park-and-ride facilities.*



SUBJECT TO CHANGE DURING FINAL DESIGN

SCALE: AS SHOWN
0 50 100 200

Regional Transit

South Sacramento Corridor
Phase 2 Project

LRT ALTERNATIVE
LAYOUT PLANS
FIGURE 2.4-3

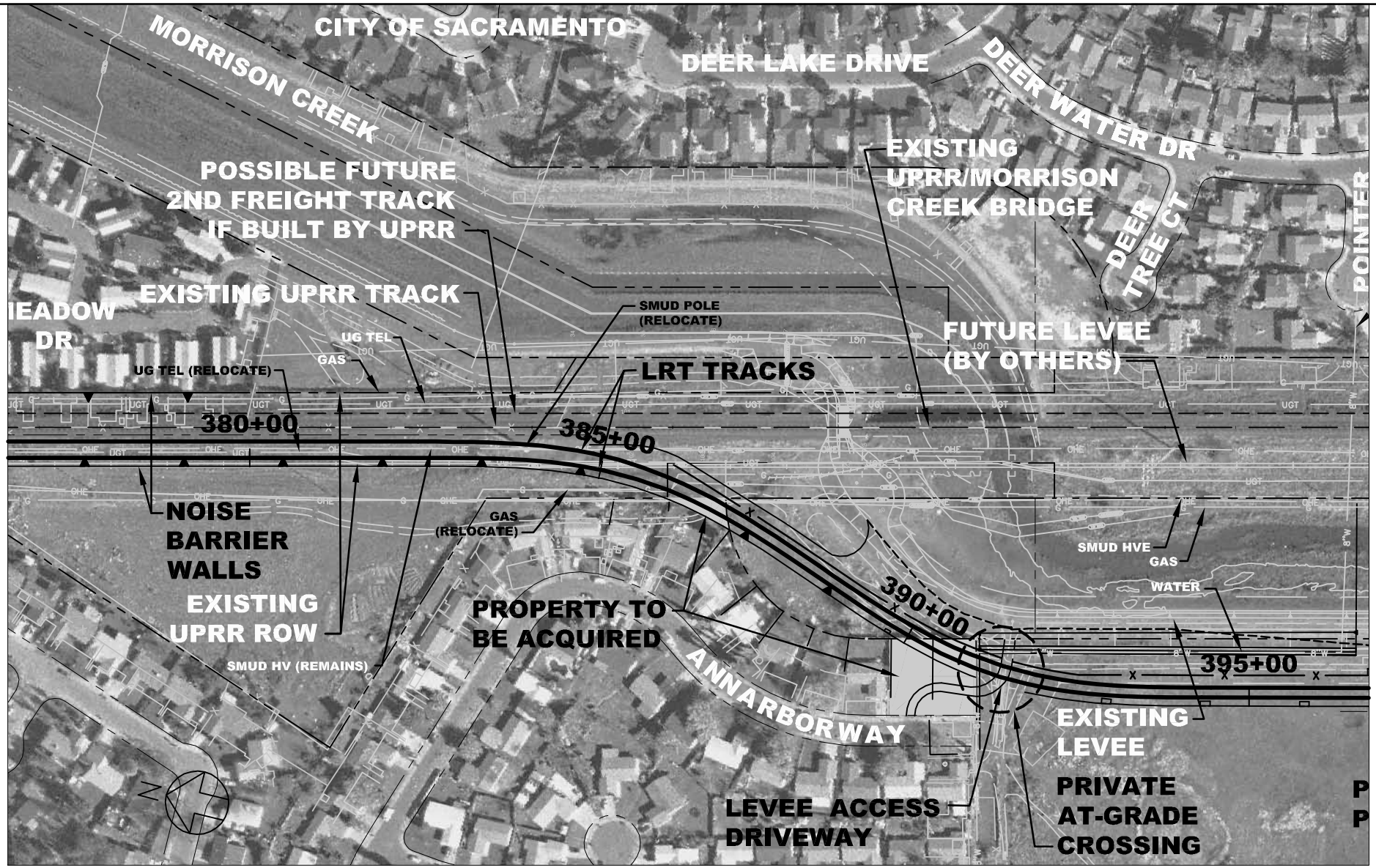
SUBJECT TO CHANGE DURING FINAL DESIGN

SCALE: AS SHOWN
0 50 100 200

Regional Transit

South Sacramento Corridor
Phase 2 Project

LRT ALTERNATIVE
LAYOUT PLANS
FIGURE 2.4-4



SUBJECT TO CHANGE DURING FINAL DESIGN

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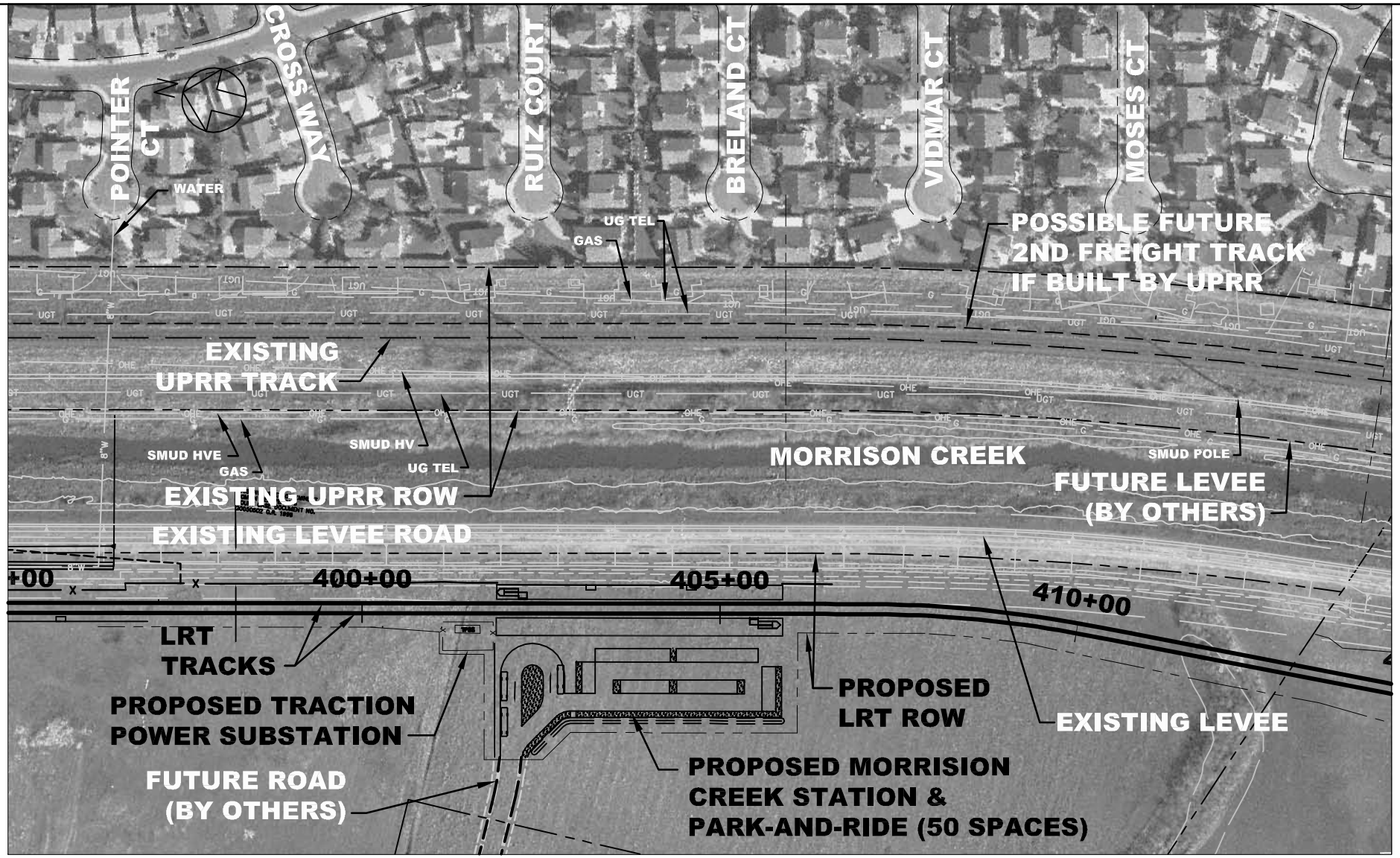
Regional Transit

South Sacramento Corridor
Phase 2 Project

LRT ALTERNATIVE
LAYOUT PLANS
FIGURE 2.4-5



SUBJECT TO CHANGE DURING FINAL DESIGN

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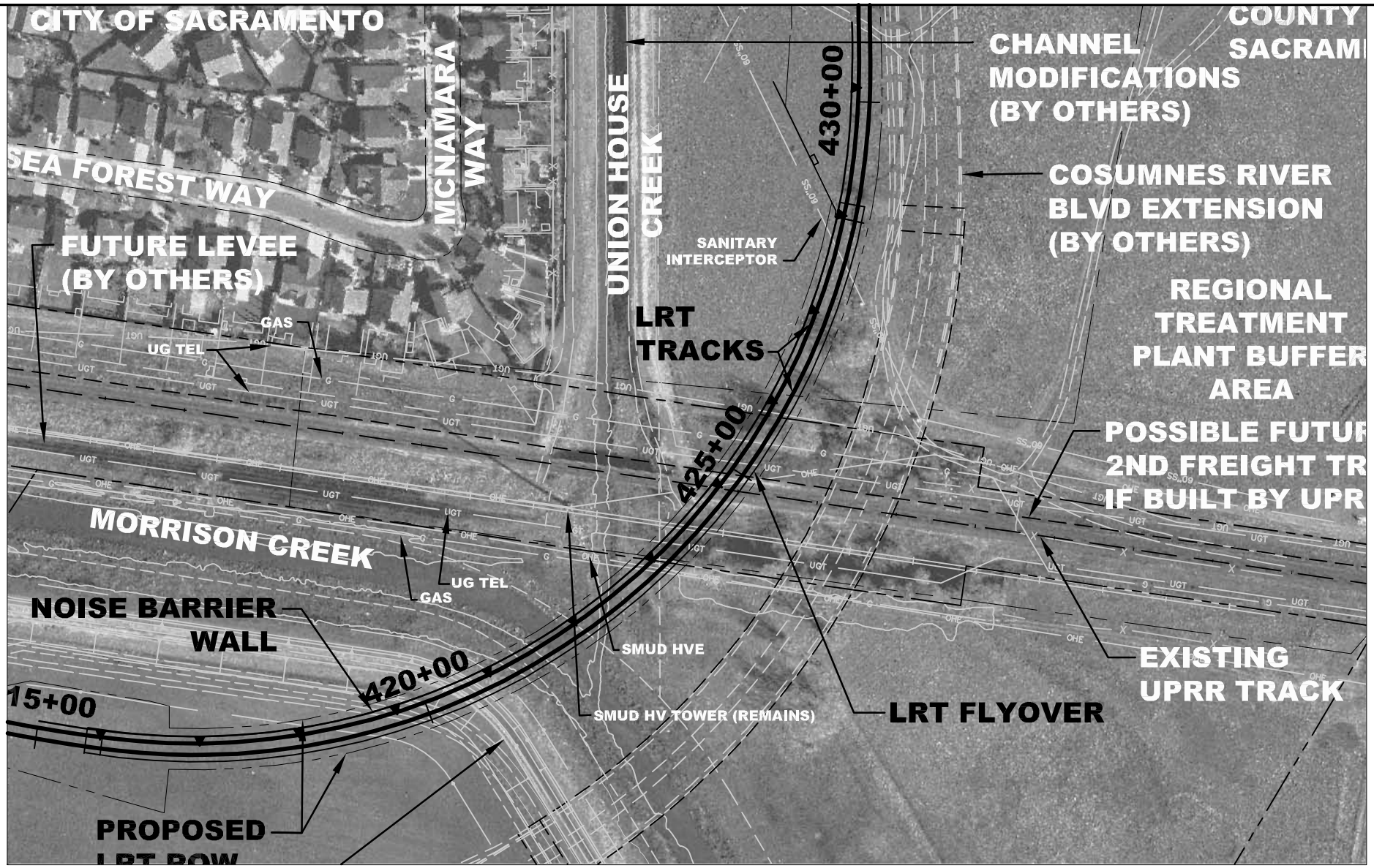
Regional Transit

South Sacramento Corridor
Phase 2 Project

LRT ALTERNATIVE
LAYOUT PLANS
FIGURE 2.4-6



SUBJECT TO CHANGE DURING FINAL DESIGN

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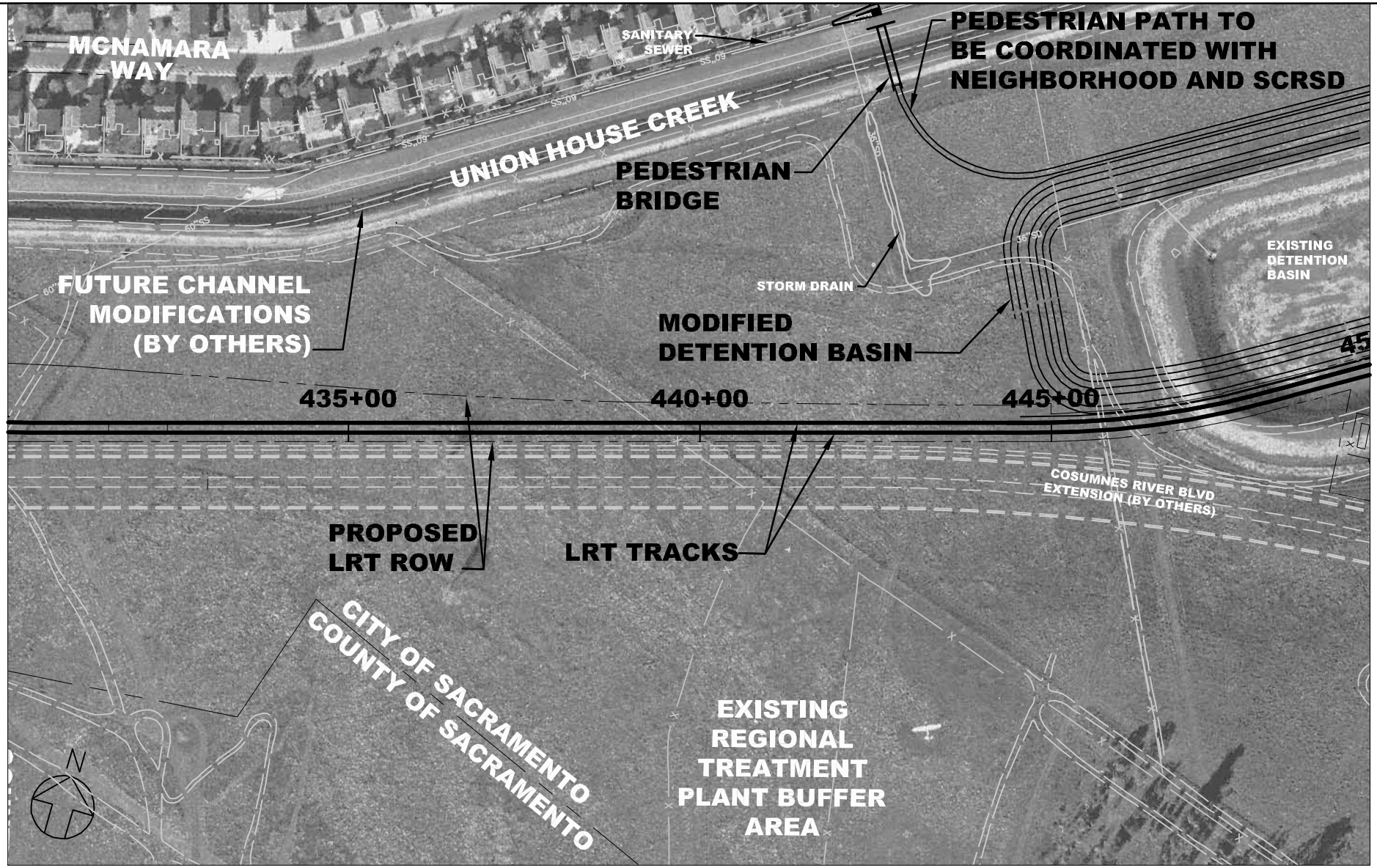
Regional Transit

South Sacramento Corridor
Phase 2 Project

LRT ALTERNATIVE
LAYOUT PLANS
FIGURE 2.4-7



SUBJECT TO CHANGE DURING FINAL DESIGN

SCALE: AS SHOWN
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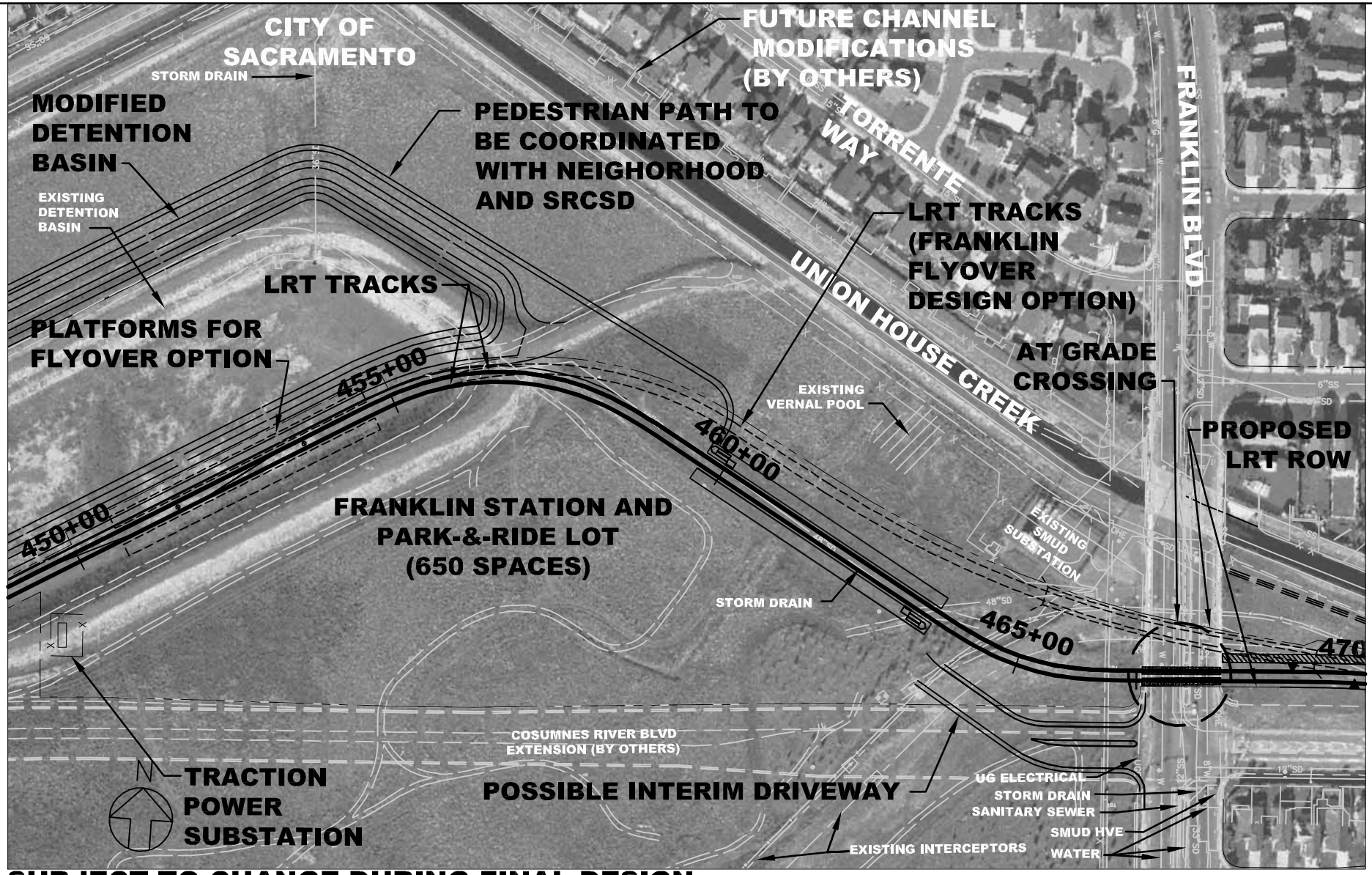
Regional Transit

South Sacramento Corridor
Phase 2 Project

LRT ALTERNATIVE
LAYOUT PLANS
FIGURE 2.4-8



SUBJECT TO CHANGE DURING FINAL DESIGN

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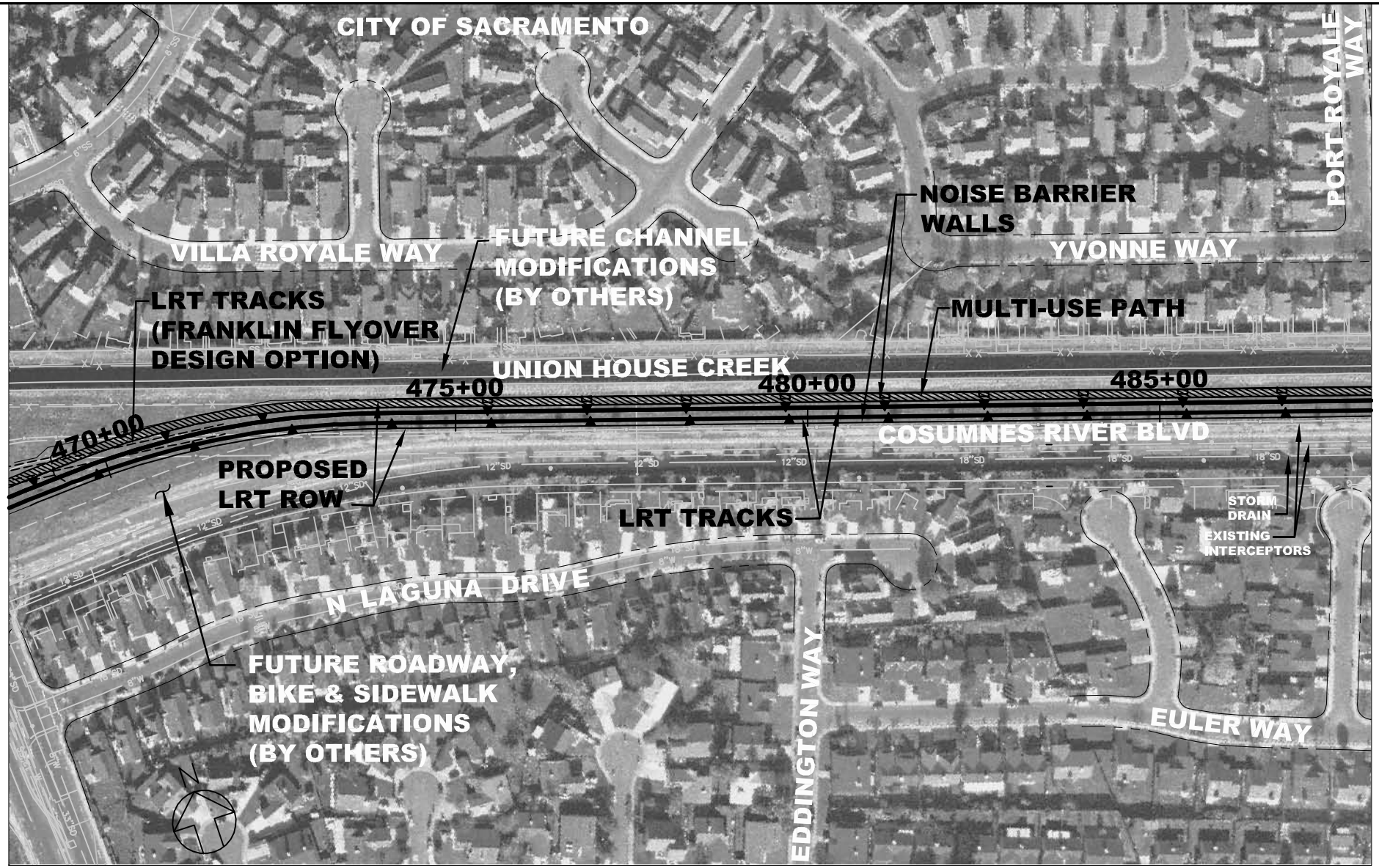
Regional Transit

South Sacramento Corridor
Phase 2 Project

LRT ALTERNATIVE
LAYOUT PLANS
FIGURE 2.4-9



SUBJECT TO CHANGE DURING FINAL DESIGN

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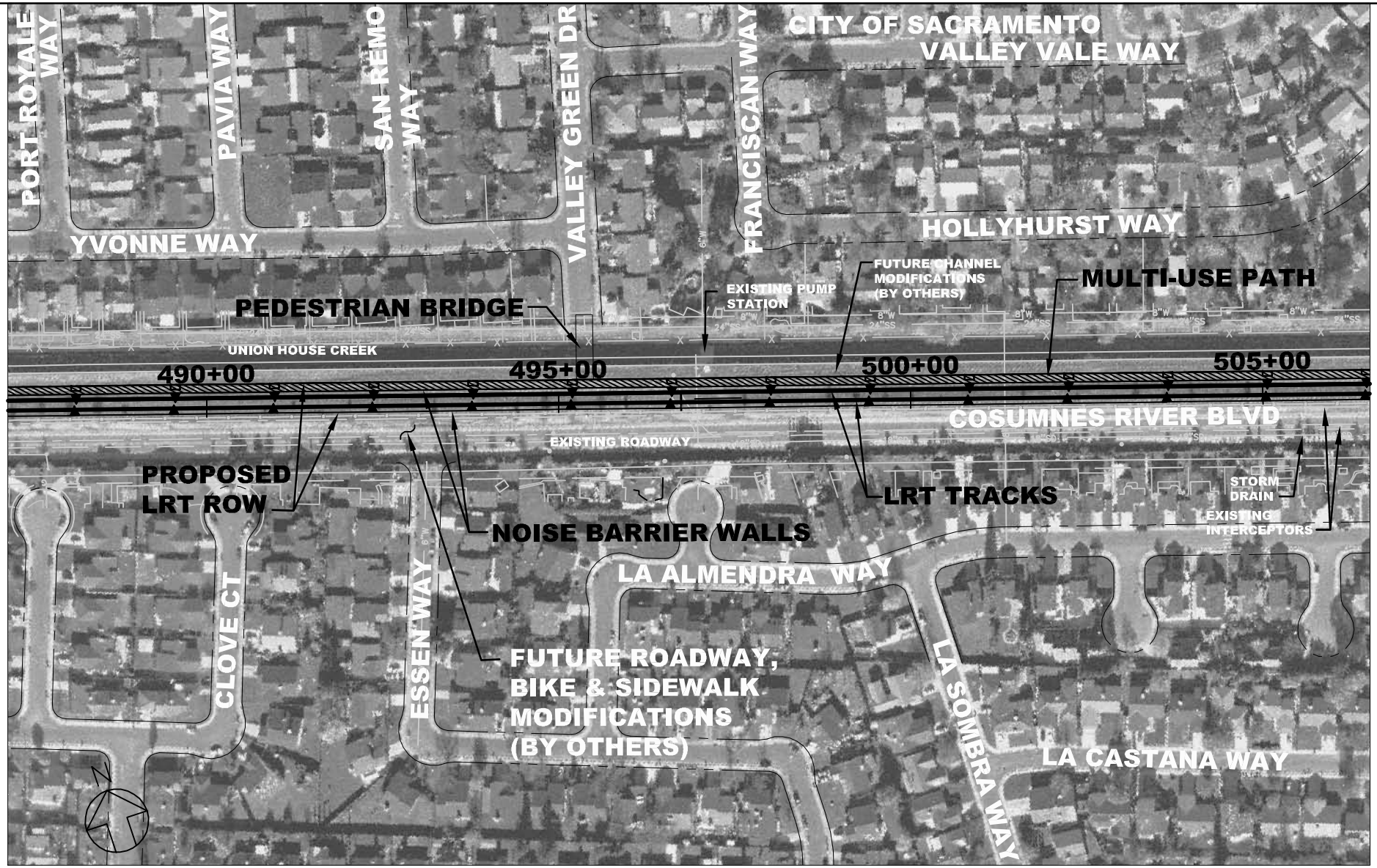
Regional Transit

South Sacramento Corridor
Phase 2 Project

LRT ALTERNATIVE
LAYOUT PLANS
FIGURE 2.4-10



SUBJECT TO CHANGE DURING FINAL DESIGN

SCALE: AS SHOWN
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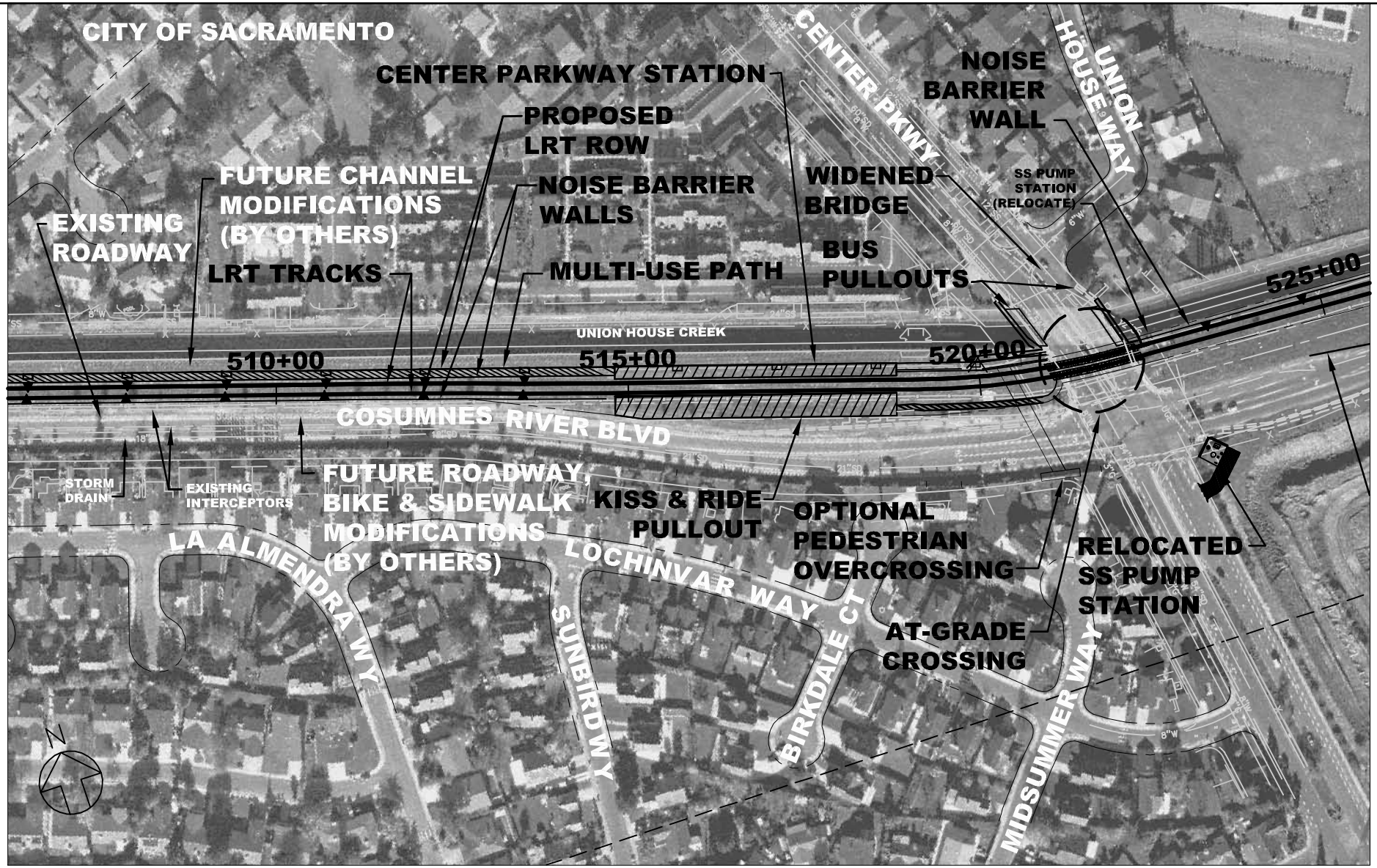
Regional Transit

South Sacramento Corridor
Phase 2 Project

LRT ALTERNATIVE
LAYOUT PLANS
FIGURE 2.4-11



SUBJECT TO CHANGE DURING FINAL DESIGN

SCALE: AS SHOWN
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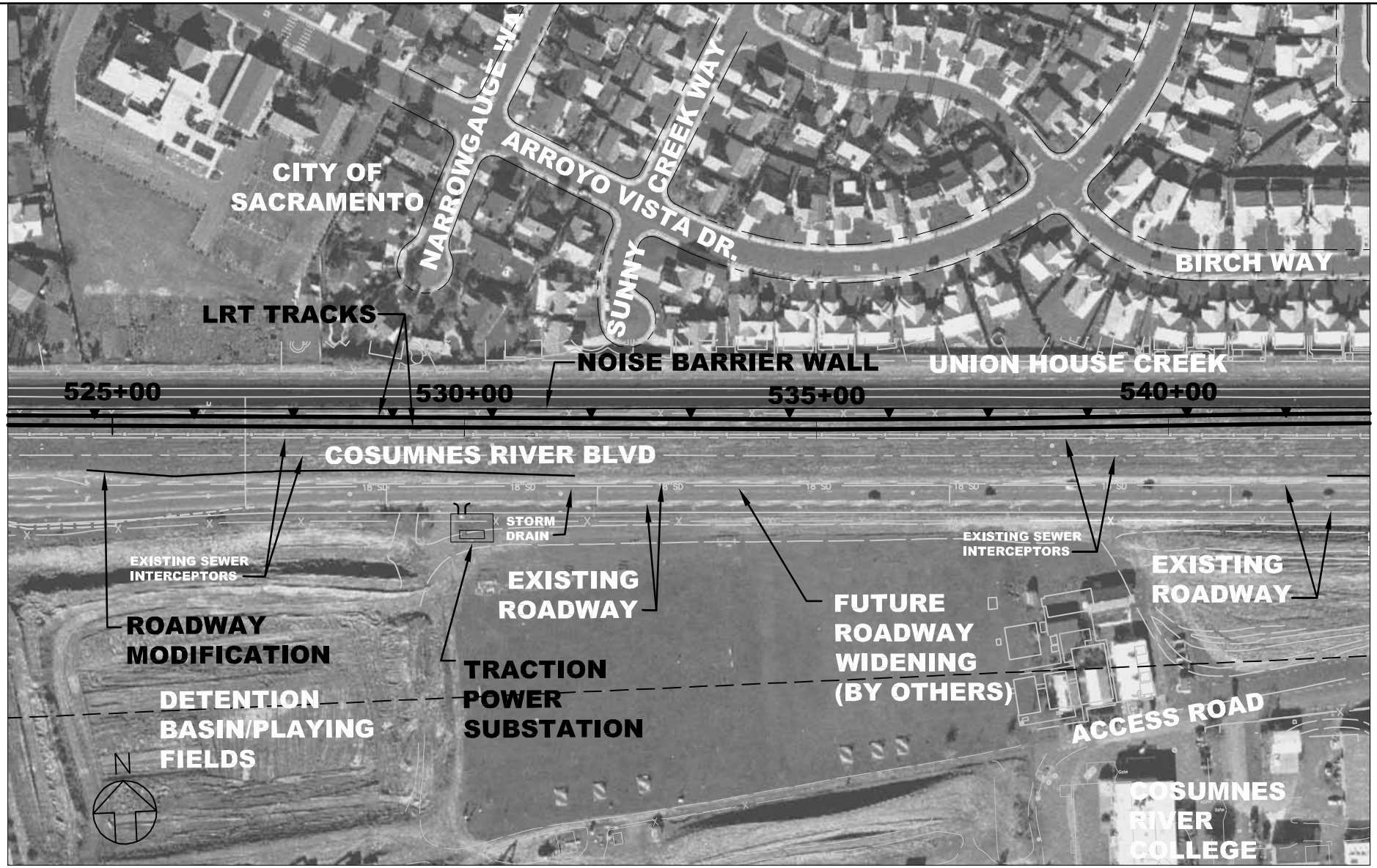
Regional Transit

South Sacramento Corridor
Phase 2 Project

LRT ALTERNATIVE
LAYOUT PLANS
FIGURE 2.4-12



SUBJECT TO CHANGE DURING FINAL DESIGN

SCALE: AS SHOWN
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Regional Transit

South Sacramento Corridor
Phase 2 Project

LRT ALTERNATIVE
LAYOUT PLANS
FIGURE 2.4-13

SUBJECT TO CHANGE DURING FINAL DESIGN

SCALE: AS SHOWN
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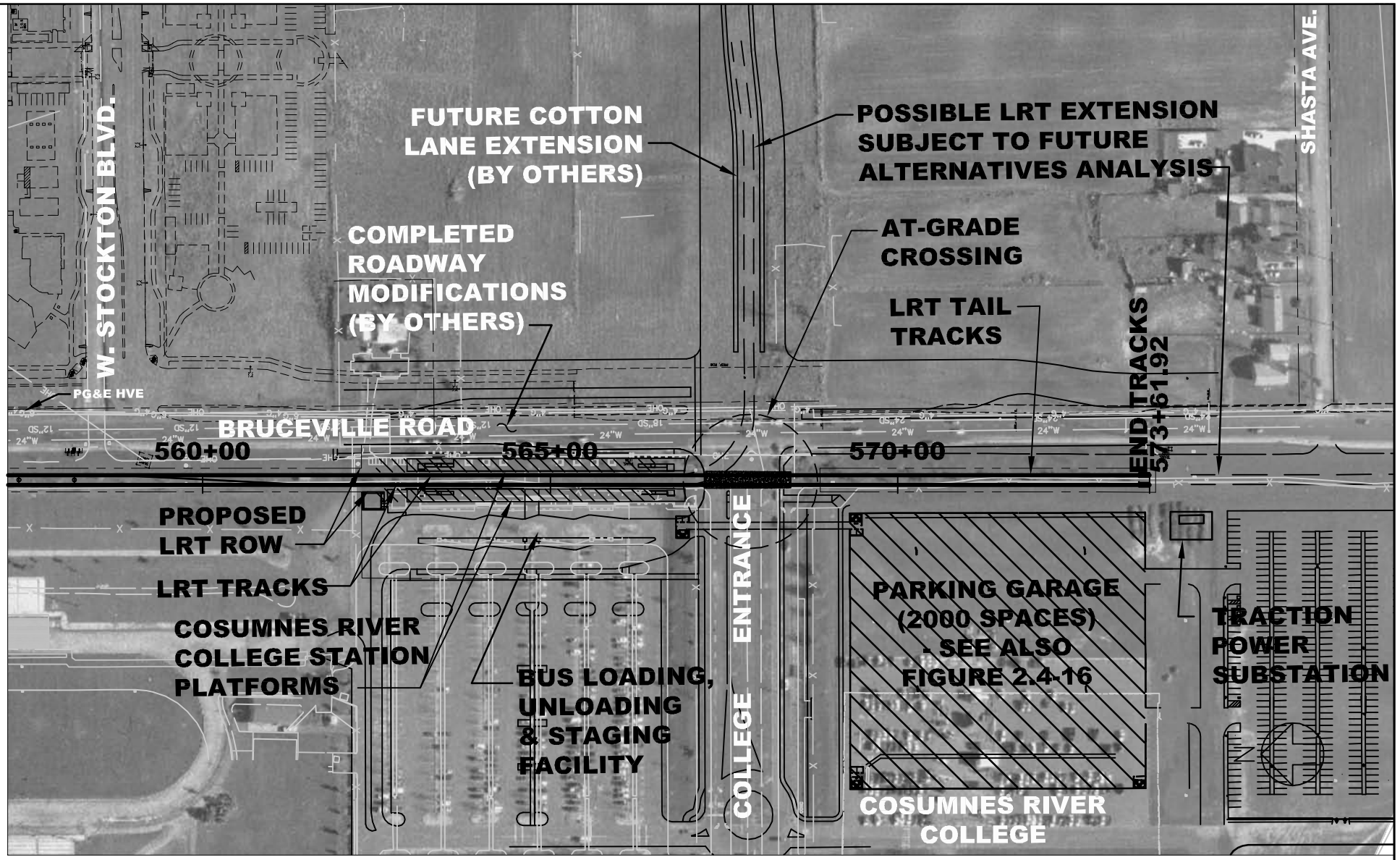
Regional Transit

South Sacramento Corridor
Phase 2 Project

LRT ALTERNATIVE
LAYOUT PLANS
FIGURE 2.4-14



SUBJECT TO CHANGE DURING FINAL DESIGN

SCALE: AS SHOWN
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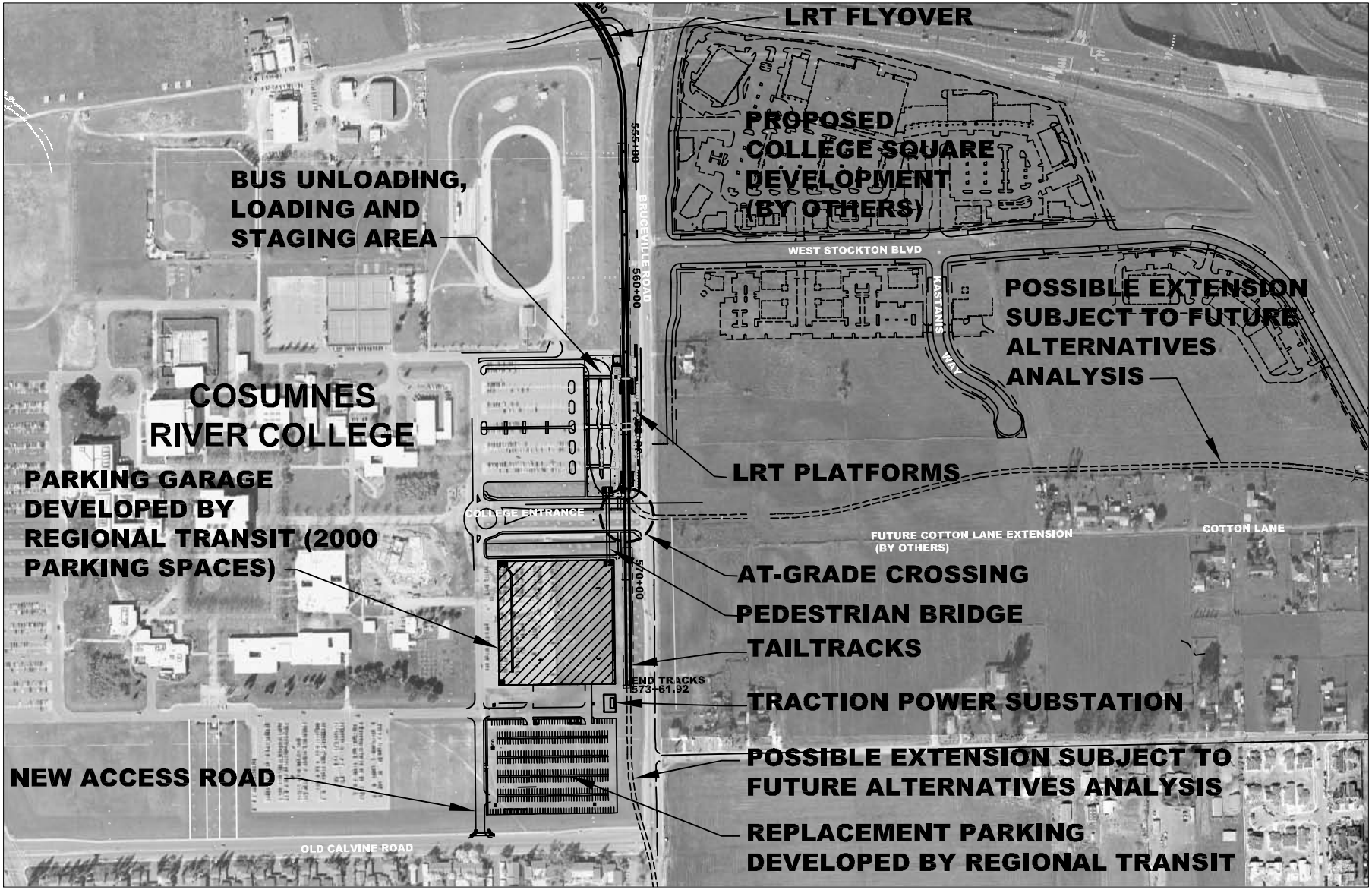
Regional Transit

South Sacramento Corridor
Phase 2 Project

LRT ALTERNATIVE
LAYOUT PLANS
FIGURE 2.4-15



SUBJECT TO CHANGE DURING FINAL DESIGN

SCALE: AS SHOWN
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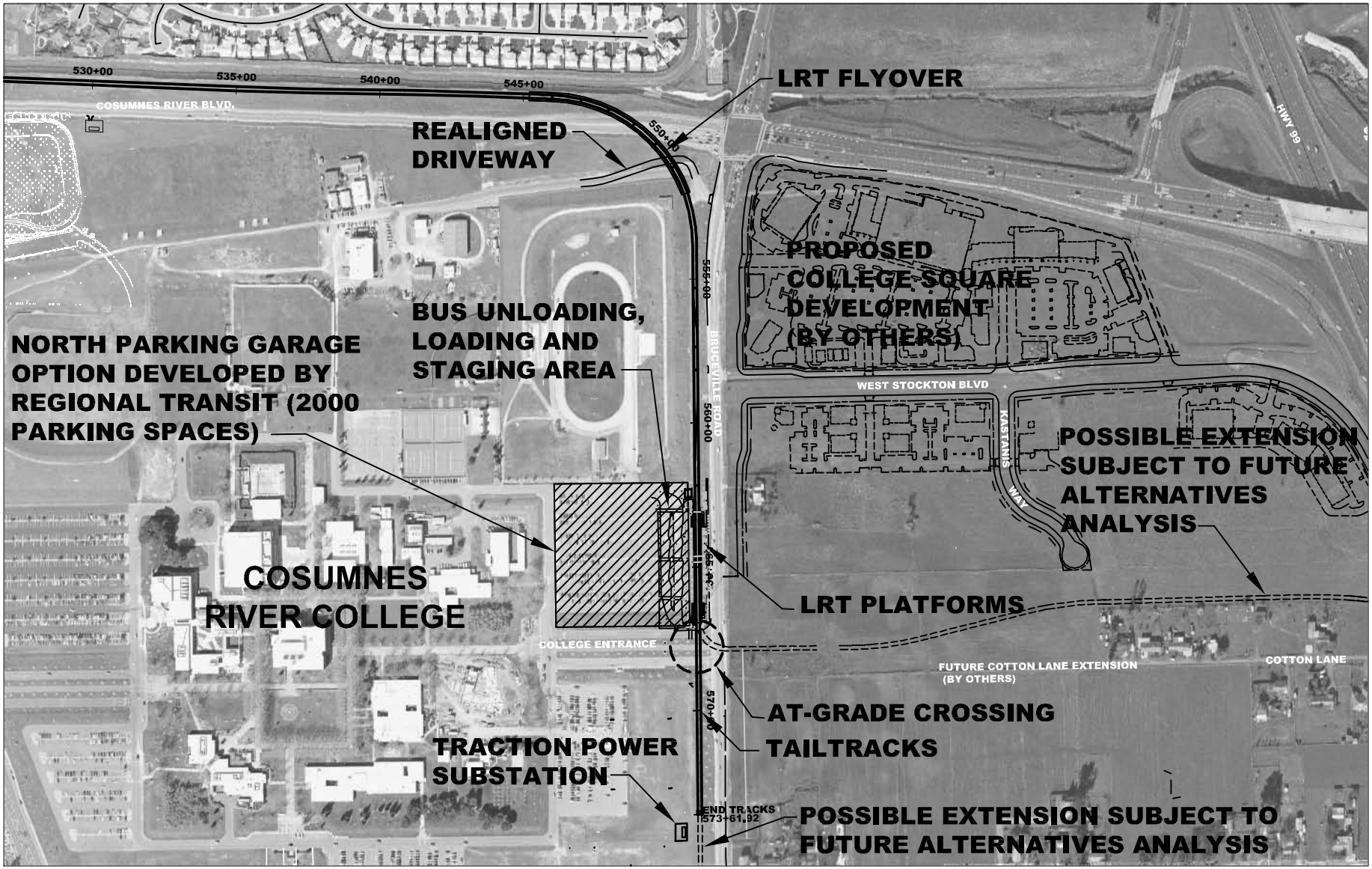
Regional Transit

South Sacramento Corridor
Phase 2 Project

LRT ALTERNATIVE

LAYOUT PLANS – PARKING GARAGE

FIGURE 2.4-16



SUBJECT TO CHANGE DURING FINAL DESIGN

SCALE: AS SHOWN
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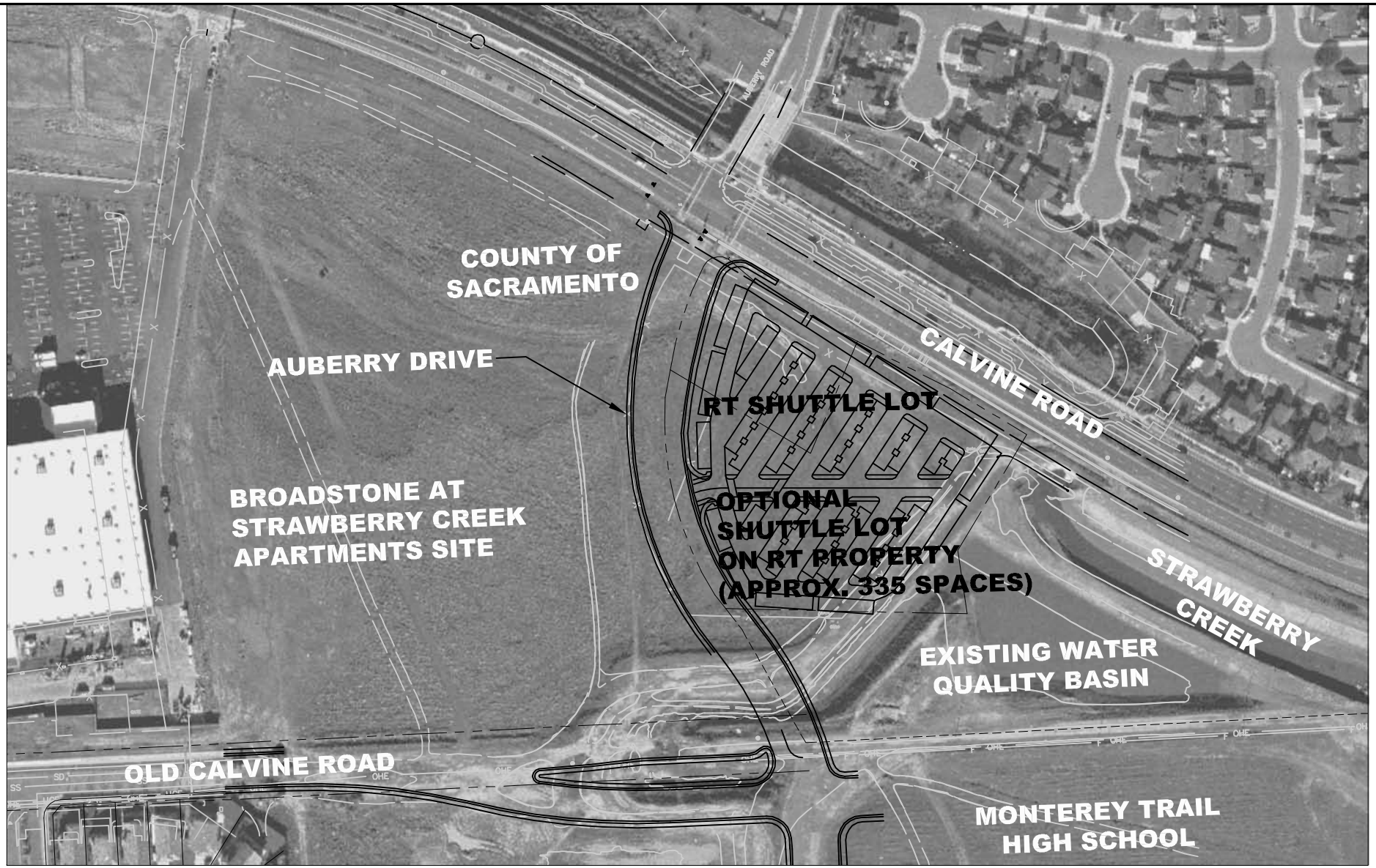
Regional Transit

South Sacramento Corridor
Phase 2 Project

LRT ALTERNATIVE

LAYOUT PLANS – NORTH PARKING GARAGE OPTION

FIGURE 2.4-17



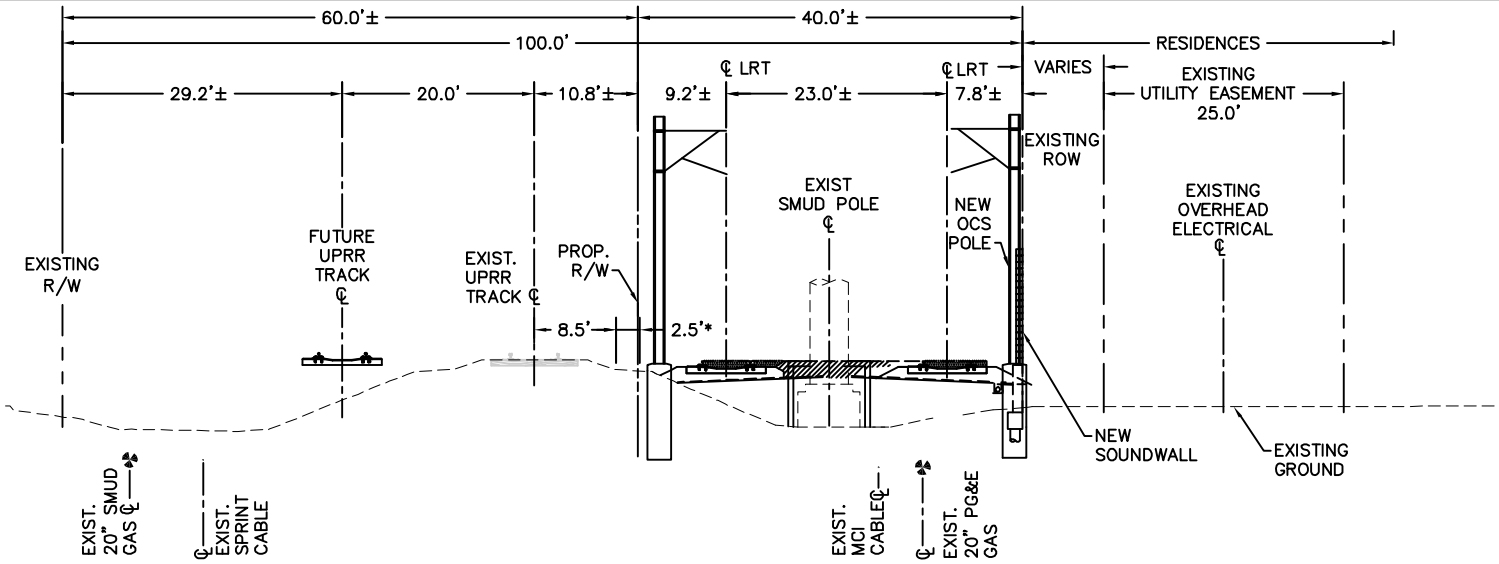
SUBJECT TO CHANGE DURING FINAL DESIGN

SCALE: AS SHOWN
0 50 100 200

Regional Transit

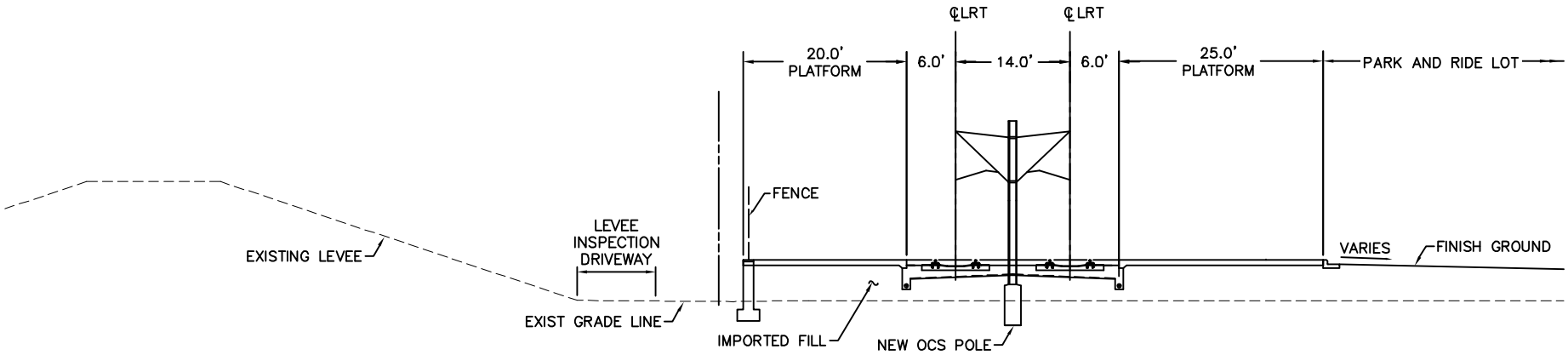
South Sacramento Corridor
Phase 2 Project

LRT ALTERNATIVE
LAYOUT PLANS
FIGURE 2.4-18



TYPICAL SECTION

BETWEEN MEADOWVIEW ROAD AND MORRISON CREEK (LOOKING SOUTH) STA 370+00±



TYPICAL SECTION

AT MORRISON CREEK STATION (LOOKING EAST) STA 402+00±

SUBJECT TO CHANGE DURING FINAL DESIGN

SCALE: 1"=20'

0 5 10 20

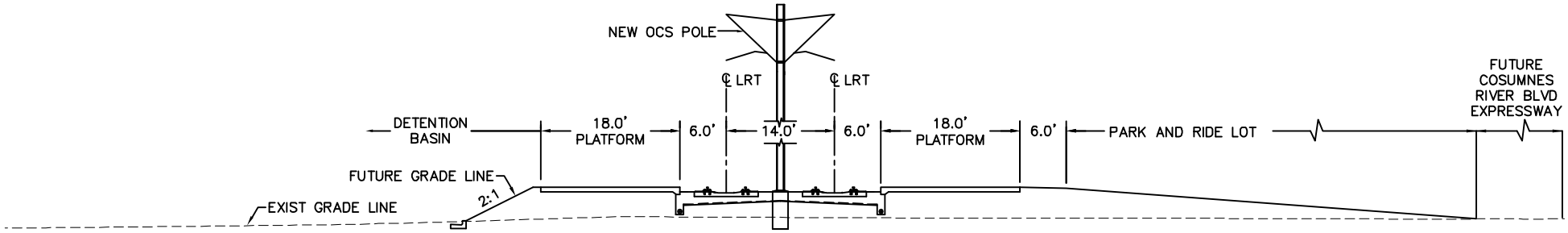
Regional Transit

South Sacramento Corridor
Phase 2 Project

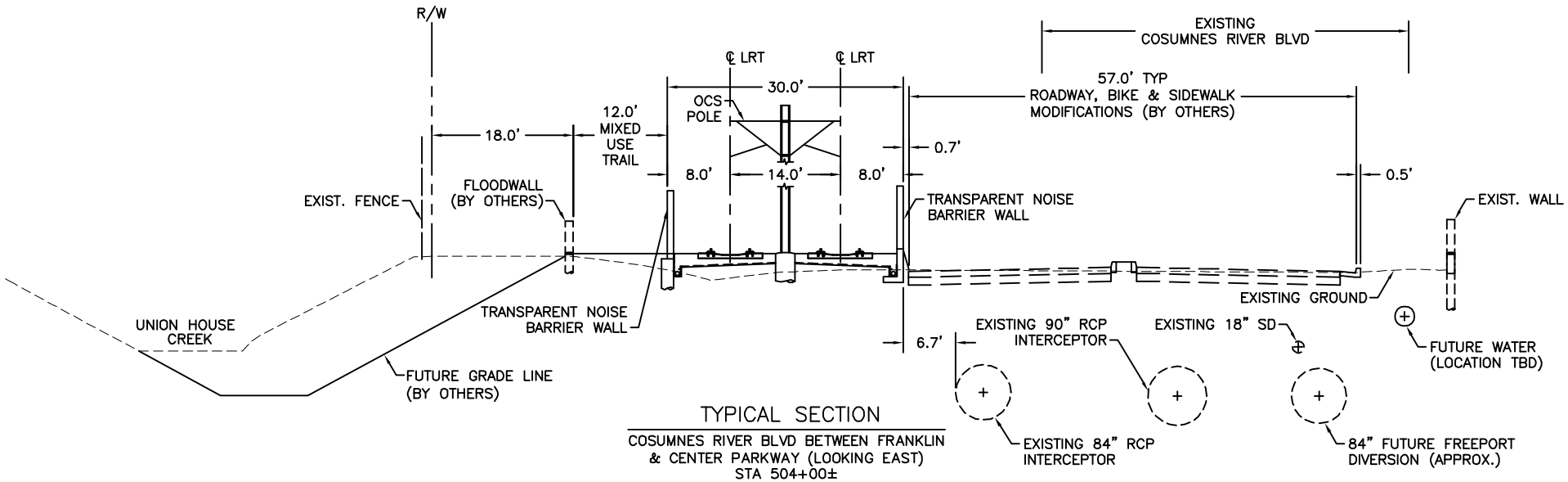
LRT ALTERNATIVE

TYPICAL CROSS SECTIONS

FIGURE 2.4-19



TYPICAL SECTION
FRANKLIN BLVD STATION
(LOOKING EAST)
STA 460+00±



TYPICAL SECTION
COSUMNES RIVER BLVD BETWEEN FRANKLIN & CENTER PARKWAY (LOOKING EAST)
STA 504+00±

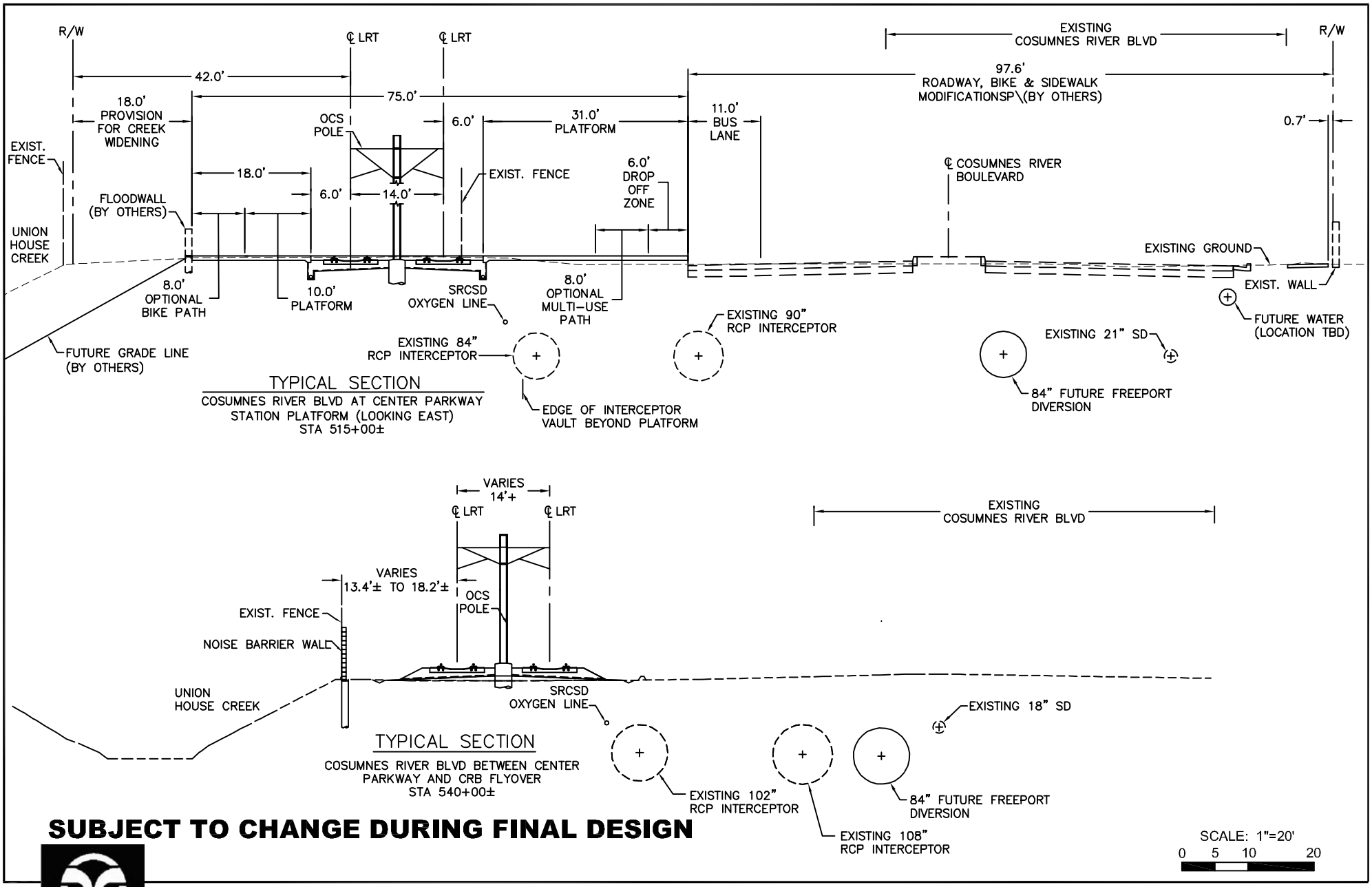
SUBJECT TO CHANGE DURING FINAL DESIGN

SCALE: 1"=20'
0 5 10 20

Regional Transit

South Sacramento Corridor
Phase 2 Project

LRT ALTERNATIVE
TYPICAL CROSS SECTIONS
FIGURE 2.4-20



SUBJECT TO CHANGE DURING FINAL DESIGN

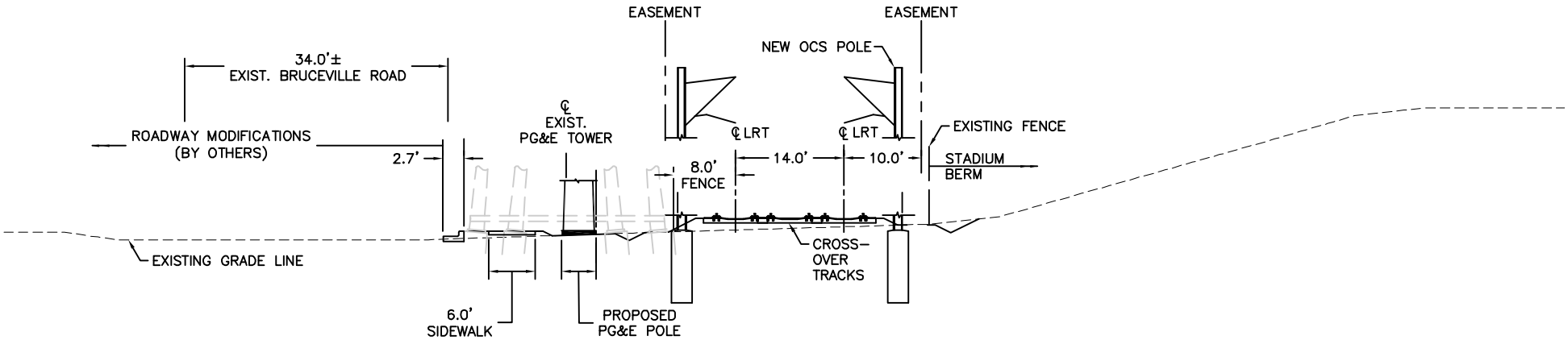
Regional Transit

South Sacramento Corridor
Phase 2 Project

LRT ALTERNATIVE

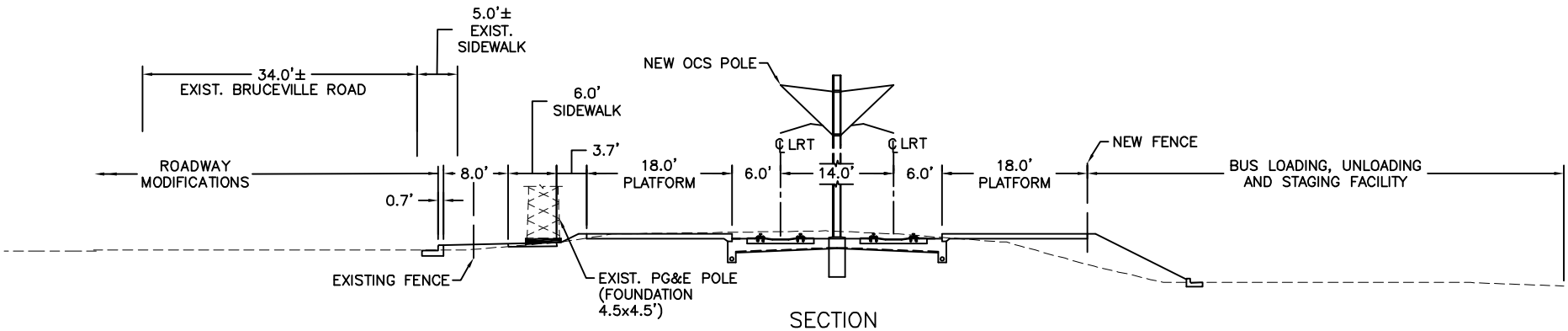
TYPICAL CROSS SECTIONS

FIGURE 2.4-21



TYPICAL SECTION

BRUCEVILLE ROAD (LOOKING SOUTH)
NORTH OF COSUMNES RIVER COLLEGE
STA 554+50±



SECTION

COSUMNES RIVER COLLEGE STATION
PLATFORM ON BRUCEVILLE ROAD
(LOOKING SOUTH)
STA 561+00±

SUBJECT TO CHANGE DURING FINAL DESIGN

SCALE: 1"=20'
0 5 10 20

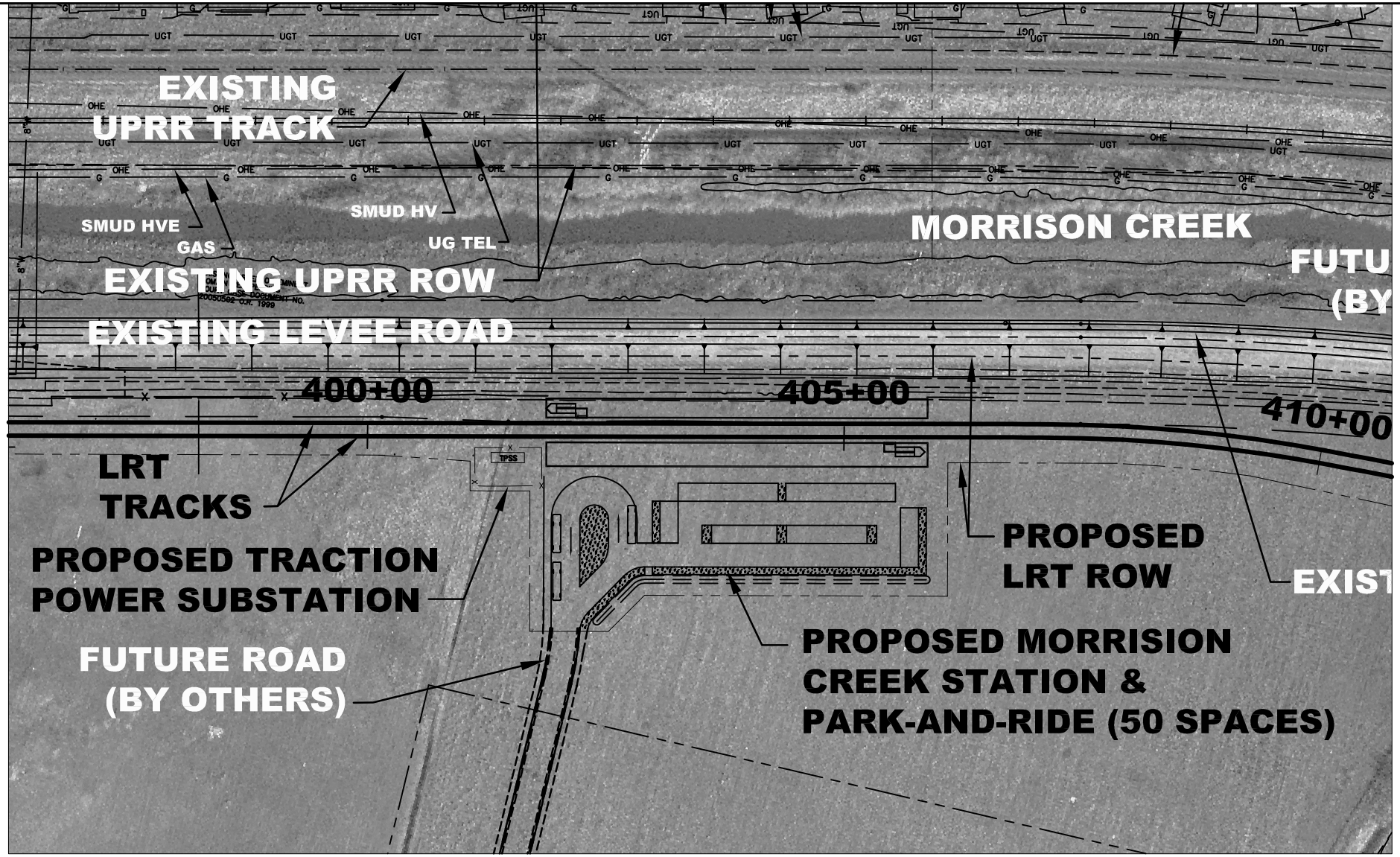
Regional Transit

South Sacramento Corridor
Phase 2 Project

LRT ALTERNATIVE

TYPICAL CROSS SECTIONS

FIGURE 2.4-22

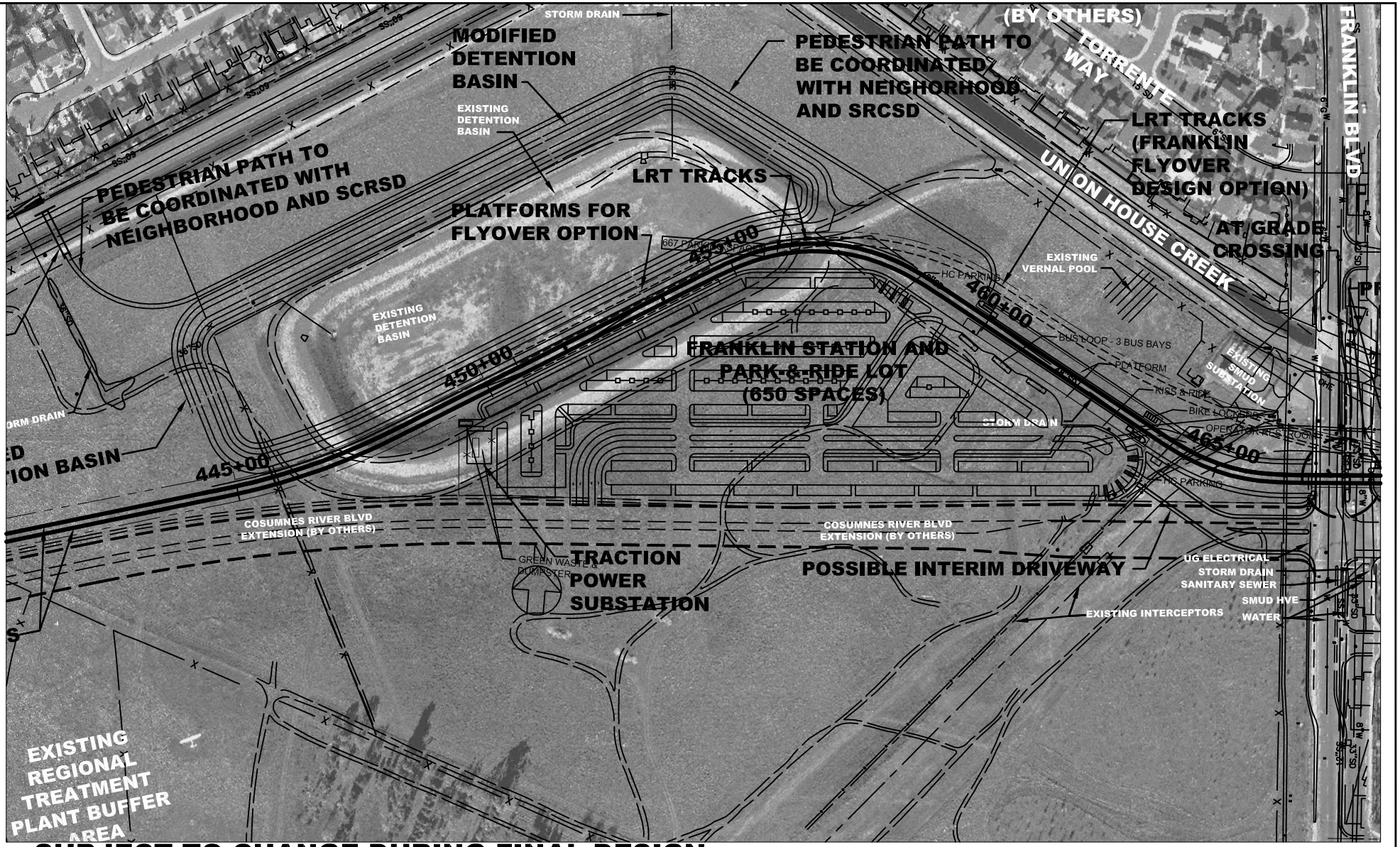


SUBJECT TO CHANGE DURING FINAL DESIGN

LRT ALTERNATIVE

MORRISON CREEK STATION PLAN

FIGURE 2.4-23



SUBJECT TO CHANGE DURING FINAL DESIGN

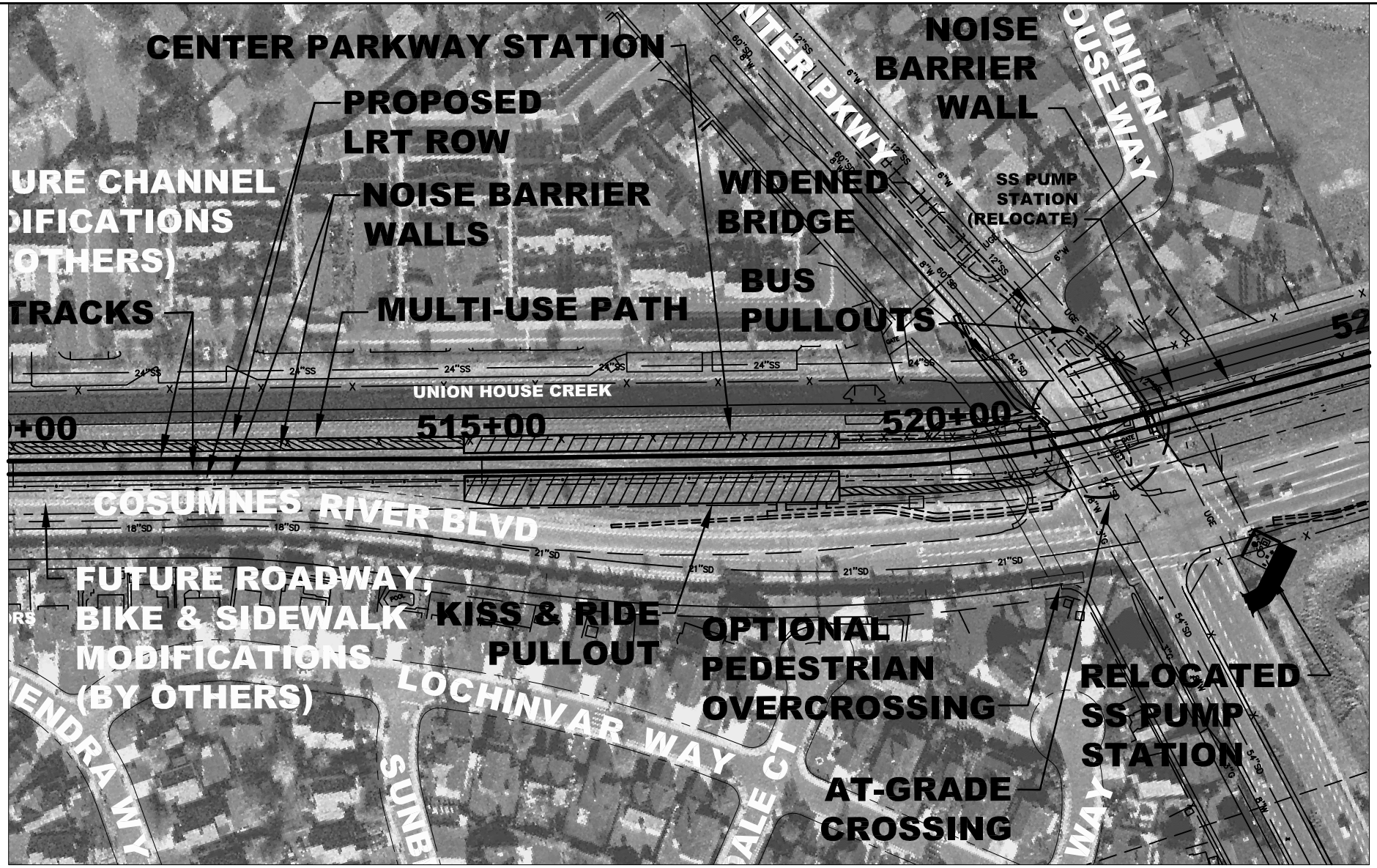
Regional Transit

South Sacramento Corridor
Phase 2 Project

LRT ALTERNATIVE

FRANKLIN BLVD. STATION PLAN

FIGURE 2.4-24



SUBJECT TO CHANGE DURING FINAL DESIGN

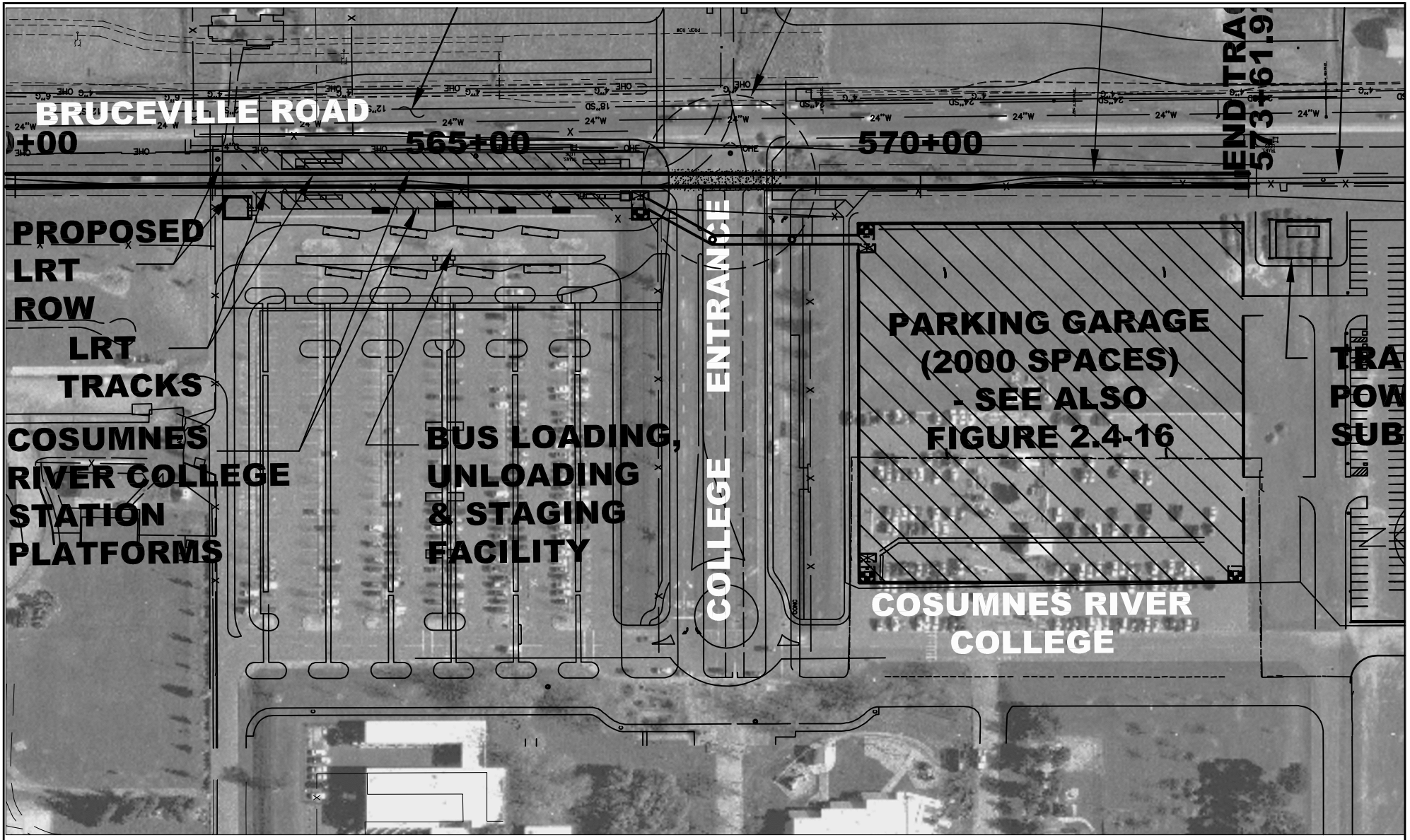
Regional Transit

South Sacramento Corridor
Phase 2 Project

LRT ALTERNATIVE

CENTER PARKWAY STATION PLAN

FIGURE 2.4-25



SUBJECT TO CHANGE DURING FINAL DESIGN

LRT ALTERNATIVE

COSUMNES RIVER COLLEGE STATION PLAN

FIGURE 2.4-26

2.4.4.1 MEADOWVIEW STATION TO UNION HOUSE CREEK

This 1.5 mile segment is illustrated in the layout plans on Figures 2.4-3 through 2.4-7 and the in the typical sections on Figure 2.4-*19*. The LPAP2 alignment runs south from the Meadowview Road LRT station as a continuation of the current South Line Phase 1 tracks, which are west of the UPRR mainline. A portion of the existing LRT tail tracks will be realigned.

Immediately upon leaving the Meadowview Station, the LRT tracks would cross Meadowview Road at grade parallel to the current UPRR tracks across Meadowview Road. Crossing protection would be provided to safeguard vehicular traffic from both the LRT and UPRR trains. The crossing protection would require the approval of the CPUC.

Two design options are under consideration for this crossing. Under the first design option, the LRT would cross over Meadowview Road on an aerial structure, leaving the UPRR to cross Meadowview Road at grade. Under the second design option, Meadowview Road would be depressed to cross beneath both the LRT and the UPRR tracks. See Chapter 4, Section 4.1.4.2, Figures 4.1-5 and 4.1-6 for visual simulations of these two design options.

Once across Meadowview Road, the alignment would continue south within the relatively straight UPRR corridor to just north of Morrison Creek. Allowable train speeds in this stretch would be 55 mph. The northbound (more easterly) LRT track will be 20 feet from the existing UPRR mainline track, which would remain in place. If UPRR were to build a second track, it would be to the east of the existing freight track. No relocation of the existing UPRR tracks is anticipated. Where parallel to the UPRR tracks, the LRT tracks will be level with the freight track or a few feet below it.

In this stretch, the LRT tracks would be spaced at minimum of 23 feet, wide enough to provide sufficient clearance to the existing Sacramento Municipal Utility District (SMUD) power poles located between the tracks and to provide SMUD with a maintenance driveway to gain access to the poles. The current South Line Phase 1 tracks also straddle existing SMUD power poles for a portion of its alignment.

At Morrison Creek the alignment would turn southwest, exit the UPRR right-of-way, and *run to the west of* the Right Bank Levee *of Morrison Creek* that the Sacramento Area Flood Control Agency (SAFCA) *recently raised* in a separate project. *A private a*t-grade crossing *to allow access to* crest-top levee maintenance road would be installed *over the tracks*. *At the point where the LRT runs closest to the levee, the levee embankment would be widened to also support the LRT tracks. Two residential properties would be acquired to provide space for tracks and the levee access driveway.*

Once *past the widened embankment,* the alignment would turn south and run parallel to the west toe of the levee *off the levee right of way*. The track profile will be lowered to approach existing ground level. Just south of Milepost (MP) 1 the Morrison Creek Station would be constructed. (Stations are described in Section 2.4.4 below). A traction power substation would be located on the northern portion of the station right of way.

South of the Morrison Creek Station, the LRT alignment would turn to the east and rise onto a bridge structure to cross over Morrison Creek, the UPRR corridor and tracks and Union House Creek and then run parallel and immediately adjacent to the north side of the proposed future CRB Extension. This LRT bridge structure would be high enough to maintain the required vertical clearance over UPRR's existing and possible future mainline tracks as well as existing and future levee maintenance roads. At their highest point, the LRT tracks are expected to be approximately *32* feet above UPRR's track. The maximum climbing grades would be five percent.

2.4.4.2 UNION HOUSE CREEK TO FRANKLIN BOULEVARD

This 0.8 mile-long portion of the LRT alignment would lie north of the future extension of CRB within the Sacramento County Regional Sanitation District (SCRSD) treatment plant bufferlands. This segment is illustrated in the layout plans on Figures 2.4-7 through 2.4-9.

The City of Sacramento plans to extend CRB to the west from its existing terminus at Franklin Boulevard with two lanes in each direction and a center median. The proposed LRT alignment has been designed consistent with the future roadway geometry.

The CRB extension would cross over the UPRR corridor on a bridge structure just to the south of the previously-described LRT bridge structure. The two bridge structures could share a common embankment approach on the eastern end. East of the bridge, the embankment would be up to nine feet high to keep the roadway and LRT above the 100-year floodplain elevation. The maximum allowable train speed across the bridge would be *40* mph due to the curvature.

Once the LRT bridge crosses the UPRR corridor, the LRT tracks would continue east to Franklin Boulevard across the SCRSD bufferlands. The maximum allowable train speed across the bufferlands would be 55 mph. Approximately mid-way across the bufferlands, the LRT alignment would turn to the northeast away from CRB to provide space for the Franklin Boulevard Station park-and-ride lot between the LRT tracks and the roadway. A City-operated flood control detention basin would be reconfigured to make room for the LRT tracks to run along the south edge of basin while leaving room for a future SCRSD interceptor sewer. The tracks would then swing southeast toward the intersection of CRB and Franklin Boulevard with the platform located at MP 2.2, just west of Franklin Boulevard. The Franklin Station and park-and-ride lot would be constructed on engineered fill above the 100-year floodplain. After leaving the Franklin Station, the LRT alignment would swing eastward and run parallel to CRB. The maximum allowable train speeds would vary from 25 to 38 mph on the series of curves that skirt the park-and-ride lot. The at-grade crossing at Franklin Boulevard would be protected with warning signals and gates consistent with California PUC regulations and would require approval by the CPUC.

A Franklin Boulevard flyover option would carry the tracks up to approximately 21 feet above the street. See Chapter 4, Section 4.1.4.2, Figure 4.1-8 for a visual simulation of this flyover.

2.4.4.3 FRANKLIN BOULEVARD TO BRUCEVILLE ROAD

The LRT alignment on this 1.5-mile-long segment would lie within the CRB corridor. The City of Sacramento plans to widen CRB to two traffic lanes and a bike lane in each direction with a center median in this area, and the US Army Corps of Engineers and Sacramento Flood Control Agency are currently planning the widening of Union House Creek some 18 feet to the south between Franklin and Center Parkway. The proposed LRT alignment takes the future roadway geometry and creek widening into account. The layout plans in Figures 2.4-9 to 2.4-14 and the typical sections on Figures 2.4-*20* and 2.4-*21* illustrate this segment.

After crossing Franklin Boulevard, the LRT alignment would continue east on the north side of widened CRB. The tracks would be located in the space between the future widened roadway and Union House Creek at approximately the same level as the roadway or a few feet higher. A concrete safety barrier would separate the LRT tracks from adjacent CRB improvements. The position of the tracks allows for future approximate 18 foot widening of the creek. The track section would be approximately 30 feet wide. The maximum allowable train speed between Franklin Boulevard and the Center Parkway station varies from 55 mph on tangent track to 38 mph on the sharpest curve.

A LRT station would be built at Center Parkway at MP 3.2. The Center Parkway Station would have side platforms located north of the CRB roadway immediately west of the Center Parkway intersection. Immediately east of the station, the alignment would cross Center Parkway at grade and continue east along the north side of CRB. The at-grade crossing would be protected with warning signals and gates in compliance with California PUC regulations.

The LRT tracks continue eastward at-grade on the north side of the existing CRB. As the tracks approach Bruceville Road, they would *ascend on a flyover bridge structure that curves south to cross over CRB, and descend to the west side of Bruceville Road in a landscaped strip of land between the stadium berm and Bruceville Road. See Chapter 4, Section 4.1.4.2, Figure 4.1-9 for a visual simulation of this flyover. There would be retaining walls forming the abutments at each end of the flyover*

The maximum allowable train speed between the Center Parkway station and Bruceville Road varies from 55 mph on tangent track and 27 mph on the *flyover* curve.

A. The maximum allowable train speed between Center Parkway station and Bruceville Road would vary between 55 mph on tangent track and 30 mph on the sharpest curve.

2.4.4.4 BRUCEVILLE ROAD

The LRT alignment on this 0.4 mile-long segment of the proposed project would lie just to the west of Bruceville Road along the easterly edge of the CRC campus. This segment would include an LRT station located near the entrance to CRC at MP 4.0. South of the station, the tracks would cross the college entrance at grade to provide a final short length of tracks before terminating. The at-grade crossing would be protected with warning signals and gates in compliance with California PUC regulations. The layout plans in Figures 2.4-14 to 2.4.15 and the typical sections on Figure 2.4-2*2* illustrate this segment.

The City of Sacramento has widened Bruceville Road which will ultimately be three lanes in each direction for a total of six lanes with additional turning lanes at intersections. A major development project called College Square is under construction on the Southeast corner of CRB and Bruceville Road, across Bruceville Road from the proposed LRT alignment. According to current plans for that project, West Stockton Boulevard will be widened to a divided roadway

*As described in the prior section, t*he LRT tracks would enter this segment descending from the flyover and would be located in the landscaped strip between the college stadium and Bruceville Road. The alignment would continue south in the landscaped strip between the toe of the CRC stadium's embankment and the western edge of Bruceville Road. The tracks would pass to the east of an existing PG&E high voltage tower. This tower *would* be replaced with a pole structure and repositioned to provide adequate maintenance access to the utility.

The tracks would continue to a station at MP 4.1, located just north of the College entrance road adjacent to the existing College parking lot. The station would serve CRC and the College Square development project located south of West Stockton Boulevard and north of Cotton Road. South of this station, the tracks would cross the college entrance roadway at grade to provide a final short length of tail tracks. These two tail tracks would be long enough to store one train set on each, improving the operating efficiency of the LRT service.

2.4.5 LPAP2 Stations

Four new LRT stations are proposed to be constructed along the LPAP2 alignment. Proceeding from Meadowview Road along the corridor they are: Morrison Creek, Franklin Boulevard, Center Parkway, and CRC. All stations would have low platforms with a special high platform to facilitate wheel chair access.

Station platforms would be approximately 400 feet long to accommodate a four-car light rail train. Platform widths would vary from 18 to 25 feet, depending upon location and configuration.

Park-and-ride lots would be built at the Morrison Creek and Franklin Boulevard with a parking structure at the CRC stations; the Center Parkway station is a walk-on station. The project's parking demand was estimated using travel demand modeling (see Section 3.4). The proposed parking may be constructed in stages based on monitoring of actual use.

Stations have been located and planned to minimize acquisition of private property, encourage transit oriented development, and minimize impacts on adjacent neighborhoods and businesses. Criteria for the design of station layouts and access pathways included:

- Achieve the best balance between station frequency and average train speed;
- Provide opportunity for associated transit oriented development;
- Minimize residential and commercial displacements/disruption;
- Minimize potential for conflict among different access modes;
- Ensure pathways of access for the disabled;
- Create a pedestrian-supporting environment;
- Provide pedestrian and vehicular safety; and
- Minimize major environmental issues.

Typical passenger amenities at stations would include:

- Covered shelter with comfortable seating;
- Telephones for outgoing calls only;
- Landscaping;
- Lighting;
- Drinking fountains;
- Bicycle racks and lockers;
- Information displays; and
- Easy access for elderly and disabled passengers.

Design details and landscaping plans would be refined during the Project's final design phase. The public will have the opportunity to review and comment upon station design and landscaping plans during this phase. RT will work closely with the public to identify critical station design issues early in the planning process and incorporate public input into station design.

2.4.5.1 MORRISON CREEK STATION

Location and Layout - The Morrison Creek Station would be constructed approximately one-mile south of the existing Meadowview Road Station. It would be located just to the west of Morrison Creek and north of the planned extension of CRB. The station would have side platforms, as shown in Figure 2.4-6. The platforms would be 400 feet long and about 18 feet wide. The station is designed to serve a proposed transit oriented development planned for the area to the west of the station.

Pedestrian Access - The station would be designed to connect with the future westerly development's pedestrian network in a manner that encourages future residents to walk and bike to the LRT station.

Bus Access – Buses would use the same access as automobiles coming from the future westerly development's yet to be designed street network.

Automobile Access – Automobiles would gain access to the station via a driveway that would connect to the yet to be designed adjacent development street network. It is assumed the future street network would connect to both CRB and Detroit Boulevard which would provide maximum vehicular access opportunities to the station.

Park-and-Ride Facilities – This station is designed primarily for "walk on" traffic, and therefore limited park-and-ride capacity is provided. Fifty parking spaces would be provided, including the handicapped spaces.

Kiss-and-Ride Facilities – Kiss-and-ride facilities would be provided adjacent to the platforms. The appropriate number of kiss-and-ride spaces would be provided in conformance with RT's Station Guidelines.

2.4.5.2 FRANKLIN STATION

Location and Layout - The Franklin Station would be located in the SCRSD bufferlands area north of the planned CRB extension and just to the west of Franklin Boulevard as shown in Figure 2.4-9. As the LRT alignment approaches from the west, it would turn northeast away from CRB and run along the south edge of a reconfigured City flood control detention basin, then turn southeast on a diagonal path to cross at grade the north leg of the intersection of Franklin Boulevard with CRB. The station would have side platforms that would be located on the southeasterly diagonal segment about 300 feet from Franklin Boulevard. The LRT alignment makes this diversion away from CRB so vehicles can enter the station's park-and-ride lot without crossing the LRT tracks.

Under the flyover option wherein the LRT alignment would cross over Franklin Blvd., the platforms would be located approximately 1,200 feet from Franklin Boulevard. This option would have side platforms on an embankment that would run along the southern edge of the City's detention basin. This platform would be about two feet higher than the adjacent park-and-ride lot. In either location, the platforms would be 400 feet long and about 18 feet wide.

The station's park-and-ride lot would be constructed on engineered fill to conform to the expected elevation of the CRB extension and to be above the elevation of the 100-year floodplain.

Pedestrian Access - Pedestrian access to the platforms would be provided from both Franklin Boulevard and the future CRB Extension. The station also includes a pedestrian access path from the end of Deer Lake Drive in the subdivision to the north. This path would start at the Deer Lake Drive cul-de-sac, cross over Union House Creek on a pedestrian bridge, pass through the northerly bufferlands area, and end at the station platforms. The exact route of this path through the bufferlands would be determined working with the SCRSD during the project's final design process.

Bus Access - Buses would use the same access as cars initially entering the station from an entrance driveway that would make up the western leg of the Franklin Boulevard/CRB intersection. Upon future completion of the CRB extension this entrance would be closed and a new permanent driveway access would be opened approximately 800 feet west of the Franklin Blvd/CRB intersection.

Automobile Access – Vehicular access to the station would initially be via an entrance driveway that would make up the western leg of the Franklin Boulevard/CRB intersection. Upon future completion of the CRB extension, this entrance would be closed and a new permanent driveway access would be opened approximately 800 feet west of the Franklin Blvd/CRB intersection.

Park-and-ride Facilities – The station would contain space for approximately 650 vehicles to include the required number of handicapped spaces.

Kiss-and-ride Facilities – The station would include kiss-and-ride facilities adjacent to the platforms. The appropriate number of kiss-and-ride spaces would be provided in conformance with RT's Station Guidelines.

2.4.5.3 CENTER PARKWAY STATION

Location and Layout – The Center Parkway Station would be a walk-on station with no park-and-ride facilities. As shown in Figure 2.4-12, the station would be located north of CRB directly west of Center Parkway. The station would have a side platform configuration. The southerly platform would be 25 feet wide and 400 feet long. The northerly platform would be 18 feet wide and 400 feet long.

Pedestrian Access - Pedestrian access to the platforms Access to the station would be via sidewalks along both CRB and Center Parkway. A pedestrian access bridge/path would be provided from the south end of Valley Green Drive in the subdivision to the north. This path would start at the Valley Green Drive cul-de-sac, cross over Union House Creek on a pedestrian bridge, and continue along the southern edge of Union House Creek to end at the station platforms and Center Parkway. The path along the southern edge of Union House Creek would also extend west to Franklin Blvd. thus also providing access to the Franklin Station.

The Center Parkway Station also includes an optional pedestrian bridge over CRB that would provide grade separated access to the station from areas south of CRB. The optional pedestrian bridge would start on the Southwest corner of CRB and Center Parkway (it would require acquisition of an existing property at this location), pass over CRB, and end at the station platforms. Each end of the bridge would include an elevator and stairways. The location of the north tower would require coordination with the SAFCA Union House Creek widening project.

Bus Access - Bus access would be provided to the station by providing bus stops along Center Parkway. Bus stops would be provided on Center Parkway just north of the intersection with CRB for northbound and southbound Center Parkway traffic. The existing bridge would be widened to mitigate traffic impacts. This widening would require acquisition of a small strip of property north of the bridge.

Automobile Access – Automobile access to this station is via the existing street network. As this is primarily a walk on station only kiss-and-ride facilities will be provided along westbound CRB.

Park-and-ride Facilities – No park-and-ride facilities are proposed for this station.

Kiss-and-ride Facilities – The station would include kiss-and-ride pull outs immediately adjacent to the southern platform along westbound CRB and at the southeast corner of the intersection. The appropriate number of kiss-and-ride spaces would be provided in conformance with RT's Station Guidelines.

2.4.5.4 COSUMNES RIVER COLLEGE STATION

Location and Layout - The CRC Station would be located just north of the College entrance along the west side of Bruceville Road as shown in Figure 2.4-15. Tail tracks would extend south of the station and south of the College entrance. The station would have side platforms 18 feet wide and 400 feet long.

Parking on the campus would be open to both students and commuters. A 2,000 space parking garage would be constructed *south of the main College Entrance road off of Bruceville Road*, as shown in Figure 2.4-16, and would be open to both students and commuters. It is anticipated that the structure could be

constructed by the Los Rios Community College District and CRC, with future financial participation from RT.

Bus terminal, kiss-and-ride and handicapped parking would be provided immediately adjacent to and west of the platforms. The station would be the terminus station for the LPAP2 Project, and would be designed so as not to constrain options for future extensions as part of a Phase 3 extension.

Pedestrian Access - Pedestrians access the station via walkways within the college campus.

Bus Access - Bus circulation would be provided west of the platforms and with access from Bruceville Road and the College entrance.

Automobile Access – Automobile access for kiss-and-ride and handicapped parking would be via the main College Entrance and Bruceville Road. Access to the parking structure would be via a new campus driveway off of Old Calvine Road as well as the main college entrance off of Bruceville Road.

Park-and-ride Facilities – An optional parking structure is under review just to the west of the platforms.

Kiss-and-ride Facilities – The station would include kiss-and-ride facilities west of the platforms and bus circulation in conformance with RT's Station Guidelines. Figure 2.4.*27* provides a visual simulation of LRT platform area and transit facility for the CRC Station.

2.4.6 Traction Power

The traction power system provides electricity necessary to operate the light rail vehicles. It consists of contact wire, support structures (i.e. poles that support the contact wire), and substations.

Four traction power substations (TPSS) will be required along the corridor to feed electricity from the SMUD power system to the LRT overhead contact system. The proposed traction power substations are labeled TPSS on figures included in this document. The TPSSs have been located away from sensitive environmental areas and residential land uses. In particular, the TPSSs are located on street or utility rights-of-way, station/park-and-ride lot areas, and on a college campus away from the student and administrative buildings.

TPSSs are proposed in the following locations:

- On the north boundary of the Morrison Creek Station (see Figure 2.4-6).
- In the southwest corner of the Franklin Station park-and-ride lot (see Figure 2.4-9).
- On the southeast corner of CRB and Center Parkway or a site 600 feet east (see Figure 2.4-12).
- In the vicinity of the tail tracks at CRC (see Figure 2.4-15).

The overhead contact system would consist of steel poles supporting copper wires in a catenary configuration. Generally, the poles would be located between the LRT tracks. However, the catenary poles will be located at the edges of the trackway in the UPRR corridor segment where the LRT tracks straddle SMUD high voltage poles.

LRT service to Cosumnes River College would operate on directional headways averaging 10 minutes during weekday peak periods, 15 minutes weekday midday and early evening, and 30 minutes weekday evenings after 7:00 PM. Total peak hours service frequency would be six trains per hour, yielding an average 10 minute headway. Actual headways would vary somewhat for each station. Train consists would include a maximum of four cars. Under the LPAP2, year 2030

Figure 2.4-27: Visual Simulation of Cosumnes River College Light Rail Station

Part of the work effort to identify suitable locations for the traction power substations was to perform a provisional traction power simulation. The simulation used the existing Siemens cars as models and ran the system at 7 ½ minute headways with each of the proposed substations taken out of service in turn. The program was run using the cars loaded to AW2 level and maximum simultaneous acceleration of two trains. The program measured the voltage drop and rail potential rise at all points of the route. The results showed that the power system would operate satisfactorily and safely under all contingency conditions.

2.4.7 Right-of-Way Requirements

Figures 2.4-3 to 2.4-19 show the proposed right-of-way lines for the South Sacramento Corridor Phase 2 LRT Extension and facilities. Property within those lines would be acquired for the LRT facilities. Additional right-of-way would also be required for station park-and-ride lots, and there would be need for added strips of right-of-way or property easements in limited areas. Displacements are discussed in Section 4.13.3, Property Acquisition and Relocation. Right-of-way requirements will be further defined during the preliminary engineering and final design phases of the project.

2.5 FLEET AND MAINTENANCE FACILITY REQUIREMENTS

RT completed a *Fleet Management Plan (2004)* that evaluates RT's future requirements for LRT and bus fleet sizes and associated maintenance facilities. Table 2.5-1 shows the anticipated fleet requirements as shown in the *Fleet Management Plan,* along with anticipated fleet and maintenance facility requirements for each of the alternatives.

Table 2.5-1: Vehicle Maintenance Facilities and Requirements

	Buses	**Light Rail Vehicles**
Current Maintenance Facility (2005)	29th & N Streets	Academy Way
Current Capacity	**275**	**97**
Planned Future Facilities		
Location	McClellan Business Park (Maintenance)	13th Street (LRT storage) + Folsom Blvd Satellite Facility
LRT Running Repair Facility		On DNA Line
Total Capacity Available (*2030*)	**475 -525**	**137**
No Action Alternative (*2030*)		
Additional Vehicles Needed for No-Action Alternative	89 [a]	12 [b]
System Requirements for No-Action Alternative	364 [a]	109 [b]
TSM (*2030*)		
Additional Vehicles Needed for TSM	21	0
System Requirements for TSM	385 [a]	109 [b]
LPAP2		
Additional Vehicles Needed for Vehicles LPAP2	0	4 [c]
System Requirements for LPAP2 (*2030*)	364 [a]	113 [d]

Notes:
[a] Excluding shuttle buses and spares.
[b] Vehicles in service for Amtrak/Folsom and DNA, excluding spares, *RT Financial cost model, 2005.*
[c] Additional vehicles to be acquired as part of for DNA project.
[d] Vehicles in service for Amtrak/Folsom, DNA, and S. Sacramento Phase 2, excluding spares, *RT Financial cost model, 2005.*

Sources: (1) Fleet Management Plan, 2003-2013, Sacramento Regional Transit District, May 2004, (2) RT Financial Operating Model, 2005, and (3) Transportation Model Outputs, DKS, 2005.

As shown, an additional 21 buses (excluding shuttle buses) systemwide would be needed for the TSM Alternative. No additional LRT vehicles or maintenance facility capacity expansion is included or necessary for either the TSM or LPAP2 Alternatives.

2.6 CAPITAL COST SUMMARY

This section presents a summary of capital costs estimated for the TSM and LPAP2 alternatives. Cost estimates were based on the latest local unit cost information available for the types of construction and procurement items. They can be compared with the capital costs for the rest of the MTP, which total $11.3 billion in constant 2002 dollars excluding the cost of the LPAP2 and Phase 3. Of that amount, $2.4 billion would go to transit improvements, $2.5 billion to state highway improvements, $4.5 billion to local street and road improvements, and the remainder to other transportation modes and related programs.

2.6.1 TSM Alternative Capital Costs

Table 2.6-1 presents capital cost estimates for the principal components of the TSM Alternative: new bus vehicles and the construction of a new park-and-ride lot and bus terminal at CRC. These costs include contingencies, engineering, and reserve. Escalation to year of expenditure is shown separately. Total capital costs, escalated to year of expenditure, are estimated to be $*53,067,000*.

Table 2.6-*1*: Capital Cost Summary Transportation Systems Management Alternative

BASE YEAR 2006 $	$ X000
Buses (21 buses)	*$17,547*
Park-and-Ride and Related Facilities	*$17,149*
Systems	*$2,020*
Right-of-Way	*$13,066*
Subtotal (*2007* $'s)	*$49,782*
Escalation to Year of Expenditure (*2009*)	*$3,285*
Total Cost Year of Expenditure (FY *2009* $)	***$53,067***

Source: Sacramento Regional Transit District and Parsons, 2006.

2.6.2 LPAP2 Capital Costs

Table 2.6-2 presents capital costs for the principal components of the Base Case LPAP2 extension to CRC. Total base case costs, escalated to the year of expenditure, are estimated to be $*270,000,000*, which is *$216,933,000* more than the estimated TSM Alternative costs. RT has acquired additional LRT vehicles to operate on the LPAP2. The base case does not include costs for optional design options such as the roadway grade separations. These optional costs are listed in Table 2.6-3 and are additive to the base escalated costs given in Table 2.6-2.

Table 2.6-2: LPAP2 Capital Cost Estimate by Cost Category

Element	Cost Estimate (Year of Expenditure dollars)
Guideway and Track Elements	*$43,974,000*
Stations, Stops, Terminals, Intermodal	*$44,886,000*
Support Facilities: Yards, Shops, Administration	$0
Sitework & Special Conditions	*$61,822,000*
Systems	*$30,044,000*
ROW, Land, Existing Improvements	*$14,929,000*
Vehicles	$0
Professional Services	*$42,094,000*
Unallocated Contingency	*$32,171,000*
Finance Charges	$0
Total Project Cost	***$269,920,000***

Source: RT Financial Forecasting Model, *September 2007*.
Notes: Construction costs include *15% to 30% contingencies*.
ROW costs include 25% contingency.

Additional vehicles will not be acquired as part of the LPAP2 Project. Vehicle maintenance for LRT vehicles would occur at RT's central maintenance facility at Academy Way. A new maintenance facility will not be required for the LPAP2 Project.

Table 2.6-3: Capital Cost Summary – Incremental Increase in Costs for LPAP2 Design Options Above the Base Case Costs

Cost Adjustments for Design Options	*Year of Expenditure $*
Meadowview Road Grade Separation	
LRT Flyover, or	$11,767,000
Meadowview Underpass	$12,087,000
Franklin Boulevard Flyover	$4,087,000
CRB Pedestrian Overcrossing at Center Parkway Station	$7,266,000
CRB Flyover	$6,393,000
Satellite Shuttle Park-and-ride Lot at Calvine/Auberry	$2,246,000
CRC Station North Lot Parking Garage Alternative	$18,379,000

Note: Costs escalated to year of expenditure, assumed as median year of 2009.
Source: Sacramento Regional Transit District and Parsons, 2005.

2.7 OPERATING AND MAINTENANCE COST SUMMARY

2.7.1 RT's Current Operating and Maintenance Costs

For Fiscal Year *2007*, the budgeted *systemwide* bus and rail operating and maintenance costs were $*134.8* million *(in 2007 $s)*.

2.7.2 Operating and Maintenance Costs of the TSM Alternative

Operating and maintenance costs for the TSM Alternative are based upon the service and fleet assumptions contained in RT's operating cost model. Fleet requirements are described in Section 2.5. In 2030, to maintain the proposed level of light rail and bus service, RT's annual LRT vehicle revenue miles of service would total *6.582* million and revenue train hours of service would total *0.149* million. RT's annual bus miles and hours operated would total 15.597 and 1.216 million, respectively. Year 2030 annual operating costs for RT are projected to be approximately $*276.3* million (FY *2007*$).

2.7.3 Operating and Maintenance Costs of the LPAP2

Operating and maintenance costs for the LPAP2 are based upon the service and fleet assumptions described in Section 2.4. Table 2.7-1 lists RT's projected 2030 LRT and bus vehicle revenue hours and miles of service, which correspond to annual operating and maintenance costs of $*275.2* million (FY *2007*$). The LPAP2 operating costs are expected to be approximately $*1.03* million lower than the costs for the TSM Alternative (FY *2007*$).

Table 2.7-1: 2030 Annual Operating Statistics for LPAP2

Alternative	2030 Annual Vehicle Revenue Hours		2030 Annual Vehicle Revenue Miles	
	Bus	LRT	Bus	LRT
LPAP2	1,170,000	*157,209*	14,864,000	*7,148,000*

Source: RT Financial Forecasting Model, *September 2007*.

2.8 ALTERNATIVES CONSIDERED AND WITHDRAWN FROM FURTHER CONSIDERATION

This section outlines alternatives considered in the project planning process and subsequently withdrawn from further consideration. The LPAP2 Project was first evaluated in an Alternatives Analysis/Draft Environmental Impact Statement/Draft Environmental Impact Report (AA/DEIS/DEIR) prepared by Sacramento Regional Transit in 1994. This document evaluated seven investment alternatives for the South Sacramento Corridor and included a comprehensive public involvement process designed to help inform the selection of a locally preferred alternative (LPA). On May 8, 1995, the RT Board of Directors certified the Final EIR and selected the "LRT-Low/Union Pacific Railroad (UPRR) alignment" as the LPA, withdrawing the other six alternatives from further consideration (RT Board Resolution 95-05-2356, included as Appendix F). These six alternatives and the public involvement in the selection process are described in detail in the AA/DEIS/DEIR.

The LPA selection established the preferred mode and alignment for transit improvements in the South Sacramento Corridor, but left open a variety of specific design options. These design options were evaluated as part of the planning process to develop an alignment that fit the basic project features while

accommodating other existing and planned developments and attempting to avoid impacts to natural resources, utilities, and other area land uses. The following discussion of alternatives considered and withdrawn focuses on these design options within each LRT alignment segment. The public involvement process for withdrawal of these design options consisted of input at RT Board meetings where the South Sacramento Corridor Phase 2 project was discussed. One key meeting took place on April 12, 2004, when the RT Board eliminated several design options based on the results of a public issues paper and associated public comments.

2.8.1 Meadowview Road to Union House Creek

The alignment selected for this segment runs south from the Meadowview Road station straddling the SMUD high voltage poles to Morrison Creek where it turns slightly east and south again to the Morrison Creek Station. From there the alignment runs south and turns east on a flyover over Morrison Creek and the UPRR tracks.

Four design options were considered for this segment in addition to the one selected. The first followed the selected alignment to Morrison Creek but then continued directly south across the creek to the UPRR flyover. It was rejected in order to add the Morrison Creek Station.

The second alignment (essentially the same as that presented in the 1994 AA/DEIS/DEIR) would have required relocating the SMUD high voltage power poles, a 20-inch high pressure gas line, and the UPRR tracks. It was rejected due to the high cost of relocating these major infrastructure items and because it had greater noise, vibration, and visual impacts on neighboring residences than the other alternatives.

The third option would have been the same as the selected option to the north of Morrison Creek, but then it would have crossed Morrison Creek, continued south, turned west, crossed Morrison Creek again, and turned south to the flyover. This option was intended to allow higher speed operation over the UPRR flyover since the flyover would follow a gentler curve. It was rejected because it required three bridges over Morrison Creek, required breeching the Morrison Creek levees at each bridge, and required significant acquisition of right-of-way.

The fourth option would have been similar to the selected option up to Morrison Creek, but the alignment would have crossed the bend in the creek levee on a bridge and run south, closer to the toe of the levee. This option was eliminated in response to comments from flood control agencies.

2.8.2 Bufferlands Corridor (UPRR Corridor to Franklin Boulevard)

Five design options were considered for the LRT alignment segment leaving the UPRR corridor and heading eastward across the SCRSD Bufferlands to Franklin Boulevard. Numerous options were developed because of the need to avoid development that would be inconsistent with SCRSD policies, to coordinate with the alignment of the planned CRB extension (by others), and to accommodate constructability and maintenance access for a new future sewer interceptor to be located in the strip of land between the City of Sacramento detention pond and Union House Creek.

The selected option would place the LRT alignment on the north side of CRB. It would follow the south berm of the SCRSD detention basin and swing around the Franklin Station parking lot (see Figure 2.4-*9*).

Four options were withdrawn from further consideration on this segment. The first alignment would have been similar to the selected alignment but it would have run along the northern berm of the SCRSD detention basin. This option was rejected because it would have had greater noise and vibration impacts on the residences north of the detention basin in the Deer Creek subdivision.

The second design option would have followed the selected option but the LRT alignment would have followed CRB rather than swinging around the Franklin Station parking lot. This option was rejected because it would have required vehicles to cross the LRT tracks at-grade to enter the parking lot.

The third design option would have required locating the Franklin Station platforms in the median of CRB, raising issues of transit patron safety in crossing CRB to the platform. Providing a pedestrian overpass to serve the station platforms in the CRB median was considered to address the safety concern, but rejected because of its excessive cost.

The fourth design option would have followed the selected option but the LRT alignment would have gone through the middle of the area between the City of Sacramento's detention basin and Union House Creek. It was rejected because it would have encroached into the area reserved for the future SCRSD sewer interceptor.

2.8.3 Franklin Boulevard to Bruceville Road

The selected LRT alignment on this segment follows the northern edge of CRB Boulevard from Franklin Boulevard across Center Parkway, and *as it approaches* Bruceville Road, the alignment would cross CRB *on a flyover* and follow the south edge of CRB to Bruceville Road. This segment of the alignment includes *an* optional flyover of Franklin Boulevard.

Many design options have been considered on this segment of the alignment to address the following constraints:

- The need to maintain manhole access to two large (84-inch and 90-inch) existing sewer interceptors;
- Space challenges to accommodate LRT as well as the future widened CRB, and the physical constraint represented by a future widened Union House Creek;
- The impacts to traffic operations with an at-grade crossing of LRT crossing CRB through the Franklin Boulevard and Center Parkway Intersections; and
- The "pinch point" between the detention pond on the northeast corner of the CRC campus adjacent to the Center Parkway/CRB intersection; and the northeast corner of the college stadium berm that was intersected by all the alignment options in this segment, given that the berm provides habitat for burrowing owls.

Several alignments were developed and rejected during the planning process for the CRB widening project and the Union House Creek widening project. Sacramento RT staff worked with project sponsors (SAFCA, the Corps of Engineers, City of Sacramento, and Regional Sanitation District) as the designs proceeded. This extensive coordination led to the development of numerous sketch-plan alignments that were rejected during the design process because they interfered with access to a large sewer interceptor, would have grade crossings that had unacceptable traffic impacts, or otherwise interfered with the widening projects.

Three *options from Franklin Boulevard to Bruceville Road* were considered in more detail*:* the selected option (north of CRB), a CRB Median option, and a CRB South option. Under the CRB South option, the LRT alignment would have crossed the Franklin Boulevard/CRB intersection on a flyover to land on the south side of CRB and continue eastward crossing Center Parkway at grade and thence along the northern edge of the CRC campus to the west side of Bruceville Road. The CRB South design option was withdrawn from further consideration due to unacceptable noise, vibration, and visual impacts to residences between Franklin Boulevard and Center Parkway, concerns regarding access to the 90-inch sewer interceptor, and the need for a costly retaining structure at the CRC detention pond. Under the CRB Median option, the alignment would have crossed Franklin Boulevard to the north of CRB and then

crossed west bound CRB lanes while moving into the median of CRB (via either a flyover or an at-grade crossing). The CRB Median option was rejected because it would conflict with the major sewer interceptor in this area.

An additional option between Center Parkway and Bruceville Road was developed to cross CRB at-grade mid-block between Center Parkway and Bruceville Road, run along the northern edge of the CRC campus with an at-grade crossing of a college service driveway and turn south around the stadium berm onto the landscaped strip on the west side of Bruceville Road. This option was eliminated in favor of the reduced traffic impacts of the flyover.

2.8.4 Bruceville Road Segment

The selected alignment along the Bruceville Road starts at the southwest corner of Bruceville Road and CRB where the LRT alignment turns south and runs along the west side of Bruceville road to a station just north of the CRC entrance roadway.

Four design options were evaluated for this segment in order to achieve the best fit given the following issues and constraints:

- Need to locate station platforms as close as possible to college entrance;
- Need to minimize impacts to proposed College Square Marketplace development;
- Infeasibility of mid-block crossings of Bruceville Road given close proximity of adjacent intersections;
- Adverse traffic operations impacts of an at-grade crossing through the Bruceville Road/West Stockton Boulevard intersection;
- Need to work out a feasible LRT crossing of Bruceville Road at the College entrance; and
- Desire not to preclude future possibility of extending the next phase of LRT southward along Bruceville Road rather than eastward along Calvine Road.

The selected option best addresses these constraints and the other three design options were withdrawn. The first withdrawn option would have followed the same basic alignment from CRB south on Bruceville Road, but about 1,000 feet south of CRB*, it* would turn east, cross into the median of Bruceville Road and include a station in the median. This option would have required a diagonal at grade LRT crossing of the intersection of Bruceville with West Stockton (the entrance to the new College Square development project). It was rejected due to the traffic impacts on this intersection and because CRC agreed to allow construction of a station on its property on the west side of Bruceville. The second rejected option would have been the similar to the first, but the alignment would have completely crossed Bruceville Road and constructed a station on the east side of Bruceville Road. It was rejected for the same reasons, traffic impacts and the ability to construct a station on the CRC property.

The third option would have crossed the West Stockton Boulevard intersection at grade and continued southeasterly (diagonally) across the College Square development area and located the College Station platforms in the middle of the mixed-use development. It was eliminated from further consideration because of the distance of the station platform from the college and the resultant disadvantage to college student riders, the adverse impacts of the diagonal crossing alignment on pedestrian and vehicular circulation within the development, and the impact of this alignment on the development potential of the College Square itself.

2.8.5 LRT Segment from the CRC to Calvine/Auberry

On April 12, 2004, the RT Board determined that the LPAP2 Project should terminate at CRC, thus withdrawing the LRT segment from CRC to Calvine/Auberry from further consideration as part of the LPAP2. The RT Board noted the following reasons for elimination of this LRT segment from the current Project:

- The adopted Elk Grove General Plan identifies Bruceville/ Big Horn as the preferred LRT or Bus Rapid Transit (BRT) alignment. The Segment from CRC to Calvine/Auberry would be inconsistent with this Plan.
- Withdrawal of this LRT segment from the LPAP2 Project would reduce Project costs by ~$28 Million, making the Project more cost effective and competitive for federal funding.
- While costs are reduced by ~$28 million, the projected ridership would be reduced by only 200-400 riders.
- Sufficient land exists in the CRC Station area to meet the estimated parking demand at this Station for 2000 spaces. The previously proposed 11-acre parking area for the Calvine/Auberry Station was developed in 2004 into residential units, and acquisition of these residences would have been required under the previously proposed plan for the Calvine/Auberry Station.

The future Phase 3 extension of LRT or BRT from the CRC Station will be the subject of a future alternatives analysis and environmental evaluation.

2.8.6 Storage and Maintenance Facility

Six locations, listed below, were considered as potential sites for a light rail vehicle storage and maintenance facility:

- Academy Way Maintenance Facility Site Option would have expanded the existing maintenance facility at 2760 Academy Way to allow storage for 115 LRT cars, in addition to the storage currently available at the existing yard.
- Florin Road Maintenance Facility Site Option would have allowed for storage of 50 LRT cars. The proposed site is located just north of the existing Florin Road LRT station.
- Meadowview Maintenance Facility Site Option, located north and west of Meadowview Station, would have provided storage for 50 LRT cars.
- 47th Avenue Maintenance Facility Site Option would have provided storage for 50 LRT cars. It is located along RT's South Line, just north of 47th Avenue.
- Morrison Creek Maintenance Facility Site Option would have been located across Morrison Creek from the project alignment south of the Morrison Creek crossing. It would have allowed storage of 50 cars.
- Cotton Lane Maintenance Facility Site Option would have been located along Cotton Lane south of the proposed College Square development. It would have offered storage for 50 cars.

As part of its recent fleet management plan, RT performed a study to evaluate systemwide storage and maintenance facility needs into the future. As noted in the fleet management plan, RT's central LRT vehicle maintenance facility at Academy Way has been expanded to accommodate a 97-car fleet of LRT vehicles. This is a sufficient capacity to meet the requirement for maintenance of the LPAP2 LRT vehicles.

Additionally, a site along the Downtown Sacramento—Folsom Corridor has been identified as a possible site for a maintenance and storage facility. The studies concluded that if RT completes the expansion of the Academy Way facility and develops the Folsom Corridor facility, RT will have sufficient facilities to meet systemwide maintenance needs, including the Phase 1 of the Downtown/Natomas/Airport Line and the LPAP2. Because of this, the RT Board determined on April 12, 2004 that a new maintenance facility will not be required for the LPAP2 Project, and the storage and maintenance facility options were eliminated from the LPAP2 Project.

2.9 RELATED PROJECTS

The following projects (shown in Figure 4.10-3) are planned or proposed within the South Sacramento Corridor. RT has in the past and will continue to coordinate its planning and conceptual design for the proposed transit alternatives with the conceptual design and possible development of these related projects.

Neither the TSM nor LPAP2 is dependent on any of these related projects to be implemented; and each related project has its own independent utility, i.e., could be built with or without implementation of either transit alternative. In several cases, however, design of the related project will need to be coordinated with the design of the proposed LPAP2. Such coordination is currently underway between RT and the various planning and implementing agencies identified below.

South Sacramento County Streams Project (Sacramento Area Flood Control Agency/U.S. Army Corps of Engineers). The SAFCA and ACOE propose to increase flood protection to the south Sacramento County area by (1) modifying existing levees or channels and constructing new levees or flood walls at the Sacramento Waste Water Treatment Plant and along portions of Morrison, Elder, Union House, and Florin *C*reeks; and (2) retrofitting bridges on these same creeks. An EIS/EIR has been completed for this work. Improvements along Morrison Creek have been funded and construction started in 2005. Completion of Morrison Creek improvements in the LPAP2 project area is planned for November of 2007. Improvements for Union House Creek, including the widening to the south *and removal of the* south levee, between the UPRR bridge and Franklin Blvd, and the widening to the south by some 18 feet between Franklin and Center Parkway, are under *construction and final design, respectively.* It is anticipated that the improvements between the UPRR bridge and Franklin will be completed in *the summer of 2008* and improvements between Franklin and Center Parkway will be completed in *late* 2008. RT will continue to work with SAFCA and the ACOE to assure coordination of the design for *LRT* facilities *with the flood control* .

Cosumnes River Boulevard Extension (City of Sacramento). This proposed new roadway would extend CRB from its current westerly terminus at Franklin Boulevard *to a new interchange at I-5*. An Environmental Impact Report *has been completed and final design has begun*. *The project is scheduled for completion in November 2010.* The proposed Phase 2 LRT alignment would be located to the north and generally parallel to the roadway extension. Vehicular access to the Franklin Boulevard LRT Station and park-and-ride lot would be provided by the CRB extension or by a separate access road should the extension not be developed.

Cosumnes River Boulevard Widening (City of Sacramento). The City of Sacramento proposes to widen CRB from two to four[4] lanes between Bruceville Road and Franklin Boulevard. The *Cosumnes River Boulevard – Franklin Boulevard to Bruceville Road Environmental Impact Report,* City of Sacramento

[4] The adopted 2002 Metropolitan Transportation Plan (MTP) shows this improvement to be from two to four lanes. The City of Sacramento's General Plan designates this portion of Cosumnes River Boulevard as an "Expressway," which could have a cross section with more than four lanes.

Planning and Development Department, December 1991 was prepared for this widening project and states that:

> "As evaluated in the EIR and adopted by the City, Route 148 Arterial within the project area would have ultimately been constructed to six lanes. The City of Sacramento is reevaluating this ultimate configuration based on the potential for other uses within the existing corridor. For example, a water transmission main may at some future date be proposed to be installed within the right-of-way of CRB, as well as, a light rail route and expansion of the Union House Creek. The amount of right-of-way necessary to accommodate a light rail corridor, landscaping, a pedestrian path, bicycle lanes, a water transmission main, the expansion of Union House Creek and six lanes of traffic is currently insufficient. Based upon these factors, the City will determine the relative merits of ultimately constructing CRB in the project area as either a four or six lane roadway."

Engineering of this project is not being progressed at this time and construction of the project is anticipated to be in the distant future after completion of the Phase 2 LRT Project.

Bruceville Road Widening (City of Sacramento). The City of Sacramento *has completed their* widening *of* Bruceville Road from two to *four and* six lanes between CRB and Sheldon Road.

Freeport Regional Water (Diversion) Project (Freeport Regional Water Authority - County of Sacramento, East Bay Municipal Utility District). The Freeport Regional Water (Diversion) Project would divert water from the Sacramento River for use by Northern California areas *along the existing CRB Corridor and the new CRB Extension*. *The water would be carried in a large underground pipeline. The project has begun construction and is scheduled for completion in May of 2009. The pipeline is located along the south side of CRB.*

Monterey Trail High School and Edward Harris Jr. Middle School. The Monterey Trail High School and Edward Harris Jr. Middle School, which opened in June 2004, will be located south of Old Calvine Road just east of Auberry Drive. Both schools will utilize the same facilities, with each school maintaining its own identity. This will be the third combined-campus educational facility constructed by the Elk Grove Unified School District to accommodate population growth in the area. The combined capacity of the campus is estimated at 4,860 students.

Shasta Park Site at Bruceville Road and Shasta Avenue. The planned Shasta Park Site would be located at the northeast corner of Bruceville Road and Shasta Avenue. The Sacramento City Park and Recreation Department is currently in the preliminary stages of acquiring the 20 acres of land for a park and community center. *The Sacramento City Park and Recreation Department will complete the environmental review for this two phased project in October, 2007. Phase 1 (10.5 acres) will begin construction in the spring of 2008 and is scheduled for completion in 2009. Phase 2 (5 to 6 acres) is scheduled to start construction in approximately 2009 with completion within a year. The library (3 acres) is to be constructed at the same time as Phase 1 of the park and will be completed by June 2009. The community center has no anticipated construction schedule and will be constructed when funding is available which is anticipated over the next ten years. The City is assuming the extension of Cotton Lane will be built by the adjacent development and will provide access to the park. If the developer does not construct it then the City will construct a driveway to the park in the location of what would have been Cotton Lane.*

Transit for Livable Communities. RT's Transit for Livable Communities (TLC) project is a land use planning process that began in late 2000 to obtain community involvement in the development of land use plans surrounding 21 current and future light rail stations including the Marconi (at Academy Way), 47th Street, Florin Road, and Meadowview Road LRT Stations in the South Sacramento Corridor. The

plans and recommendations emphasize pedestrian-oriented design, efficient use of land, and a mixture of residential, retail and office land uses, all designed to support and help create unique and sustainable communities at each station while increasing transit ridership.

The land use plans cover an approximately one-quarter mile radius around each of the 21 stations on the South, Folsom, and Northeast lines. Strategies for joint development are promulgated that apply to property that RT owns at seven of these stations. RT has initiated review of the TLC program to the Morrison Creek and CRC Station areas on the South Sacramento Corridor Phase 2 project. TLC Implementation measures are relevant to transit-oriented development throughout the Sacramento region.

College Square (Private Developer). The College Square development is located in the southeast quadrant at the CRB/Bruceville Road intersection. Fifty-three acres of planned unit development are *approved and either open or under construction. The retail associated with this site, including the largest anchor store, a national grocery store, opened July 2007 and approximately 50,000 square feet of additional retail and restaurants are constructed with more to come,* including a mix of residential, office and retail uses. The mixed-use development *will* meet the needs of the local community by providing residential uses including low-cost housing and conventional multi-family units, as well as neighborhood retail and office functions in close proximity to the CRC and the SR 99 interchange.

Dunmore Homes Development (Private Developer). The Dunmore Homes Development is to be located to the west of the proposed LRT alignment serving the Morrison Creek Station. It would be west of Morrison Creek, north of the CRB Extension and south of the existing Detroit Boulevard residential neighborhood. The project area

2.10 ISSUES TO BE RESOLVED / AREAS OF CONTROVERSY

A review of the environmental impacts and mitigation measures for the project alternatives are provided in Chapters 3, 4, and 5 and summarized in the summary and in Chapter 6. As shown in these chapters, adverse environmental impacts are mitigated for the project alternatives and there appear to be no remaining issues to be resolved or areas of controversy.

CHAPTER 3: TRANSPORTATION AND PARKING: AFFECTED ENVIRONMENT, IMPACTS, AND MITIGATION

3.1 OVERVIEW

This chapter describes existing and future transportation conditions in the South Sacramento Phase 2 Corridor and quantifies the expected long-term transportation impacts of the No-Action Alternative, the TSM Alternative, and Locally Preferred Alternative Phase 2 (LPAP2). Construction-phase impacts are discussed in Chapter 5. The No-Action Alternative provides the basis for evaluation of TSM and LPAP2 impacts under NEPA and CEQA. Comparison of the TSM and LPAP2 alternatives provides the basis for the FTA's evaluation of the project's worthiness for federal funding.

The first sections describe existing and projected future transit services, forecasts of transit patronage, and impacts on travel patterns and the transportation environment. Subsequent sections describe existing and projected vehicular traffic, circulation, parking, and non-motorized conditions in the corridor. Traffic operations under the alternatives during peak hours[1] are evaluated, with emphasis on intersection level of service (LOS), and measures are identified for mitigating adverse impacts of the TSM and LPAP2 alternatives on the roadway network. An assessment of traffic delays and potential queuing conflicts at LRT at-grade arterial crossings is summarized along with measures to lessen the potential for conflicts between LRT operations and vehicular traffic.

Future transit patronage and vehicular traffic volumes were developed using a refined version of the Sacramento Area Council of Governments' (SACOG) current regional travel demand model (SACMET01). Transportation modeling approaches, assumptions, projects, and projections for current conditions under the TSM and LPAP2 alternatives are described in the *Travel Demand Forecasting Methodology and Results Report* (DKS Associates, August 2004), which is available for review at RT offices. This report forms the basis for much of the information provided in this chapter.

3.2 TRANSIT

Transit service within metropolitan Sacramento consists of LRT, fixed-route bus, paratransit for the disabled and mobility impaired, and intercity rail.

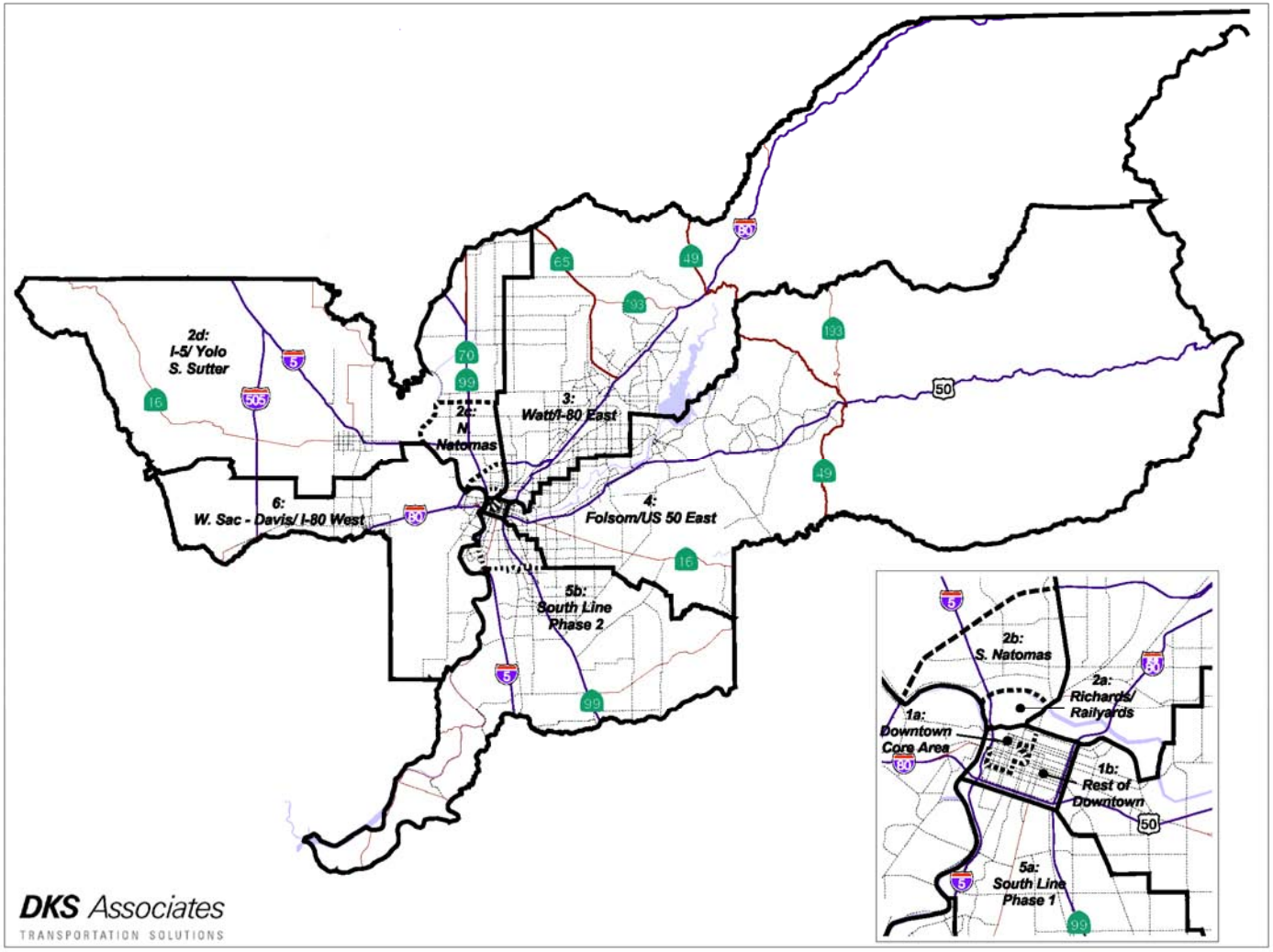
3.2.1 Existing Rail Transit Services

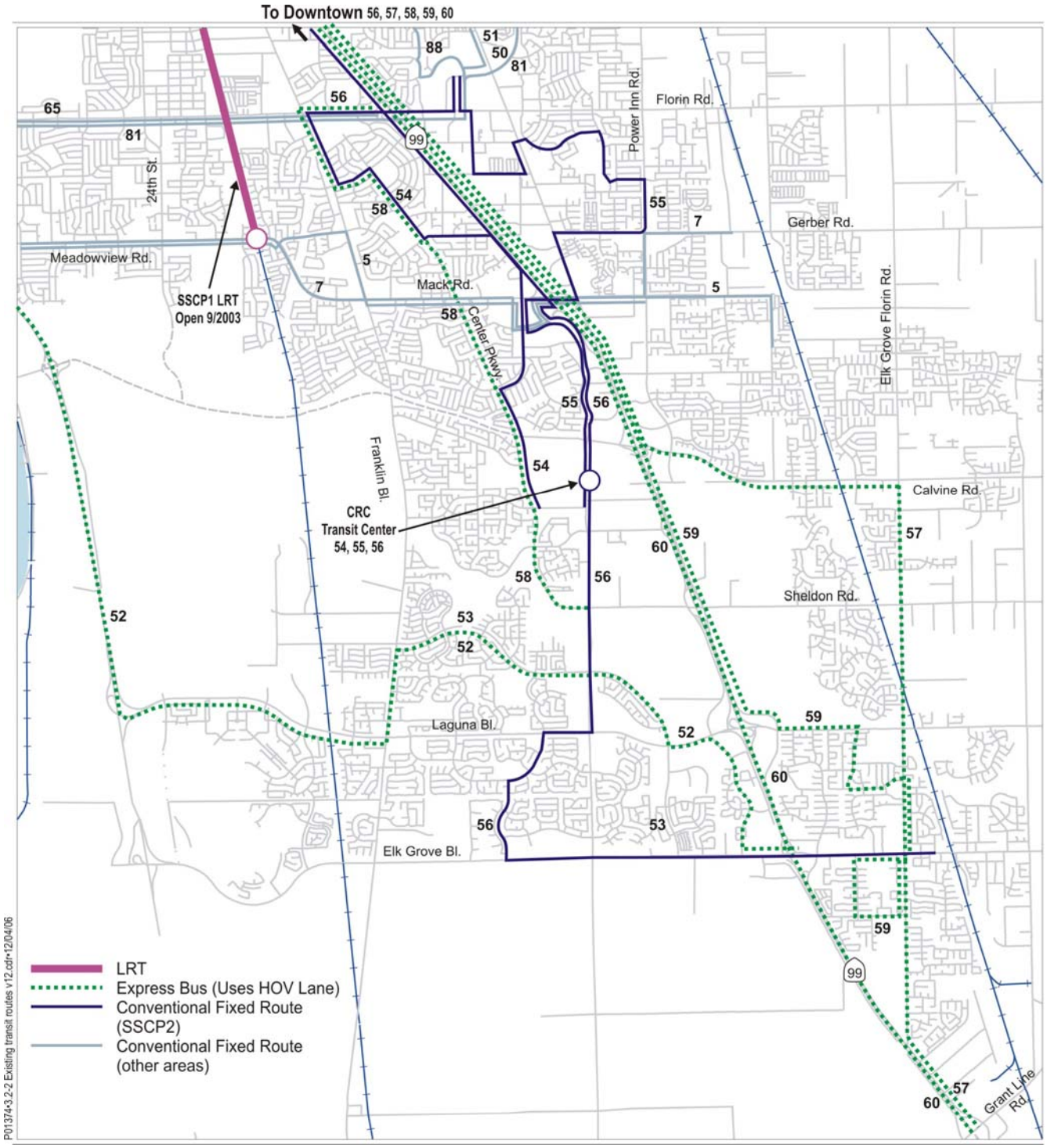
3.2.1.1 ROUTES AND OPERATIONS

In 1987, Sacramento RT began LRT service with the opening of an 18.3-mile Starter Line. In 1998, that line was extended to the Mather Field Station in the U.S. 50 Corridor, for a total of 20.6 miles of track. In 2003 service was extended to Meadowview Road as part of the South Sacramento Corridor Phase 1 Project. Figure 3.2-1 defines key travel corridors in the Sacramento region and Figure 3.2-2 defines the existing transit network. The corridors are as follows:

[1] Peak hours are defined as the highest hours of travel demand in the morning and the afternoon commute periods. Based on Year 2000 household surveys, these hours occur at 7:45-8:45 AM and 4:45-5:45 PM.

Figure 3.2-1: Definition of Corridors in RT Service Area





Regional Transit

South Sacramento Corridor Phase 2 Project

EXISTING TRANSIT NETWORK
Figure 3.2-2

- *Downtown Sacramento* is the highest density employment center in the region, with over 90,000 employees. About two-thirds of these jobs are located in the Core Area of Downtown. Downtown Sacramento has the highest level of transit service in the region, with LRT, RT trunkline and express buses, commuter buses from surrounding counties, and inter-city rail converging in the Core Area.
- *The DNA/I-5/SR 99 North Corridor* includes the Richards/Railyards, South Natomas, and North Natomas areas north of Downtown Sacramento, along I-5, and the portions of Yolo, Sutter, and Yuba Counties along Interstate 5 and State Route 99. RT is considering options for providing transit service in this corridor, connecting from Downtown to the Sacramento International Airport. Current transit service within this corridor includes limited RT fixed route bus service, and commuter buses from Yolo, Sutter and Yuba Counties to Downtown Sacramento.
- *The Watt/I-80 East Corridor* is centered on Interstate 80, moving northeasterly from Downtown Sacramento to Placer County. RT provides light rail service and fixed route bus service in the corridor. Commuter bus service to Downtown Sacramento is provided by Placer County and the City of Roseville.
- *The Folsom/US-50 East Corridor* is centered on US-50, moving due east from Downtown Sacramento to El Dorado County. RT provides light rail and fixed route bus service in the corridor. Commuter bus service to Downtown Sacramento is provided by El Dorado County and the City of Folsom.
- *The West Sacramento/Davis/I-80 West Corridor* is centered on the Capital City Freeway (formerly Business 80) and I-80, moving westerly from Downtown Sacramento. Commuter and local fixed route bus service is provided by Yolobus in the corridor, with some routes connecting to Downtown Sacramento.
- *The South Sacramento Corridor/I-5/SR-99 Corridor* is centered on I-5 and SR-99 moving south from Downtown Sacramento. This corridor is split into the Phase 1 Corridor, north of Meadowview Road, and the Phase 2 Corridor, south of Meadowview Road. RT has recently opened for operation an LRT line connecting from Downtown Sacramento to Meadowview Road. The focus of this study is the Phase 2 Corridor.

Trains of up to four cars in length operate along both exclusive and shared (LRT and other vehicles) rights-of-way. In Downtown Sacramento trains operate at-grade on city streets and exclusively along the K Street Mall. Currently, trains provide through service between the Watt/I-80 Station, the terminus of which is referred to as the Northeast Line, and the Folsom Line to Folsom; and between downtown (St. Rose of Lima Park) and Meadowview Road the current terminus for the South Sacramento Corridor. There are a total of 31 LRT stations, including 9 bus and LRT transfer centers, and ten free park-and-ride lots.

LRT revenue service is provided seven days a week. On weekdays, passenger service begins at about 4:20 AM (first departure) and terminates at about 12:00 midnight (last end-of-line departure). Saturday service begins at about 5:00 AM, while Sunday and holiday service begins at about 5:30 AM. Weekend service terminates at about 12:00 midnight. Train headways – the time between consecutive train movements in the same direction – are 15 minutes, except for 30 minutes in the following periods: weekday evenings after 6:30 or 8:00 PM, depending on direction; Saturdays between 5:00 AM and 7:00 or 8:00 AM, depending upon direction; and Sundays between 5:30 AM and 9:30 or 10:30 AM, depending on direction. In general, service from Mather Field to Watt/I-80 has 15-minute headways beginning later and continuing until later than service in the opposite direction.

The current peak fleet requirement is eight trains and 32 light rail vehicles. The Year 2000 LRT fleet is 36 vehicles, which includes four spare vehicles. In fiscal year 2002 (ending June 30, 2002), LRT operations included 2.1 million annual revenue train-car miles, and 47,155 revenue consist hours of service.

In addition to LRT service operated by RT, the Sacramento area is served directly by two long-distance intercity passenger services and one northern California interregional service, all operated by Amtrak. The Amtrak depot at 4th and I Streets is served by the Coast Starlight service (between Seattle and San Diego), with one southbound and one northbound stop daily; the California Zephyr route (between Chicago and Oakland/San Francisco), with one eastbound and one westbound stop daily; and the Capitol Corridor service (between San Jose and Sacramento), with 20 trips (ten eastbound and ten westbound trains) on weekdays and 18 trips on weekends. The Amtrak depot is the only intercity rail stop serving Sacramento. The depot also provides connections via Amtrak buses to the California cities of Redding, Stockton, Martinez, Davis, Roseville, Nevada City, and Stateline as well as the Nevada cities of Reno/Sparks and Carson City.

Access can be gained via feeder bus service to one other intercity rail service provided by Amtrak. The San Joaquin route between Oakland and Bakersfield includes an Amtrak bus connection between the Sacramento Amtrak depot and the Stockton station stop for San Joaquin trains. The San Joaquin operates six trains per day in each direction.

3.2.1.2 EXISTING FARES

LRT fares are $1.75 for adults and $0.85 for students (age 5-12), elderly (62 and over), and persons with qualifying disabilities. Children under five years ride for free. There is also a Central City fare of $1.00 without transfer valid between the Alkali Flat/La Valentina and 29th Street Stations only within RT's Central City Zone bounded by C Street (north), Broadway Ave. (south), Alhambra Blvd. (east), and the Sacramento River (west). Various discounted daily, monthly, and multi-ride fares are also available. The LRT fare system is a self service “honor” system, where proof of payment is periodically checked on trains by RT officers. Transfers to and from LRT and RT fixed-route buses are $0.25.

3.2.1.3 PATRONAGE

Table 3.2-1 summarizes the average weekday transit boardings (see Section 3.2.4.1 for a discussion of transit boardings and linked trips) in the Sacramento metropolitan area in 2001.[2] RT's light rail system carried approximately 29,000 passengers on an average weekday.[3] This represents about 31 percent of the total transit passenger boardings on services provided by RT and other fixed-route transit providers in metropolitan Sacramento.

[2] Year 2001 is used to represent "existing" conditions because it is the year nearest to the base year for the travel demand model (2000) for which station level boardings were available for LRT and line level boardings for fixed route buses.

[3] For comparison, 1997 total weekday boardings were 91,400 and Year 2002 were 92,800.

Table 3.2-1: Year 2001 Average Weekday Transit Boarding				
Operator	**Walk**	**Drive**	**Transfer**	**Total**
Sacramento Regional Transit District[1]				
Light Rail Vehicle	10,200	9,400	9,400	29,000
Bus	44,200	2,600	18,200	65,000
SRTD Total	54,400	12,000	27,600	94,000
Other Fixed Route Operators[2]				
Bus	n/a	n/a	n/a	7,000
Region Total				101,000

Notes:
[1] Based on 1999 On-Board Transit Survey, scaled up to match FY2001 boardings by mode.
[2] Includes Yolobus, Roseville Transit, Placer County Transit, Folsom Transit, El Dorado Transit.
Excludes free or near-free operators (Unitrans, CSUS Shuttle) and Paratransit.

3.2.1.4 ACCESSIBILITY

One measure of transit accessibility is travel time between various geographic areas, for example, between major activity centers within the service area. As shown in Table 3.2-2, LRT service has improved travel times on corridors over bus service. One reason LRT service is faster than bus is that LRT trains operate on exclusive rights-of-way in some areas, and in areas where they operate in shared rights-of-way, preferential treatment is provided to the LRT over regular traffic. Peak period automobile travel times are extremely variable in these corridors, due to the effects of traffic and incidents. Anecdotal evidence and information from spot travel times studies suggest that automobile travel times are between the LRT and bus line haul times.

Table 3.2-2: Accessibility Comparison AM and PM Peak Period Travel Times by Mode		
Corridor	**LRT Travel Time (Minutes)**	**Bus Travel Time[1] (Minutes)**
Northeast Corridor: Watt/I-80 to State Capitol	26	36
East Corridor: Mather Mills to State Capitol	29	45
South Corridor: Meadowview Road to St. Rose of Lima Park	20	34

1 Bus times are estimates based on current or historic schedules.
Source: DKS Associates, June 2005

3.2.2 Existing Bus Services

3.2.2.1 BUS ROUTES AND OPERATIONS

RT operates fixed-route bus service on 77 routes in Sacramento County on weekdays, a combination of conventional, fixed-route, all-day local (56 routes), peak period express or limited (12), all-day express (2), and "Neighborhood Ride" shuttle services (7). Twenty-nine routes provide services in the evenings. Forty-nine of the local bus routes continue service on Saturdays, Sundays or holidays. The peak bus fleet is 187 vehicles, and the total fleet is 220 vehicles, including 136 compressed natural gas (CNG) and 75 diesel buses.

RT service is provided in the following four periods: Morning Peak (up to 9:00AM); Midday (9:00AM to 3:30PM); Afternoon Peak (3:30PM to 6:00PM); and Evening (after 6:00PM).

Bus service hours vary by route. Most regular routes are in service by 5:00 AM and end service around midnight on weekdays. Headways vary by time of day and route, and reflect policy standards (typically the case in off-peak periods) or are established to meet loading requirements to maintain a level of seating comfort for passengers (often the case for peak period). The RT load standard is 1.5 passengers per bus seat, meaning maximum loads should not have more than 50 percent standees[4].

Existing peak hour headways range from 15 minutes to 60 minutes on regular routes, with most services in the 15 to 30 minute range. Two or more routes may overlap coverage along certain roadways and thereby provide combined headways less than 15 minutes. Express limited routes usually offer two to four peak direction trips during the AM and PM peak periods only. In Year 2000, RT provided 7.4 million annual revenue miles, and 561,000 revenue hours of bus service.

Routes currently serving within or near the LPAP2 Corridor are shown in Figure 3.2-2 (page 3-4). Table 3.2-3 summarizes operations for each route in the corridor including the time periods and days of operation, headways, and weekday boardings. In the Table, "peak" service period refers to the Morning Peak and Afternoon Peak periods, as defined above; "off peak" refers to the Midday service period. Within and near the corridor, RT operates five express routes and two limited service routes that provide peak-period-only service. Ten RT local routes in the corridor provide peak and midday service, with six also providing evening service. Eight routes operate on Saturdays and seven on Sundays.

3.2.2.2 BUS PATRONAGE

As shown in Table 3.2-1 (page 3-6), fixed-route bus services in metropolitan Sacramento served approximately 72,000 passenger boardings (65,000 on RT buses, and 7,000 on other fixed route buses) on an average weekday in 2001.

Table 3.2-3 shows that there are approximately 3,400 average weekday boardings on bus routes within the South Sacramento Phase 2 Corridor, based on Year 2001 ridership data.[5] Bus routes operating primarily in the Phase 1 Corridor, but connecting to other buses in the northern part of the Phase 2 Corridor, are also shown on the Table. The most utilized routes are 5, 51, 56, 67, 68 and 81, each with over 1,000 passenger trips on weekdays. Each of these routes has maximum load factors over 90 percent in the morning service period.

[4] Sacramento Regional Transit, "Short Range Transit Plan, 2000-2008".

[5] Ibid.

Table 3.2-3: Year 2001 Average Weekday RT Transit Boardings by Line

	Schedules / Weekday	Peak Headway	Off-Peak Headway	Boardings
Light Rail Vehicle				
Downtown Area	122	15	15	13,500
Watt/I-80 Corridor	122	15	15	6,800
Folsom/US 50 Corridor	122	15	15	8,700
LRV Subtotal	122	15	15	29,000
South Sacramento Corridor Phase 2 Bus Routes				
54 / Center Parkway	28	60	60	600
55 / Scottsdale	36	60	60	600
56 / Laguna Express	28	60	60	1,000
57 / Elk Grove - Florin Express	4	30	n/a	100
58 / Center Parkway Express	4	30	n/a	100
59 / Elk Grove Express	6	30	n/a	200
60 / Elk Grove P&R Express	6	30	n/a	300
52 / Laguna West	10	25	n/a	400
53 / Laguna - Elk Grove	18	60	60	100
SSCP2 Bus Subtotal	n/a	n/a	n/a	3,400
Selected South Sacramento Corridor Phase 1 Bus Routes				
5 / Land Park – Meadowview	32	60	60	1,400
7 / Meadowview Express	30	60	60	900
50 / Stockton Limited	8	15	n/a	100
51 / Broadway – Stockton	122	15	15	5,600
65 / Florin Express	4	30	n/a	100
67 / Franklin	60	30	30	2,600
68 / 44th Street	60	30	30	2,300
81 / Florin - 65th	64	30	30	3,000
Selected SSCP1 Bus Subtotal	n/a	n/a	n/a	16,000
All Other RT Bus Routes	n/a	n/a	n/a	45,600
RT Bus Subtotal	n/a	n/a	n/a	65,000
Total RT Boardings	**n/a**	**n/a**	**n/a**	**94,000**

Table 3.2-4 shows greater detail on the routing and frequency of buses operating within the South Sacramento Phase 1 and South Sacramento Phase 2 Corridors.

Table 3.2-4: Year 2001 Bus Routes in the South Sacramento Corridor Phase 2 Study Area

Route	Schedules Per Weekday	Service Headway (Minutes)		Service Area	Ave. Weekday Boardings
		Peak	Off Peak		
Primary Routes in the Corridor					
54 / Center Parkway	28	60	60	Florin Mall to Kaiser Hosp. & CRC via Florin Rd., Franklin Blvd., Center Parkway.	600
55 / Scottsdale	36	60	60	Florin Mall to Kaiser Hosp. & CRC via Power Inn Rd., Stockton Blvd., Bruceville Rd.	600
56 / Laguna Express	28	60	60	Elk Grove to Laguna, CRC & Downtown Sacramento via Elk Grove Blvd., Bruceville Rd., & State Route 99 (SR 99).	1,000
57 / Elk Grove - Florin Express	4	30	n/a	Elk Grove to Downtown Sacramento via Elk Grove-Florin Rd., Calvine Rd., & SR 99.	100
58 / Center Parkway Express	4	30	n/a	CRC to Downtown Sacramento via Center Parkway, Florin Rd., and SR 99.	100
59 / Elk Grove Express	6	45	n/a	Elk Grove to Downtown Sacramento via Elk Grove-Florin Rd., Bond Rd., East Stockton Blvd. & SR 99.	200
60 / Elk Grove P&R Express	6	45	n/a	Grant Line Road to Downtown Sacramento via East Stockton Blvd. and SR 99.	300
Other Routes In or Near the Corridor					
5 / Land Park - Meadowview	32	60	60	Florin H.S. & Kaiser Hosp. to Downtown Sacramento via Elsie Ave., Mack Rd., Meadowview Rd. via Land Park Dr.	1,400
7 / Meadowview Express	30	60	60	Kaiser Hosp. to Downtown Sacramento via I-5 via Mack Rd, Meadowview Rd. & I-5.	900
50 / Stockton Limited	8	15	n/a	Florin Mall to Downtown Sacramento via Stockton Blvd and P/Q Streets.	100
51 / Broadway - Stockton	122	15	15	Florin Mall to Downtown via Stockton Blvd., Broadway & 8th/9th Streets.	5,600
52 / Laguna West	10	25	n/a	Laguna to Downtown Sacramento via Laguna Blvd. and I-5.	400
53 / Laguna – Elk Grove	18	60	60	Laguna Town Hall to Elk Grove via Laguna Blvd., Big Horn, and Elk Grove Blvd.	100
65 / Florin Express	4	30	n/a	Florin to Downtown Sacramento via Florin Road and I-5.	100
67 / Franklin	60	30	30	Florin Mall to Downtown Sacramento and Arden Fair Mall, via Florin Rd., Franklin Blvd., 29th/30th Sts., and Capital City Freeway.	2,600
68 / 44th Street	60	30	30	Florin Mall to Downtown Sacramento and Arden Fair Mall, via 44th St., 14th Ave., MLK Jr. Way, 29th/30th Sts., and Capital City Freeway.	2,300
81 / Florin – 65th	64	30	30	Pocket to Florin Mall and 65th St. LRT, via Florin Road and 65th St.	3,000
				Total Weekday Boardings in Phase 2 Study Area	**19,400**

Source: Regional Transit, 2001.

3.2.2.3 OTHER FIXED-ROUTE TRANSIT OPERATORS

Other bus operators serve metropolitan Sacramento from Folsom and points outside of Sacramento County. Service is primarily to Downtown Sacramento and the State Capitol. These transit providers include the Folsom Stage Line, El Dorado Transit, Placer County Transit, Roseville Commuter Service, San Joaquin Regional Transit District– SMART, Yolobus, and Yuba-Sutter Transit.

Three shuttle bus services operate weekdays within the metropolitan area, including South Natomas Transportation Management Association Commuter Scooter, California State University, Sacramento (CSUS) Hornet Express, and University of California Davis Medical Center. Long distance intercity bus connections are provided by Greyhound out of its depot at 715 L Street in Sacramento. Other than the transfer connections provided for in Downtown Sacramento, only the CSUS Hornet Express serves the Sacramento-Folsom Corridor directly.

3.2.2.4 PARATRANSIT SERVICE

Door-to-door, shared-ride service for individuals in metropolitan Sacramento who are disabled and cannot use conventional transit services is provided by Paratransit, Inc. and is operated seven days a week. The Folsom Stage Line provides a similar service within the City of Folsom. Riders must meet Americans with Disabilities Act eligibility requirements and register in advance for service.

3.2.2.5 TRANSIT ACCESSIBILITY

Current average bus travel times[6] between major activity centers and community areas in the South Sacramento Phase 2 Corridor are as follows:

- Cosumnes River College and Downtown is 61 minutes.
- Laguna and Downtown is approximately 62 minutes.
- Elk Grove and Downtown is approximately 65 minutes.
- Vineyard and Downtown Sacramento is approximately 90 minutes.

These travel times include the elapsed time to walk to the bus stop at either end of the trip, wait time, and in-vehicle travel time. Travel times represent weighted averages of several locations within those areas. (This travel time data is presented in tabular form in Table 3.2-13 below as part of the section comparing the No-Action, TSM, and LPAP2 alternatives).

3.2.3 Future Transit Services in the South Sacramento Phase 2 Corridor

This section outlines the three future transportation alternatives evaluated in this environmental analysis. These alternatives were: No-Action TSM, and LPAP2. A detailed description of the alternatives is presented above in Chapter 2.

The starting point for the No-Action, TSM, and LPAP2 alternatives in the South Sacramento Phase 2 Corridor is the *2027* Metropolitan Transportation Plan (MTP) adopted by the Sacramento Area Council

[6] Reported times are averages of walk-to-transit times from a collection of travel analysis zones representing each area, to a collection of zones in the Downtown Sacramento core area, calculated using the refined version of SACMET01 used for travel forecasts for this study.

of Governments (SACOG) in July *2006*. The *2006* MTP's major transit improvements reflect the System Expansion and Phasing Strategy that was developed in RT's Multi-Corridor Study and adopted by the RT Board of Directors in July 2001 (outlined above in Section 2.2.2).

3.2.3.1 NO-ACTION ALTERNATIVE TRANSIT SERVICES

The No-Action Alternative includes all of the roadway improvements and nearly all of the transit improvements in the adopted *2027* MTP. The No-Action Alternative differs from the MTP in that LRT service in the South Sacramento Corridor would end at the Phase 1 terminus (Meadowview Road) and the feeder bus services in South Sacramento County would thus be routed to serve different LRT stations. The No-Action Alternative includes no new park-and-ride lots in the Phase 2 Corridor. The overall amount of transit service in the Phase 2 Corridor will increase by about 90 percent, comparing the 2030 No-Action Alternative to Year 2000 service. Section 2.2.2 above presents a complete description of the No-Action Alternative's transit services.

3.2.3.2 TRANSPORTATION SYSTEMS MANAGEMENT (TSM) ALTERNATIVE TRANSIT SERVICES

The TSM Alternative consists of the *2027* MTP, but replaces the LPAP2 LRT extension and its associated feeder bus services with new line-haul and feeder bus routes designed to represent the best that can be done through lower-cost transit service improvements to accommodate the LPA Phase 2 Corridor's travel demand without the proposed LPAP2 LRT extension.

Transit services provided under the TSM Alternative are detailed in Chapter 2, Section 2.3 and illustrated on Figure 2.3-1. Table 2.3-1 in Chapter 2 presents transit service headways under the TSM Alternative and their difference from the No-Action Alternative. The headways for this alternative were determined through "equilibration" (i.e., iterative travel model forecasts to balance headways to projected ridership for each transit line). Outside of the South Sacramento Phase 2 Corridor, the TSM Alternative network contains all the *2027* MTP transit investments and projects included in the No-Action Alternative.

3.2.3.4 LPAP2 TRANSIT SERVICES

The LPAP2 would extend LRT from the existing Phase 1 terminus at Meadowview Road to a terminus in the vicinity of Cosumnes River College. It would include stations at Morrison Creek, Franklin Boulevard, Center Parkway, and Cosumnes River College/College Square. *The LPAP2 project also would include a grade separation over Cosumnes River Boulevard between Center Parkway and Bruceville Road.* The LPAP2's transit network is presented in Figure 2.4-1 and is based on the *2027* MTP. Key features of this system within the LPAP2 Corridor area are:

- Completion of the LPAP2 LRT extension to Cosumnes River College.
- Re-routing and re-orientation of existing fixed route bus service in the South Sacramento Corridor to avoid duplicate service and to provide feeder service to LRT stations.
- Provision of new fixed route bus service feeding the light rail line, primarily in the areas south of Meadowview Road and west of State Route 99 (SR 99).

One modification to the fixed route service in the LPAP2 is the result of re-configuring some of the existing express bus routes from Elk Grove to Downtown Sacramento. Table 2.4-1 in Chapter 2 provides service headways for the LPAP2 transit network and differences from the Future TSM

Alternative. The headways were determined through "equilibration" (i.e. iterative travel model forecasts to balance headways to projected ridership for each transit line).

The LPAP2 does not include the proposed South Sacramento Corridor Phase 3 project which is included in the MTP project list. The Phase 3 project would extend the South Sacramento Corridor to Elk Grove. The mode, alignment, terminus, and other key project parameters of the Phase 3 extension have not been determined and will be the subject of a future alternatives analysis and environmental evaluation. In lieu of representing the Phase 3 project in the LPAP2, the alternative's transit network includes enhanced fixed route bus service from the LPAP2 terminus to Elk Grove (specifically the E, F, and G routes). Outside of the South Sacramento Corridor, the LPAP2 transit network contains all the *2027* MTP transit investments and projects described in the No-Action Alternative.

A comparison of the passenger-carrying capacity of the three alternatives and existing service is provided in Table 3.2-5. Capacity is tabulated for three "cutlines":

- Cutline 1—North of Meadowview and Mack Roads. LRT carrying capacity for this cutline increases from Year 2000 to Year 2030, due to the addition of supplemental peak period trains. LRT carrying capacity does not differ among the three alternatives for Cutline 1. Bus carrying capacity is highest for the TSM alternative (2,160) which reflects the addition express bus service included in this alternative compared to the No-Action and LRT alternatives.
- Cutline 2—North of Cosumnes River Boulevard and Calvine Road. LRT carrying capacity for this cutline is zero for existing conditions, and Year 2030 conditions with the No-Action and TSM alternatives, because LRT service terminates at Meadowview Road. For the LPAP2 alternative, LRT carrying capacity is 3,000 passengers, reflecting the extension of LRT service to CRC. Bus carrying capacity is highest for the TSM alternative (3,540 passengers).
- Cutline 3—North of Laguna Boulevard and Bond Road. No alternative provides LRT carrying capacity across this cutline. Bus carrying capacity is highest for the TSM alternative (1,560 passengers).

3.2.4 Projected Future Rail and Bus Patronage

Travel demand forecasts, based on the 2030 transit network assumptions described above, were developed for each project alternative. Forecasts include estimates of regional transit activity and trip-making in LPAP2 Corridor. Evaluation of future patronage focuses on the differences among the three alternatives: No-Action, TSM, and LPAP2.

3.2.4.1 LINKED TRANSIT PASSENGER TRIPS AND PASSENGER BOARDINGS BY CORRIDOR

Table 3.2-6 summarizes 2030 linked transit passenger trips by corridor for the alternatives[7]. Table 3.2-7 summarizes transit passenger boardings by corridor for the alternatives. In both cases, the analysis corridors are those shown in Figure 3.2-1.

[7] Forecasts include the recent proposed transit fare changes under consideration by SRTD.

Table 3.2-5: Comparison of Peak Hour Passenger Carrying Capacity

Cutline/Vehicle Type	Existing[1,2]	Year 2030[1,3] No-Action	TSM	LPAP2
Cutline 1: North of Meadowview/Mack Roads				
LRT	2,000	3,000	3,000	3,000
Bus	540	1,140	2,160	1,020
Total	2,540	4,140	5,160	4,020
Cutline 1 Changes...				
...from Existing	n/a	+ 1,600	+ 2,620	+ 1,480
...from 2030 No-Action	n/a	n/a	+ 1,020	- 120
Cutline 2: North of Cosumnes River Blvd./Calvine Road				
LRT	0	0	0	3,000
Bus	520	2,460	3,540	1,560
Total	520	2,460	3,540	4,560
Cutline 2 Changes...				
...from Existing	n/a	+ 1,940	+ 3,020	+ 4,040
...from 2030 No-Action	n/a	n/a	+ 1,080	+ 2,100
Cutline 3: North of Laguna Blvd./Bond Road				
LRT	0	0	0	0
Bus	400	1,020	1,560	1,200
Total	400	1,020	1,560	1,200
Cutline 3 Changes...				
...from Existing	n/a	+ 620	+ 1,160	+ 800
...from 2030 No-Action	n/a	n/a	+ 540	+ 180

Source: DKS
[1] Passenger capacities include seats and standees (125 per LRV, 60 per standard bus, 90 per articulated bus). Carrying capacities calculated for AM peak hour in the northbound (peak) direction.
[2] Existing capacity based on 2004 published routes and schedules.
[3] Year 2030 capacities based on routes and schedules described in Chapter 2 of this document.

A "linked trip" includes all of the segments of a passenger's trip from its point of origin (e.g., the passenger's home) to its final destination (e.g., the passenger's place of work). Evaluating transportation improvements using linked trips is a common industry practice.

A "boarding" occurs whenever a passenger enters a transit vehicle. A single linked trip must include at least one boarding, but often includes more than one. For example, a trip which includes a bus trip from home to an LRT station, an LRT ride, and then a bus trip to a final destination includes three boardings (two bus boardings, and one LRT boarding) but only one linked trip. Figure 3.2-3 provides an illustration of the difference between a transit boarding and a linked trip.

Table 3.2-6: 2030 Weekday Linked Transit Trips by Corridor				
Corridor[1]	**Year 2000**	**Alternatives**		
		No-Action	**TSM**	**LPAP2**
South Sacramento Corridor (I-5/SR 99 South)				
Phase 1 Corridor (5a)	*9,930*	*18,900*	*18,930*	*19,130*
Phase 2 Corridor (5b)	*1,030*	*11,040*	*12,950*	*14,330*
South Sac. Subtotal	10,960	29,940	31,880	33,460
Rest of Region				
Downtown Area (1a-1b)	28,710	64,770	66,090	66,960
DNA/I-5/SR 99 North (2a-2d)	2,980	19,000	19,050	19,070
Watt/I-80 East (3)	15,060	25,940	25,950	25,960
Folsom/US 50 East (4)	14,800	27,830	27,860	27,940
W.Sac-Davis/I-80 West (6)	5,310	14,700	14,700	14,720
Gateways	0	0	0	0
Total Regionwide	***77,820***	***182,180***	***185,540***	***188,110***
Change from No-Build		n/a	**+ 3,360**	**+ 5,930**
Change from TSM			**n/a**	**+ 2,570**[2]

[1] See Figure 3.2-1 for boundaries of corridors used to summarize systemwide transit trips. Numbers in parentheses indicate the corridor segments included in the tabulation.
[2] This compares to incremental trips of 2,273 reported in the New Starts submittal, which are based on SUMMIT output files. This tabulation includes one trip purpose (home-based-school) which is excluded from SUMMIT. Also, there are minor computational differences between SUMMIT (used for New Starts submittal) and MINUTP (used for all tabulations in this document).
Source: DKS Associates, July 2006.

No-Action Alternative. Under the No-Action Alternative, Year 2030 weekday linked transit trips increase to 182,180, an increase of 134 percent over Year 2000 (Table 3.2-6). Weekday passenger boardings on bus and rail services in metropolitan Sacramento on weekdays are expected to increase from 101,500 in 2000 to about 278,570 in 2030, a 174 percent increase (Table 3.2-7).

TSM Alternative. For the TSM Alternative, Year 2030 weekday transit trips are forecasted to be 185,540, an increase of 3,360 linked transit trips over No-Action (Table 3.2-6). Total passenger boardings are projected to be about 284,930 in 2030, a 181 percent increase from 2000 levels. The bus improvements proposed for corridor with the TSM Alternative is estimated to result in about 1,330 more passenger boardings than the No-Action Alternative (Table 3.2-7).

Table 3.2-7: 2030 Weekday Transit Passenger Boardings by Corridor				
Corridor[1]	**Year 2000**	**Alternatives**		
		No-Action	**TSM**	**LPAP2**
South Sacramento Corridor (I-5/SR 99 South)				
Phase 1 Corridor	*13,100*	*43,910*	*43,790*	*42,720*
Phase 2 Corridor	*1,200*	*9,120*	*10,570*	*12,990*
South Sac. Subtotal	14,300	53,030	54,360	55,710
Rest of Region				
Downtown Area	31,600	89,780	93,080	93,020
DNA/I-5/SR 99 North	3,500	27,830	27,920	27,980
Watt/I-80 East	22,400	40,440	40,580	40,590
Folsom/US 50 East	25,100	51,720	53,200	52,510
W.Sac-Davis/I-80 West	4,600	15,770	15,790	15,880
Gateways	0	0	0	0
Total Regionwide	***101,500***	***278,570***	***284,930***	***285,690***
Change from No-Build		n/a	+ 6,360	+ 7,120
Change from TSM			n/a	+ 760

[1] See Figure 3.2-1 for boundaries of corridors used to summarize systemwide transit trips.
Source: DKS Associates, July 2006.

LPAP2. With completion and operation of the LPAP2, total systemwide linked transit trips are projected to be about 188,110 in the Year 2030. Linked transit trips for the LPAP2 Alternative would increase by 2,570 compared to the TSM, and increase by 5,930 compared to the No Action (Table 3.2-6). While the LPAP2 would result in an increase in transit trips, it would also require fewer transfers to serve some trips, resulting in only slightly higher (+760) total boardings than the TSM Alternative (Table 3.2-7). Specifically, many of the transit trips to and from the South Corridor without the LPAP2 would require more than one transfer. With the LPAP2, these trips would now only require one transfer.

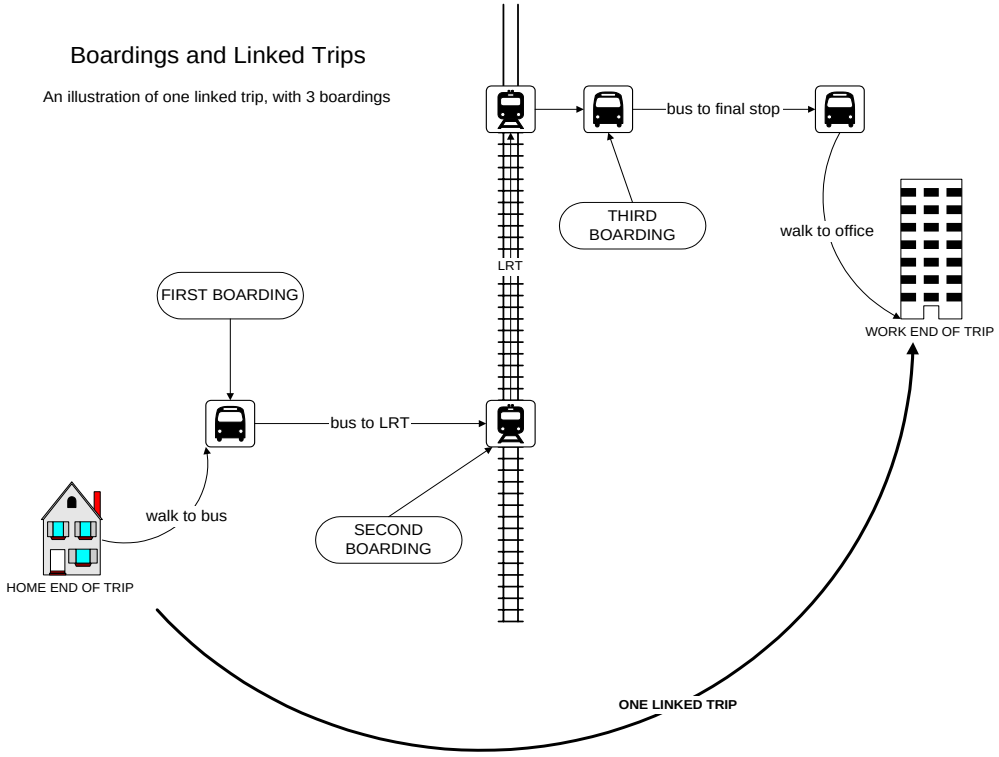
3.2.4.2 LINKED TRIPS BY ACCESS MODE

Access mode refers to the means used by a transit passenger to get to the transit line. Two modes of access are applicable to linked transit trips: walking or driving.[8] Transfers from other transit modes are tabulated for boardings, but a linked transit trip cannot begin with a transfer from another transit mode. Table 3.2-8 presents a comparison of regionwide linked transit trips by access mode, for the three corridor alternatives. Linked transit trips are reported for home-based-work trips, and for all other trip purposes.[9]

[8] For forecasting purposes, walk access includes all non-motorized modes of access, such as walking, bicycling, etc. Drive access mode includes both park-and-ride and drop-off modes.

[9] Includes home-based-shop, home-based-other, home-based-school (K-12), and non-home-based trips. Also includes airport passenger trips to Sacramento International Airport. Airport passenger trips are held constant for the alternatives analyzed in this study.

Figure 3.2-3: Illustration of Linked Transit Trips and Transit Boardings



Existing breakdowns of linked transit trips by mode and access mode are not available. The most recent transit survey of sufficient detail to estimate existing linked trips was conducted in 1999,[10] and surveyed only RT buses and trains. According to that survey, 80 percent of all linked transit trips served by RT are walk access, and 20 percent are drive access. By applying that split to estimates of average weekday linked transit trips for Year 2001, walk access trips were about 62,000, and drive access trips, about 15,000.

No-Action Alternative. Year 2030 average weekday walk access trips for this alternative are forecasted to be 134,862, an increase of 117 percent over Year 2000. Drive access trips are forecasted to be 47,313, an increase of 215 percent over Year 2000.

TSM Alternative. This alternative is forecasted to generate only slightly more (+704) walk access transit trips, compared to the No-Action Alternative. Drive access trips are forecasted to be about 2,657 higher than the No-Action Alternative, an increase of about six percent regionwide.

LPAP2. This alternative is forecasted to generate 1,631 more walk access transit trips than the No-Action Alternative, or 927 more than the TSM Alternative. Drive access trips are forecasted to be about 4,301 (nine percent) higher than the No-Action Alternative, and 1,644 (three percent) higher than the TSM Alternative.

[10] SACOG, "1999 On-Board Sacramento Regional Transit District Survey", June 2000.

Table 3.2-8: 2030 Regionwide Weekday Linked Transit Trips by Access Mode[1]

Access Mode	No-Action				TSM Alternative				LPAP2			
	Work	All Other	Total	%	Work	All Other	Total	%	Work	All Other	Total	%
Walk	48,641	86,221	134,862	74%	49,087	86,479	135,566	73%	49,604	86,889	136,493	73%
Drive[2]	35,353	11,960	47,313	26%	37,930	12,040	49,970	27%	39,119	12,495	51,614	27%
Total	**83,994**	**98,181**	**182,175**	100%	**87,017**	**98,519**	**185,536**	100%	**88,723**	**99,384**	**188,107**	100%
%	46%	54%	100%		47%	53%	100%		47%	53%	100%	

[1]For a definition of "linked transit trips", see Section 3.2.4.1 and Figure 3.2-4.
[2]Drive access combines park-and-ride and drop-off access modes.
Source: DKS Associates, July 2006.

3.2.4.3 PASSENGER BOARDINGS BY ACCESS MODE AND VEHICLE TYPE

Table 3.2-9 presents transit passenger boardings broken down by transit vehicle types. The vehicle considered are LRT and bus, with buses split out by RT versus all other operators. Bus includes all fixed route buses and community shuttles. Special user transit service (e.g., Paratransit) is not included in the tabulations. Year 2001 transit passenger boardings for LRT, RT buses and other fixed route buses are provided in Table 3.2-1.

Table 3.2-10 presents tabulations of LRT passenger boardings by mode of access. The modes of access to LRT stations presented in this table are similar to those presented in Table 3.2-7, but transfers are included as an access mode. Transfers are split into two categories: transfers from LRT to or from connecting buses, and "line-to-line" transfers on LRT (e.g., transfers from the Folsom-Airport line to the Watt-South Sacramento Line).

No-Action Alternative. Year 2030 average weekday passenger boardings to RT buses are projected to increase from 65,000 in 2001 to about 154,310 by 2030 with the No-Action Alternative, a 137 percent increase. Boardings to LRT are forecasted to increase from 29,000 in Year 2001 (Table 3.2-1) to 105,180, a 263 percent increase (Table. 3.2-8).

Currently about 35 percent of the LRT boarding are walk-access, and 32 percent are drive-access. By 2030 under the No-Action Alternative, walk-access boardings are forecasted to increase to 45 percent of total LRT boardings, while drive-access will decrease to 21 percent (Table 3.2-9). Boardings transferring from other transit remain relatively steady at 34 percent, but 3 percent of transfers are line-to-line transfers on LRT (i.e. transfers from one LRT line to another, rather than from LRT to/from buses).

TSM Alternative. Compared to No-Action Alternative, Year 2030 average weekday RT bus boardings would be 15,530 (10 percent) higher under the TSM Alternative. LRT patronage would be 1,120 (less than 1 percent) lower than the No-Action Alternative (Table 3.2-9). LRT boardings would be lower, because the TSM includes direct express bus service from CRC, which diverts some boardings from LRT relative to the No-Action Alternative.

Walk access boardings to LRT would decrease by 1 percent with the No-Action Alternative (47,330 compared to 47,760—see Table 3.2-9). Drive access boardings to LRT would actually decrease slightly relative to the No-Action alternative (21,620 compared to 21,750—see Table 3.2-10), and transfers from LRT to/from buses decrease slightly (31,910 compared to 32,440). This reflects the additional direct express bus services included in the TSM Alternative.

LPAP2. Year 2030 average weekday RT bus boardings for the LPAP2 would be about 3 percent higher than the No-Action Alternative (159,060 compared to 154,310—see Table 3.2-9). Boardings to LRT would be about 6,730 higher (111,550 compared to 105,180, an increase of 6 percent—see Table 3.2-9).

Walk access boardings to LRT would be almost 5 percent higher than for the No-Action Alternative (49,970 compared to 47,760—see Table 3.2-10). Drive access boardings to LRT would be about 15 percent higher (25,010 compared to 21,750—see Table 3.2-10).

Table 3.2-9: 2030 Regionwide Weekday Transit Passenger Boardings by Vehicle Type

Access Mode	No-Action				TSM Alternative				LPAP2			
	Peak	**Off-Peak**	**Total**	**%**	**Peak**	**Off-Peak**	**Total**	**%**	**Peak**	**Off-Peak**	**Total**	**%**
LRT	59,130	46,050	105,180	37%	57,460	46,590	104,060	36%	63,430	48,120	111,550	38%
RT Bus	81,990	72,320	154,310	56%	88,050	81,790	169,840	57%	81,170	77,890	159,060	55%
Other Bus[2]	9,310	10,920	20,230	7%	9,330	10,920	20,250	7%	9,360	10,940	20,290	7%
Total	**150,430**	**129,290**	**279,720**	100%	**154,130**	**136,440**	**290,570**	100%	**153,950**	**136,950**	**290,900**	100%
%	53%	47%	100%		53%	47%	100%		53%	47%	100%	

[1]For a definition of "transit passenger boardings", see Section 3.2.4.1 and Figure 3.2-4.
[2]Includes Yolobus, Unitrans, Folsom Transit/Stage Lines, CSUS shuttles, El Dorado Transit, Placer County Transit, and Roseville Transit/RUSH.
Source: DKS Associates, July 2006.

Table 3.2-10: Weekday LRT Passenger Boardings by Access Mode

Alternative	Walk	Drive	Bus Transfer[1]	LRT Transfer[2]	Total	% Change Compared with 2001	% Change Compared with No-Action
Year 2000	10,200	9,400	9,400	0	29,000	n/a	n/a
%	35%	32%	32%	0%	100%	n/a	n/a
Year 2030							
No-Action	47,760	21,750	32,440	3,240	105,190	+ 263%	n/a
%	45%	21%	31%	3%	100%	n/a	n/a
TSM	47,330	21,620	31,910	3,190	104,050	+ 259%	- 1%
%	45%	21%	31%	3%	100%	n/a	n/a
LRT	49,970	25,010	33,130	3,430	111,540	+ 285%	+ 6%
%	45%	22%	30%	3%	100%	n/a	n/a

[1]Includes transfers from bus to LRT, and LRT to bus.
[2]Includes line-to-line transfers on LRT.
Source: DKS Associates, July 2006.

3.2.4.4 PROJECTED LPAP2 PATRONAGE BY STATION AREA

Table 3.2-11 summarizes projected passenger boardings at South Line LRT stations for the TSM, and Table 3.2-12 provides a similar tabulation for the LPAP2.

Table 3.2-11: 2030 Weekday Station/Transit Center Boardings and Parking Space Demand TSM Alternative

Transit Center/Station[1]	Mode of Access to Transit Center/Station				Parking Space Demand[2]
	Walk	Drive	Bus Transfer	Total	
South Sacramento Corridor-Phase 2					
Morrison Creek	110	0	120	230	0
Franklin	10	0	300	310	0
Cosumnes Riv. Coll. Transit Ctr.	210	2,000	940	3,150	1,320
Calvine/SR-99 Park-and-Ride	80	250	60	390	170
Phase 2 Subtotal	410	2,250	1,420	4,080	1,490
South Sacramento Corridor-Phase 1 LRT Stations					
Meadowview	190	1,680	2,600	4,460	1,110
Other Phase 1 Stations	3,620	3,370	2,110	9,120	2,220
Phase 1 Subtotal	3,810	5,050	4,710	13,580	3,330
Southline Total	**4,220**	**7,300**	**6,130**	**17,660**	**4,820**

[1]TSM includes no LRT stations in the Phase 2 Corridor. Table shows bus transit centers, roughly equivalent to LRT station areas in the LPAP2.
[2]Parking space demand shown for Phase 2 Corridor are new bus park-and-ride facilities.
Source: DKS Associates, July 2006.

TSM Alternative. Since the TSM Alternative includes only bus service south of Meadowview, no LRT boardings would take place in the Phase 2 Corridor. However, the TSM Alternative includes additional transit facilities such as transit centers and bus park-and-ride lots. Table 3.2-11 tabulates transit passenger boardings for transit centers and bus stops in areas equivalent to the LRT station areas in the LPAP2.

A total of 4,080 passenger boardings would occur at bus stops served by multiple lines near the Morrison Creek and Franklin Boulevard Station areas, or at the Cosumnes River College or Calvine/Auberry transit centers in the TSM Alternative. The majority of passenger boardings would occur at the CRC Transit Center (3,150), where the largest concentration of bus routes converges in this alternative. Additionally, a direct express bus service via SR-99 to Downtown Sacramento (the G2 Route) terminates here, and is served by a 1,320 space park-and-ride lot.

Year 2030 average weekday LRT boardings at the Meadowview LRT station would be about 4,460, with over one-third of those passengers accessing the station by car (either parking or being dropped off). This would require about 1,110 parking spaces at this station, which is near the planned capacity of the station lot. An additional 2,600 passengers would transfer from one of thirteen feeder buses serving this station.

LPAP2. Year 2030 average weekday passenger boardings to the four Phase 2 stations (Morrison Creek, Franklin, Center Parkway, and CRC) are about 6,050 (Table 3.2-12). As with the TSM Alternative, the station with the highest levels of boardings would be CRC Station, with about 3,820 weekday boardings. Activity is high at this station in part because of trips generated by the College itself, but also because of the high level of feeder bus activity at the station with nine bus lines converging there, and the large park-and-ride lot provided at the station. Franklin Station has the next highest ridership with 1,690 passenger boardings. Morrison Creek[11] and Center Parkway Stations serve the remaining 540 passenger boardings.

Table 3.2-12: 2030 Weekday LRT Station Boardings and Parking Space Demand LPAP2

LRT Station	Mode of Access to Station				Parking Space Demand
	Walk	Drive	Bus Transfer	Total	
South Sacramento Corridor-Phase 2					
Morrison Creek	220	70	70	360	*50*
Franklin	160	900	630	1,690	*530*
Center Parkway	60	0	120	180	*0*
Cosumnes River College.	110	2,620	1,090	3,820	*1,830*
Phase 2 Subtotal	550	3,590	1,910	6,050	*2,410*
South Sacramento Corridor-Phase 1					
Meadowview	310	1,330	1,350	2,880	880
Other Phase 1 Stations	3,620	3,430	2,300	9,440	2,270
Phase 1 Subtotal	3,930	4,760	3,650	12,320	3,150
Southline Total	**4,380**	**8,450**	**5,560**	**18,370**	**5,590**

Source: DKS Associates, July 2006.

[11] Land uses assumed at the Morrison Creek Station for purposes of this study reflect the current residential zoning of the land, and the regional demographic forecasts provided by SACOG for use in this study. A community plan update is under way which would intensify the land uses around the station and increase the ridership.

Three of the four new LRT stations in the Phase 2 Corridor for this alternative would include park-and-ride lots. A total of 2,410 park-and-ride spaces would be required to meet estimated weekday drive access demands. A total of about 1,830 of these spaces would be needed at the CRC Station. An additional 530 would be needed at Franklin Boulevard, and 50 spaces at Morrison Creek Station.

Total boardings at the Meadowview Station would be about two-thirds that of the TSM Alternative (2,880 compared to 4,460). The total number of parking spaces at the Meadowview LRT station would be 880, or 230 less than the TSM Alternative. This reduction in parking requirement provides opportunities for joint development at this station which could be considered in future planning efforts by RT and the City of Sacramento (See Section 4.10 regarding RT's Transit for Livable Communities (TLC) program).

3.2.5 Projected Travel Times/Accessibility

On average, in-vehicle travel times between many locations in the South Sacramento Corridor and Downtown Sacramento, as elsewhere in metropolitan Sacramento, are projected to increase in the future due to traffic growth and increasing congestion. The impacts of congestion on travel times would differ by mode. Individuals relying on modes that must operate in mixed flow traffic (e.g., bus) would experience longer travel times than would individuals using modes that provide preferential treatments when operating on public roadways (e.g., carpools or HOV lanes) or modes operating in exclusive rights-of-way (e.g., LRT).

Table 3.2-13 lists projected AM peak period travel times by mode between four areas in the South Sacramento Phase 2 Corridor (CRC area, Laguna area, Vineyard area, and Elk Grove area) for each of the project alternatives. All times are for average conditions in the morning commute period,[12] exclusive of any incidents, breakdowns, accidents, construction, etc. The travel times represent the average of travel times from all the traffic analysis zones (TAZ) in those areas to the State Capitol (travel times are measured from the TAZ centroids). The following subsections discuss the travel times.

3.2.5.1 NO-ACTION ALTERNATIVE

As shown in Table 3.2-13, in most cases, Year 2030 No-Action Alternative auto travel times are projected to increase significantly compared to Year 2000 conditions. Increases in travel times range from 25 percent to over 50 percent relative to Year 2000.

For most of the trips interchanges examined, the Year 2030 No-Action Alternative transit travel times are also longer relative to Year 2000. Although the No-Action alternative includes significant additional bus service in the South Sacramento Phase 2 Corridor, most of the new service consists of buses operating on non-exclusive rights-of-way. To that extent, they are subject to the same growth in congestion reflected in the automobile travel times.

[12] The commute period is the three hours of highest travel demand in the morning and afternoon commute periods. Based on Year 2000 household travel surveys, this time period is 6:45 to 9:45 AM.

Table 3.2-13: Year 2000 and 2030 AM-Peak Period Travel Times

Alternative	Average Travel Time in Minutes by Mode (AM Peak Period)[1]			
	Auto[2]		Transit	
	Drive Alone	Carpool	Walk Access	Drive Access
CRC Area to Downtown Sacramento				
Existing (2000)	32 to 39	27 to 34	61	n/a
No-Action (2030)	40 to 51	33 to 42	47	52
TSM (2030)	"	"	47	50
LRT (2030)	"	"	40	35
Laguna West Area to Downtown Sacramento				
Existing (2000)	30 to 37	30 to 37	62	n/a
No-Action (2030)	42 to 53	38 to 48	76	72
TSM (2030)	"	"	72	54
LRT (2030)	"	"	66	43
Elk Grove Area to Downtown Sacramento				
Existing (2000)	35 to 43	30 to 36	65	n/a
No-Action (2030)	51 to 64	40 to 50	95	70
TSM (2030)	"	"	94	60
LRT (2030)	"	"	78	46
Vineyard Area to Downtown Sacramento				
Existing (2000)	48 to 57	33 to 41	90	n/a
No-Action (2030)	54 to 66	46 to 56	92	75
TSM (2030)	"	"	92	65
LRT (2030)	"	"	87	51

[1] Weighted times by trips amongst groups of travel analysis zones representing each area to the State Capitol.
[2] Ranges of Year 2000 auto times reflect 10% variation due to fluctuations in demand within the 3-hour period. Future year variations are assumed to be 15% to reflect higher congestion levels on major surface streets and freeways.

Source: DKS Associates, July 2006.

3.2.5.2 TSM ALTERNATIVE

The TSM Alternative is projected to marginally improve transit travel times relative to the No-Action Alternative for all trip interchanges reported here. In general, the bus network assumed to be present in the TSM Alternative is very similar to the No-Action Alternative, but with higher frequencies of service and more drive access opportunities. The walk access times for the TSM Alternative are marginally lower than the No-Action alternative, reflecting slightly lower waiting times due to higher service frequencies. For most of the trip interchanges, the TSM Alternative provides *substantially* lower drive-access transit travel times, because of the addition of two park-and-ride lots with high-frequency, timed-transfer feeder connections to LRT.

3.2.5.3 LPAP2

Drive-access-transit times for the LPAP2 are more *substantially* improved relative to Year 2000 than for the No-Action and TSM Alternatives. Relative to Year 2000, the LPAP2 would provide 40 to 50

percent reductions in transit travel times. This is due to the potential for "one-seat", no-transfer transit trips via drive access, which compare to bus park-and-ride to LRT trips for the No-Action and TSM Alternatives.

Walk access travel times are generally lower for the LPAP2 than the No-Action Alternative, but relative improvements are less than for drive access options.

3.2.5.4 ESTIMATES OF USER BENEFITS

An alternate measure of user benefits for the LPAP2 was prepared using the SUMMIT analysis software program provided by the Federal Transit Administration. SUMMIT is a unique program that enables a comprehensive comparison of the project benefits compared to the No-Action or TSM alternatives. The benefits calculation takes into account actual travel time savings as one measure. It also considers the "equivalent time value" of auto operating costs, parking charges, etc. that are avoidable if the project is built. Costs are converted to equivalent time using statistically estimated monetary values of time. Finally, if the project itself provides a viable travel option not present in the comparison alternative, the value of the additional option itself is included in the estimate of benefit. The benefits are weighted by the number of travelers affected, even if the transit option is not utilized. This program is required for use in FTA New Starts applications and is provided in this document as another measure of project impact.

Table 3.2-14 provides a tabulation of Year 2030 average weekday hours of user benefit, calculated using the SUMMIT program. This Table compares the LPAP2 to the TSM Alternative, and shows a total of 2,222 hours of equivalent travel time savings. The Table shows how the benefits break down by the "production end" (i.e. home end of a home-based trip) and the "attraction end" (i.e. non-home end of a home-based trip) of all trips. In general, the production end can be equated with the residence location for a traveler, and the attraction end with the work, shop or other destination end of a trip. The tabulation shows that the South Sacramento Phase 2 Corridor receives the vast majority of production end benefits (96%) and Downtown Sacramento receives the majority of attraction-end benefits (75%).

Table 3.2-14: User Benefits by District (LRT Compared to TSM)

Corridor	Production or "From" Corridor Benefits[1]		Attraction or "To" Corridor Benefits[1]	
1 Downtown Core	15	1%	1,284	58%
2 Rest of Downtown	1	0%	385	17%
3 DNA	-7	0%	36	2%
4 Watt/I-80 East	4	0%	27	1%
5 Folsom/U.S. 50	9	0%	110	5%
6 South Line Phase 1	55	2%	185	8%
7 South Line Phase 2	2,142	96%	177	8%
8 W.Sac/Davis/I-80 West	4	0%	19	1%
9 External	0	0%	0	0%
Total	2,222	100%	2,222	100%

[1] Includes "general purpose" trips (i.e. home-based-work, home-based-shop, home-based-other, and non-home-based trips). Does not include airport passenger ground access or other special purpose trips.
Source: DKS Associates, July 2006.

3.2.6 Mitigation Measures

There are no substantial adverse impacts to transit use under either the TSM or LPAP2, no transit mitigation measures are proposed. In fact, *substantial* benefits would accrue to most transit passengers, due to travel time savings and increased transit accessibility provided by the LPAP2 alternative. Additionally, the LPAP2 alternative would result in reduced parking demand in Downtown Sacramento.

3.3 VEHICULAR TRAFFIC

The following assessment of vehicular traffic focuses on existing and anticipated future conditions in the South Sacramento Phase 2 Corridor, including changes in traffic patterns and potential impacts associated with each of the project alternatives.

3.3.1 Existing Street and Highway System

An overview of the major roadway network in the South Sacramento Phase 2 Corridor is shown in Figure 3.3-1. The two major freeways serving the study area also serve Downtown Sacramento. Interstate 5 and State Route 99, generally follow a north-south direction between Downtown Sacramento and the South Sacramento Phase 2 Corridor area. Away from Downtown Sacramento, roadways generally follow north-south or east-west alignments and form a grid pattern. In the vicinity of the LPAP2, CRB and Calvine Road are the major east-west streets, while Franklin Boulevard, Center Parkway and Bruceville Road are the major north-south streets.

3.3.2 Existing Traffic Volumes and Level of Service

3.3.2.1 FREEWAYS

Interstate 5 (I-5) is a north-south freeway located west of the Phase 2 Corridor. The average daily traffic volume on I-5 south of Meadowview Road is about 75,000 vehicles per day (Source: State of California, Department of Transportation, *2000 Traffic Volumes on The California State Highway System)*. To the north, I-5 provides access to Interstate 80, northern portions of the City and County, Sacramento International Airport, other Sacramento Valley communities and the Pacific Northwest. To the south, I-5 provides access to many San Joaquin Valley and Southern California communities.

State Route 99 (SR-99) is also a north-south freeway that extends through the eastern portion of the Phase 2 Corridor study area. Access to this freeway within the corridor area is primarily via interchanges at Mack Road and CRB/Calvine Road. The average daily traffic volume on SR 99 south of Meadowview Road is about *136,000* vehicles per day (Source: State of California, Department of Transportation, *2000 Traffic Volumes on The California State Highway System)*. To the north, SR-99 provides access to U.S. Highway 50 and connects to the Capital City Freeway north of U.S. Highway 50. The Capital City Freeway provides access to northeastern portions of the City and County and to Interstate 80 extending into Placer County. To the south, State Route 99 provides access to southern portions of Sacramento County, as well as many San Joaquin Valley communities.

DKS Associates

South Line Phase 1 LRT (under construction)

Major Roadway

Regional Transit

South Sacramento Corridor Phase 2 Project

STUDY AREA HIGHWAY NETWORK
Figure 3.3-1

Sacramento County, as part of its Traffic Impact Analysis Guidelines, has established evaluation criteria for level of service (LOS) based upon facility type, daily traffic volumes, number of travel lanes, and access control. The criteria for freeways that provide full access control set the maximum daily traffic volume per lane at 20,000 for LOS E. Above this threshold, LOS F, or failure conditions, would typically result. A planning level LOS analysis of existing conditions was conducted for freeway segments in the study area based upon daily traffic count data, the number of mixed-flow traffic lanes and the daily capacity used by Sacramento County to evaluate its roadway system. Although segment-based LOS analysis is based upon daily traffic volumes, the resultant LOS is representative of peak period conditions.

LOS criteria for freeways are defined in Table 3.3-1. LOS "A" to "D" are considered as "good." Freeway LOS were determined based on a segment's calculated volume-to-capacity (V/C) ratio. A segments V/C ratio is the average daily traffic volume divided by its capacity assuming mixed flow lanes have a maximum daily capacity of 20,000 vehicles per lane, and high-occupancy vehicle (HOV) lanes have a maximum capacity of 5,278

Existing LOS and average daily traffic volumes (ADT) on State Route 99 and Interstate 5 are summarized in Table 3.3-2. As Table 3.3-2 shows, State Route 99 currently has recurring traffic congestion (LOS F) during both the morning and afternoon commute periods between Laguna Boulevard and Florin Road.

Table 3.3-1: Level of Service Criteria for Freeways

LOS	Description	Volume/Capacity Ratio
A	Free-flow conditions with a high level of maneuverability.	0.00 to 0.35
B	Free-flow conditions but presence of other vehicles is noticeable. Minor disruptions easily absorbed.	0.35 to 0.54
C	Minor disruptions cause significant local deterioration.	0.54 to 0.77
D	Borders on unstable flow with ability to maneuver severely restricted due to congestion.	0.77 to 0.93 61 mph
E	Conditions at or near capacity. Disruptions cannot be dissipated and cause queues to form.	0.93 to 1.00
F	Forced or breakdown flow with queues forming at locations where demand exceeds capacity.	Greater than 1.00

Source: DKS Associates, January 2005. Based on *Sacramento County General Plan Update, Technical Appendix, February 1992.*

Table 3.3-2: Existing (Year *2005)* Levels of Service on Study Area Freeways

Freeway	Segment		ADT	Lanes Mixed-flow (HOV)	V/C[1]	LOS[1]
	From	To				
I-5	Florin Road	Meadowview Road	*107,000*	*6(2)*	*0.79*	*D*
	Meadowview Road	Laguna Boulevard	*115,000*	*6(0)*	*0.96*	E
SR 99	Florin Road	Mack Road	*165,000*	4(2)	*1.72*	F
	Mack Road	Cosumnes River Blvd/Calvine Road	*136,000*	4(2)	*1.42*	F
	Cosumnes River Blvd/Calvine Road	Sheldon Road	*132,000*	4(2)	*1.38*	F
	Sheldon Road	Laguna Boulevard	*122,000*	4(2)	*1.27*	F

Note 1: Volume/Capacity ratio (V/C) and LOS reflects mixed-flow lanes.

Source: DKS Associates, *2007.*

3.3.2.2 ARTERIALS

Table 3.3-3 summarizes existing daily traffic volumes on arterials in the South Sacramento Phase 2 Corridor study area. The volumes do not necessarily represent the most heavily traveled arterial segments in the area but characterize traffic levels on critical links.

The street system in South Sacramento is served by roadways that generally follow north–south or east-west alignments to form a grid pattern. Aside from freeways, arterial roadways are the most important part of this street system since they carry higher traffic volumes and longer distance trips than other roadways (i.e. collector and local roadways).

Important east-west arterial roadways within the corridor study area include Meadowview Road, Mack Road, CRB and Calvine Road. Meadowview Road is a four-lane arterial that extends from I-5 to Brookfield Drive where it becomes Mack Road. It carries about *35,500* daily vehicles near Brookfield Drive. Mack Road is a four-lane arterial that extends across SR 99 to Stockton Boulevard where it becomes Elsie Avenue. It carries about *35,500* daily vehicles near Franklin Boulevard.

CRB is currently a two lane arterial roadway that extends from Franklin Boulevard to Bruceville Road where it becomes Calvine Road. CRB will be widened from two lanes to four lanes west of the Bruceville Road intersection. Calvine Road extends eastward from Bruceville Road over SR-99 to Grant Line Road. Calvine Road is a 6 lane arterial between Bruceville Road and Power Inn Road, and a four-lane roadway east of Power Inn Road. One of the highest volumes on the study area arterials occurs on Calvine Road between SR 99 and Power Inn Road with *58,400* vehicles per day. CRB carries about *21,100* daily vehicles between Center Parkway and Bruceville Road.

Important north-south streets for corridor access include Franklin Boulevard, Center Parkway, and Bruceville Road. Franklin Boulevard is located between I-5 and SR-99 and extends south from Broadway near Downtown Sacramento to the San Joaquin County line where it becomes Thornton Road. Within the corridor study area it is a four-lane arterial roadway. Between Mack Road and CRB, Franklin Boulevard carries about *28,600* daily vehicles.

Table 3.3-3: Year 2007-2030 Change in Daily Traffic Volumes on Study Area Arterial Roadways

Roadway	Segment		Lanes		Average Weekday Traffic Volume		
			2007	2030	Year 2007	Year 2030 No-Action	Percent Increase
Cosumnes River Boulevard	SR 99	Bruceville Road	6	6	47,100	73,000	55%
	Bruceville Road	Center Parkway	2	4	21,100	34,300	63%
	Center Parkway	Franklin Boulevard	4	4	18,600	27,400	47%
	Franklin Boulevard	24th Street	0	4	NA	26,600	NA
	24th Street	I-5	0	6	NA	24,600	NA
Calvine Road	SR 99	Power Inn Road	6	6	58,400	94,600	62%
	Power Inn Road	Auberry Drive	4	4	44,100	65,100	48%
	Auberry Drive	Elk Grove-Florin Road	4	4	40,700	59,900	47%
Sheldon Road	Bruceville Road	SR99	6	6	16,500	41,200	150%
Mack Road	Center Parkway	Franklin Boulevard	4	4	28,200	31,100	10%
	Franklin Boulevard	24th Street	4	4	35,500	37,000	4%
Center Parkway	Mack Road	Cosumnes River Blvd	4	4	10,100	19,800	96%
	Cosumnes River Blvd.	Calvine Road	4	4	11,200	18,700	67%
	Calvine Road	Bruceville Road	2	2	10,800	17,600	63%
Franklin Boulevard	Mack Road	Cosumnes River Blvd	4	4	28,600	32,200	13%
	Cosumnes River Blvd	Calvine Road	4	4	20,200	27,700	37%
Power Inn Road	Stockton Boulevard	Calvine Road	4	4	28,800	45,800	59%
	Calvine Road	Old Calvine Road	4	4	19,200	45,000	134%
Auberry Drive	Spengler	Calvine Road	2	2	4,900	11,500	135%
	Calvine Road	Old Calvine Road	0	2	NA	5,000	NA
Bruceville Road	Cosumnes River Blvd	West Stockton Blvd	4	6	28,000	62,300	122%
	West Stockton Blvd	Cosumnes River College	4	6	28,000	62,300	122%
	Calvine Road	Sheldon Road	2	6	19,800	56,100	183%

Source: DKS Associates, 2007.

Center Parkway is located east of Franklin Boulevard and extends from the intersection of Bruceville Road and Sheldon Road to north of Mack Road. It carries about *10,800* daily vehicles north of Bruceville Road. Bruceville Road is located west of SR-99 and extends from Valley High Drive, north of CRB, to the southern end of Sacramento County. Within the corridor study area, it is a two-lane roadway. Bruceville Road carries about *28,000* daily vehicles south of CRB.

3.3.2.3 ARTERIAL INTERSECTION OPERATIONS

In an urban setting, roadway capacity of the local (non-freeway) roadway system is generally governed by the characteristics and capacity of intersections. Field reconnaissance was undertaken to ascertain the traffic control characteristics of each of the study area intersections. Available traffic volume data from the City of Sacramento was assembled for the AM and PM peak hours and supplemented with new counts conducted in May *2007.* Counts at the major study area intersections were conducted during the AM and PM commuter periods (7:00 to 9:00 AM and 4:00 to 6:00 PM).

Determination of roadway operating conditions is based upon comparison of known or projected traffic volumes during peak hours to roadway capacity. "Levels of service" describe roadway-operating conditions. LOS is a qualitative measure of the effect of a number of factors, including speed and travel time, traffic interruptions, freedom to maneuver, safety, driving comfort and convenience, and operating costs. Levels of service are designated "A" through "F" from best to worst, which cover the entire range of traffic operations that might occur. Levels of Service (LOS) "A" through "E" generally represent traffic volumes at less than roadway capacity, while LOS "F" represents over capacity and/or forced flow conditions. Table 3.3-4 presents general LOS definitions.

Table 3.3-4: LOS Criteria for Signalized Intersections

LOS	Control Delay Per Vehicle (seconds)	Description
A	< 10.0	Very low control delay. 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.
B	> 10.0 and < 20.0	Generally occurs with good progression, short cycle lengths, or both. More vehicles stop than with LOS "A," causing higher levels of average delay.
C	> 20.0 and < 35.0	These higher delays may result from fair progression, longer cycle lengths, or both. Individual cycle failures may begin to appear at this level. The number of vehicles stopping is significant at this level, though many still pass through the intersection without stopping.
D	> 35.0 and < 55.0	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.
E	> 55.0 and < 80.0	These high delay values generally indicate poor progression, long cycle lengths, and high v/c ratios. Individual cycle failures are frequent occurrences.
F	> 80.0	This level, considered to be unacceptable to most drivers, often occurs with oversaturation, that is, when arrival flow rates exceed the capacity of the intersection. It may also occur at high v/c ratios below 1.0 with many individual cycle failures. Poor progression and long cycle lengths may also be major contributing causes to such delay levels.

Source: Highway Capacity Manual, Transportation Research Board, Special Report No. 209, Washington, D.C., 2000.

The City of Sacramento General Plan includes a goal of maintaining LOS "C" throughout the roadway network. Because of the constraints of existing development in the City, and because of other environmental concerns, this goal cannot always be met. Sacramento County and the City of Elk Grove have a LOS E standard for urban area roadways.

Intersection analyses were conducted using a methodology outlined in the Transportation Research Board's Special Report 209, Highway Capacity Manual, 2000. The methodology utilized is known as "operational analysis." This procedure calculates an average control delay per vehicle at an intersection, and assigns a LOS designation based upon the delay. The method also provides a calculation of the volume-to-capacity (v/c) ratio of the critical movements at signalized intersections. Table 3.3-4 summarizes LOS criteria for signalized intersections.

Peak hour traffic operations at *16* intersections in the South Sacramento Phase 2 Corridor study area were evaluated in terms of LOS. Table 3.3-5 summarizes the existing AM and PM peak hour operating conditions at the study area intersections. All of the intersections currently operate at LOS C or better *in the AM peak hour,* which meets the LOS standards for the City of Sacramento, Sacramento County and the City of Elk Grove. *In the PM peak hour, the intersection of Franklin Blvd and Mack Road operates at level of service D, which is below the goal for the City of Sacramento. The intersection of Power Inn Road and Calvine Road also operates at LOS D; however this meets the LOS goal for the County.* The intersections chosen for analysis were selected in coordination with the above jurisdictions as the ones most likely to be affected by traffic to stations or by LRT trains delaying traffic.

Table 3.3-5: Existing (Year *2007)* Intersection Levels of Service

Intersection	AM Peak Hour		PM Peak Hour	
	LOS	Delay	LOS	Delay
Franklin Boulevard/Mack Rd	C	*24.8*	*D*	*41.0*
Franklin Blvd PNR/Cosumnes River Blvd	-	-	-	-
Franklin Blvd/Cosumnes River Blvd	C	*28.2*	B	*19.9*
Center Pkwy/Cosumnes River Blvd	C	*33.2*	C	*28.0*
Bruceville Rd/Cosumnes River Blvd	C	*41.9*	C	*31.7*
SR 99 SB Ramps/Cosumnes River Blvd	B	*17.4*	C	*22.7*
SR 99 NB Ramps/Cosumnes River Blvd	B	*9.5*	B	*10.1*
Power Inn Rd/Calvine Rd.	C	*29.7*	*D*	*41.4*
Auberry Dr/Calvine Rd	*C*	*21.1*	*B*	*10.4*
Bruceville Rd/W Stockton Blvd	n/a[1]	n/a[1]	n/a[1]	n/a[1]
Bruceville Rd/CRC	A	*5.8*	*A*	*9.2*
Bruceville Rd/Old Calvine Rd.	*B*	*13.0*	*A*	*8.8*
Bruceville Rd/Sheldon Rd	C	*23.8*	C	*30.1*
24th Street/Cosumnes River Blvd	n/a[1]	n/a[1]	n/a[1]	n/a[1]
Detroit Blvd/Cosumnes River Blvd	n/a[1]	n/a[1]	n/a[1]	n/a[1]
Detroit Blvd/Meadowview Rd	*B*	*14.0*	*B*	*16.5*

[1] Future intersection

Source: DKS Associates, 2007.

3.3.3 Criteria for Assessing Project-Specific Impacts on Vehicular Traffic

The South Sacramento Corridor includes areas in three jurisdictions: the City of Sacramento, the County of Sacramento, and the City of Elk Grove. These jurisdictions have different standards for evaluating the impact of projects on intersections.

In the City of Sacramento, projects are considered to have impacts on intersections if one of the following is true:

- Traffic generated by a project degrades AM or PM peak period LOS from A, B or C (without project) to D, E or F (with project); or
- LOS (without project) is D, E or F and project generated traffic increases the AM or PM peak period delay by five seconds or more.

In Sacramento County and Elk Grove, projects are considered to have impacts on intersections if one of the following is true:

- Traffic generated by a project degrades AM or PM peak period LOS from A, B, C, D, or E (without project) to F (with project); or
- LOS (without project) is F and project generated traffic increases the AM or PM peak period delay by five seconds or more.

3.3.4 No-Action Alternative Long-Term Traffic Impacts

Substantial growth is projected in the Elk Grove and South Sacramento County areas over the next *23* years. To accommodate this growth, several major roadway improvements are planned including widening Bruceville Road from two to six lanes south of CRB, widening CRB from two to four lanes west of Bruceville Road and extending CRB from Franklin Boulevard to I-5 and Freeport Boulevard.

Traffic impacts under the No-Action Alternative would consist of freeway, arterial, and intersection impacts. Section 2.2 lists major roadway improvements in the MTP that are intended to enhance operation of the existing network and to provide capacity for continuing growth in travel demand. These improvements are assumed to be part of the Year *2030* roadway network for the No-Action Alternative. No other improvements are programmed that would substantially affect future operations of transportation systems in the project corridor.

The No-Action future traffic volume forecasts include the College Square Development at the southeast corner of Consumes River College and Bruceville Road, the project roadway improvements and the mitigation measures.

3.3.4.1 NO-ACTION ALTERNATIVE FREEWAY AND ARTERIAL IMPACTS

Even with programmed roadway improvements, future traffic conditions in the South Sacramento Phase 2 Corridor and much of metropolitan Sacramento are expected to deteriorate steadily.

Table 3.3-6 shows substantial increases in traffic volumes on both SR 99 and I-5 between *2007* and *2030.* It also shows a LOS analysis for these freeways based on daily capacities. This general analysis shows that much of SR 99 currently operates at LOS E or F conditions.

Table 3.3-6: Existing and Year *2030* Freeway Levels of Service - No-Action Alternative

Freeway	Segment		Existing				*2030* No-Action			
	From	To	ADT	Lanes Mixed Flow (HOV)	V/C	LOS	ADT	Lanes Mixed Flow (HOV)	V/C	LOS
I-5	Florin Road	Meadowview Road	*107,000*	*6(2)*	*0.79*	*D*	*162,900*	6(2)	*1.13*	F
	Meadowview Road	Laguna Boulevard	*115,000*	6(0)	*0.96*	*E*	*172,400*	6(0)	*1.44*	F
SR 99	Florin Road	Mack Road	*165,000*	4(2)	*1.72*	F	*205,400*	4(2)	*1.96*	F
	Mack Road	Cosumnes River Blvd / Calvine Rd	*136,000*	4(2)	*1.42*	F	*175,700*	4(2)	*1.68*	F
	Cosumnes River Blvd / Calvine Rd	Sheldon Road	*132,000*	4(2)	*1.38*	F	*152,900*	4(2)	*1.46*	F
	Sheldon Road	Laguna Boulevard	*122,000*	4(2)	*1.27*	F	*149,000*	4(2)	*1.42*	F

Notes:
ADT = Average daily traffic volumes.
V /C = Volume/capacity ratio.
Source: DKS Associates, *2007.*

Daily traffic volumes on SR 99 north of Mack Road are expected to increase by about 25 percent by *2030*, while between Calvine Road and Mack Road a *30* percent increase is expected. During the 1990's, SR 99 was widened to accommodate HOV lanes from Elk Grove Boulevard north to the Sacramento Central City. However, no additional improvements are planned for this section of SR 99 over the next *23* years. The projected increase in volumes will cause traffic congestion on SR 99 to expand to more hours of the day and extend southward to Elk Grove. This freeway congestion will cause traffic diversions to numerous parallel arterial roadways in the corridor and thereby add to the anticipated congestion levels along those roadways.

Average daily traffic volumes on study arterial roadways are shown on Table 3.3-3 for both existing year *2007* conditions, and the year *2030* No-Action Alternative. The estimated traffic volume increases on other roadways in the study area vary greatly, with daily volumes on many roadways increasing by more than 100 percent by *2030* under the No-Action Alternative.

3.3.4.2 NO-ACTION ALTERNATIVE INTERSECTION IMPACTS

Table 3.3-7 compares existing year *2007* intersection operating conditions to future year *2030* conditions under the No-Action Alternative during the AM and PM peak hours. The future widening of Bruceville Road and CRB, as well as the other future roadway improvements detailed in Table 2.2-1, will help accommodate projected growth. While most study intersections will operate at LOS C or better in *2030,* some would degrade to LOS D or E.

During the AM peak hour, intersection operations are expected to degrade between *2007* and *2030* from LOS C or better to LOS D at *two* intersections and to LOS E at *one intersection and to LOS F at two intersections*. During the PM peak hour, intersection operations are expected to degrade between *2007* and *2030* from LOS C or better to LOS D at *five* intersections and to LOS F at *three intersections.* The intersections that would operate at LOS D or worse conditions in *2030,* except *two* in the AM peak hour and two in the PM peak hour, are located in the City of Sacramento, which has a LOS C standard. The other intersections are in Sacramento County and the City of Elk Grove, both of which have a LOS E standard.

The MTP includes CRB as a roadway that will be widened from two to four lanes between Bruceville Road and Franklin Boulevard by *2030.* CRB will also be extended from its current terminus at Franklin Boulevard to I-5. The extended CRB would be four lanes between Franklin Boulevard and 24th Street and six lanes between 24th Street and I-5. The lane geometries at the intersection of CRB with Franklin Boulevard and with Bruceville Road have been evaluated in recent EIRs and were thus assumed for this analysis.

The specific intersection improvements that will be constructed in connection with the widening of CRB at the Center Parkway intersection are not certain at this time. If only the eastbound and westbound approaches were improved with the future widening, this intersection would operate at LOS E during the AM peak hour and LOS *F* during the PM peak hour in *2030* under the No-Action Alternative.

The LOS values shown in Table 3.3-7 assume a second northbound left turn lane would be added to this intersection with construction of the four-lane CRB project. This level of improvement to the intersection would be reasonable to assume. Both the eastbound and westbound approaches will be improved with the widening project, and the right-of-way appears to presently exist to allow for the addition of a second northbound left turn lane. With this geometry, the AM peak hour Year *2030* No-Action Alternative LOS would improve from E to *D,* and the PM peak hour LOS would remain *F.*

Table 3.3-7: Year *2030* Intersection Levels of Service - No-Action Alternative

Intersection	AM Peak Hour				PM Peak Hour			
	2007		*2030* No-Action		*2007*		*2030* No-Action	
	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay
Franklin Blvd/Mack Rd	C	*24.8*	C	*33.5*	*D*	*41.0*	*C*	*30.4*
Franklin Blvd PNR/Cosumnes River Blvd	-	-	-	-	-	-	-	-
Franklin Blvd/Cosumnes River Blvd	C	*28.2*	*D*	*47.8*	B	*19.9*	*D*	*37.6*
Center Pkwy/Cosumnes River Blvd	C	*33.2*	*D*	*48.0*	C	*28.0*	*F*	*86.1*
Bruceville Rd/Cosumnes River Blvd	*D*	*41.9*	*D*	*50.6*	C	*31.7*	**F**	*140.1*
SR 99 SB Ramps/Cosumnes River Blvd	B	*17.4*	*B*	*19.3*	C	*22.7*	**D**	*38.5*
SR 99 NB Ramps/Cosumnes River Blvd	*A*	*9.5*	*A*	*9.2*	B	*10.1*	B	*12.2*
Power Inn Rd/Calvine Rd.	C	*29.7*	*F*	*83.2*	*D*	*41.4*	*F*	*121.6*
Auberry Dr/Calvine Rd	*C*	*21.1*	*E*	*60.2*	*B*	*10.4*	*D*	*53.8*
Bruceville Rd/W Stockton Blvd	-	-	*C*	*25.4*	-	-	*C*	*20.1*
Bruceville Rd/CRC-Cotton *Ln*	A	*5.8*	C	*21.5*	*A*	*9.2*	C	*33.6*
Bruceville Rd/Old Calvine Rd.	*B*	*13.0*	*B*	*13.4*	*A*	*8.8*	C	*32.6*
Bruceville Rd/Sheldon Rd	C	*23.8*	*F*	*85.2*	C	*30.1*	*D*	*36.1*
24th Street/Cosumnes River Blvd	-	-	A	*9.0*	-	-	*A*	*9.6*
Detroit Blvd/Cosumnes River Blvd	-	-	A	*1.2*	-	-	*A*	*2.0*
Detroit Blvd/Meadowview Rd	*B*	*14.0*	*C*	*24.4*	*B*	*16.5*	*D*	*37.2*

Notes: "-" future intersection
Source: DKS Associates, 2007.

LOS *D* could be obtained during both the AM and PM peak hours for the Center Parkway and CRB intersection if the widening of CRB from two to four lanes included a second left turn lane on the westbound, southbound and northbound approaches. Improving the southbound approach would be more difficult because of the existing bridge over the drainage canal that would require widening to accommodate two left turn lanes. Therefore, this improvement was not assumed under the No-Action Alternative.

3.3.5 TSM Alternative Traffic Impacts

Traffic impacts under the TSM Alternative would consist of freeway, arterial, and intersection impacts.

3.3.5.1 TSM Alternative Freeway and Arterial Impacts

Proposed transit improvements would encourage shifts from auto to transit and are projected to result in some lessening in traffic on corridor roadways. The projected shift would not be sufficient to reduce roadway congestion substantially. Table 3.3-8 shows that traffic volumes and levels of service on both SR 99 and I-5 in *2030* would be almost identical to the No-Action Alternative. As under the No-Action Alternative, the duration of LOS F conditions along SR 99 is expected to lengthen by *2030* under the TSM Alternative.

Table 3.3-9 compares the estimated daily traffic volumes on study area arterial roadways under each of the project alternatives. It shows that the TSM Alternative would reduce traffic volumes on some roadways in the study area and increase volumes on others compared to the No-Action Alternative, but such changes would be only marginal.

Traffic volumes would change between the No-Action Alternative and the TSM Alternative for two reasons. First, additional bus service would attract some additional transit riders compared to the No-Action Alternative and thereby reduce traffic volumes on some roadways. Second, direct express bus service to Downtown Sacramento via SR-99 and I-5 would encourage some people to shift their travel routes and drive to park-and-ride lots at one of the new bus centers. The traffic coming to and from these lots would result in traffic increases on some roadways, or in some additional turn movements at some intersections.

3.3.5.2 TSM Alternative Intersection Impacts

Tables 3.3-10 and 3.3-11 show intersection LOS under the No Action, TSM, and LPAP2 alternatives. The impacts on intersection LOS are judged by the criteria for the appropriate jurisdiction (described in Section3.3.3).

The TSM Alternative is projected to adversely affect one City of Sacramento intersection in *2030:*

Bruceville Road and Cosumnes River College – During the PM peak hour, the intersection operating condition deteriorates from LOS C to LOS D and the average delay increases from *33.6 seconds* to *41.3* seconds.

The TSM Alternative is not projected to adversely affect any study intersections during the AM peak hour.

Table 3.3-8: Year 2030 Levels of Service on Study Area Freeways - TSM and LPAP2 Alternatives

Freeway	Segment		TSM Alternative				LPAP2			
	From	To	ADT	Lanes Mixed Flow (HOV)	V/C	LOS	ADT	Lanes Mixed Flow (HOV)	V/C	LOS
I-5	Florin Road	Meadowview Road	162,300	6(2)	1.12	F	162,600	6(2)	1.12	F
	Meadowview Road	Laguna Boulevard	171,800	6(0)	1.43	F	171,600	6(0)	1.43	F
SR 99	Florin Road	Mack Road	204,000	4(2)	1.95	F	204,000	4(2)	1.95	F
	Mack Road	Cosumnes River Blvd/Calvine Rd	174,900	4(2)	1.67	F	173,200	4(2)	1.66	F
	Cosumnes River Blvd/Calvine Rd	Sheldon Road	152,800	4(2)	1.46	F	152,800	4(2)	1.46	F
	Sheldon Road	Laguna Boulevard	148,800	4(2)	1.42	F	149,200	4(2)	1.43	F

ADT = Average daily traffic volumes.
V/C = Volume/capacity ratio.

Source: DKS Associates, 2007.

Table 3.3-9: Daily Traffic Volumes on Study Area Arterial Roadways – TSM and LPAP2 Alternatives

Roadway	Segment		Lanes		Average Weekday Traffic Volume			
					Year 2007	Year 2030		
			2007	2030		No-Action	TSM	LPAP2
Cosumnes River Blvd	SR 99	Bruceville Road	6	6	47,100	73,000	74,200	74,100
	Bruceville Road	Center Parkway	2	4	21,100	34,300	34,400	34,000
	Center Parkway	Franklin Boulevard	2	4	18,600	27,400	27,200	27,100
	Franklin Boulevard	24th Street	0	4	0	26,600	26,400	26,400
	24th Street	I-5	0	6	0	24,600	24,400	24,500
Calvine Road	SR 99	Power Inn Road	6	6	58,400	94,600	95,200	95,400
	Power Inn Road	Auberry Drive	4	4	44,100	65,100	65,100	65,100
	Auberry Drive	Elk Grove-Florin Rd	4	4	40,700	59,900	59,900	59,900
Sheldon Road	Bruceville Road	SR 99	6	6	16,500	41,200	41,700	41,900
Mack Road	Center Parkway	Franklin Boulevard	4	4	28,200	31,100	31,300	30,400
	Franklin Boulevard	24th Street	4	4	35,500	37,000	36,800	36,800
Center Parkway	Mack Road	Cosumnes River Blvd	4	4	10,100	19,800	20,100	19,700
	Cosumnes River Blvd.	Calvine Road	4	4	11,200	18,700	18,500	18,500
	Calvine Road	Bruceville	2	2	10,800	17,600	17,800	17,600
Franklin Boulevard	Mack Road	Cosumnes River Blvd	4	4	28,600	32,200	31,700	31,500
	Cosumnes River Blvd	Calvine Road	4	4	20,200	27,700	27,600	27,500
Power Inn Road	Stockton Boulevard	Calvine Road	4	4	28,800	45,800	45,900	46,200
	Calvine Road	Old Calvine Road	4	4	19,200	45,000	44,800	45,000
Auberry Drive	Spengler	Calvine Road	2	2	4,900	11,500	11,800	11,700
	Calvine Road	Old Calvine Road	0	2	0	5,000	5,200	5,100
Bruceville Road	Cosumnes River Blvd	West Stockton Blvd	4	6	28,000	62,300	63,300	64,000
	West Stockton Blvd	Cosumnes River College	2	6	28,000	56,200	56,700	57,900

Source: DKS Associates, 2007.

Table 3.3-10: Year 2030 Intersection LOS Impacts - TSM and LPAP2 Alternatives - AM Peak Hour

Intersection	No-Action		TSM		LPAP2	
	LOS	Delay	LOS	Delay	LOS	Delay
Franklin Boulevard/Mack Rd	C	33.5	C	33.6	C	33.5
Franklin Blvd PNR/Cosumnes River Blvd	-	-	A	0.8	A	2.0
Franklin Blvd/Cosumnes River Blvd	D	47.8	D	40.2	E	56.9
Center Pkwy/Cosumnes River Blvd	D	48.0	D	39.6	E	62.4
Bruceville Rd/Cosumnes River Blvd	D	50.6	D	52.3	D	52.6
SR 99 SB Ramps/Cosumnes River Blvd	B	19.3	C	21.5	B	16.8
SR 99 NB Ramps/Cosumnes River Blvd	A	9.2	A	9.0	B	11.1
Power Inn Rd/Calvine Rd	F	83.2	F	81.9	F	88.1
Auberry Dr/Calvine Rd	E	60.2	E	63.0	E	67.8
Bruceville Rd/W Stockton Blvd	C	25.4	C	29.2	C	23.2
Bruceville Rd/CRC-Cotton Ln	C	21.5	C	22.3	D	35.7
Bruceville Rd/Old Calvine Rd.	B	13.4	B	16.9	C	33.6
Bruceville Rd/Sheldon Rd	F	85.2	E	73.2	**D**	52.2
24th Street/Cosumnes River Blvd	A	9.0	A	6.0	A	6.0
Detroit Blvd/Cosumnes River Blvd	A	1.2	A	1.2	A	2.3
Detroit Blvd/Meadowview Rd	C	24.4	C	24.3	C	23.2
CRC P&R/Cosumnes River Blvd	-	-	A	2.3	-	-
Old Calvine Rd/New CRC Access (TWSC)[2]	-	-	-	-	C(F)	17.5 (338.3)

Shaded cells denote levels of service impacts, as defined in Subsection 3.3.3, Criteria for Assessing Project-Specific Impacts on Vehicular Traffic
[1] The Power Inn Rd/Calvine Rd Intersection is located in Sacramento County and hence LOS E is not considered as an impact. [2.] TWSC = Two-Way Stop Control – 2000 HCM Methodology – average control delay (worst-case approach delay)
Source: DKS Associates, 2007.

Table 3.3-11: Year 2030 Intersection LOS Impacts - TSM and LPAP2 Alternatives - PM Peak Hour

Intersection	No-Action		TSM		LPAP2	
	LOS	Delay	LOS	Delay	LOS	Delay
Franklin Boulevard/Mack Rd	C	30.4	C	34.8	C	30.8
Franklin Blvd PNR/Cosumnes River Blvd	-	-	A	1.8	A	5.4
Franklin Blvd/Cosumnes River Blvd	D	37.6	D	35.1	D	48.7
Center Pkwy/Cosumnes River Blvd	F	86.1	D	51.5	F	94.9
Bruceville Rd/Cosumnes River Blvd	F	140.1	F	88.8	F	89.8
SR 99 SB Ramps/Cosumnes River Blvd	D	38.5	C	27.8	C	25.7
SR 99 NB Ramps/Cosumnes River Blvd	B	12.2	B	12.1	B	11.5
Power Inn Rd/Calvine Rd	F	121.6	F	88.9	F	106.5
Auberry Dr/Calvine Rd	D	53.8	E	56.2	D	51.8
Bruceville Rd/W Stockton Blvd	C	20.1	B	10.8	B	15.3
Bruceville Rd/CRC-Cotton Ln	C	33.6	D	41.3	D	39.7
Bruceville Rd/Old Calvine Rd.	C	32.6	C	29.3	E	65.2
Bruceville Rd/Sheldon Rd	D	36.1	C	34.8	D	35.9
24th Street/Cosumnes River Blvd	A	9.6	A	9.9	A	6.5
Detroit Blvd/Cosumnes River Blvd	A	2.0	A	2.0	A	1.4
Detroit Blvd/Meadowview Rd	D	37.2	D	36.7	C	29.3
CRC P&R/Cosumnes River Blvd	-	-	A	2.6	-	-
Old Calvine Rd/New CRC Access[1]	-	-	-	-	D (F)	33.5 (229)

Shaded cells denote LOS impacts, as defined in Subsection 3.3.3, Criteria for Assessing Project-Specific Impacts on Vehicular Traffic
Note: 1. TWSC = Two-Way Stop Control – 2000 HCM Methodology – average control delay (worst-case approach delay)
Source: DKS Associates, 2007

3.3.6 LPAP2 Long-Term Traffic Impacts[13]

Traffic impacts under the LPAP2 would consist of freeway, arterial, and intersection impacts.

3.3.6.1 LPAP2 FREEWAY AND ARTERIAL IMPACTS

Table 3.3-8 shows traffic volumes and levels of service on both SR 99 and I-5 in *2030* under the LPAP2. Table 3.3-9 compares daily traffic volumes on arterial roadways under each of the project alternatives. These Tables show that the LPAP2 would reduce traffic volumes on some roadways in the study area and increase volumes on others compared to the No-Action Alternative, but only marginally.

Traffic volumes would change between the No-Action Alternative and the LPAP2 for two reasons. First, the extension of light rail service would attract some additional transit riders compared to the No-Action Alternative and thereby reduce traffic volumes on some roadways. Second, some people would shift their travel routes and drive to park-and-ride lots at one of the new LRT stations. The traffic coming to and from these new stations would result in traffic increases on some roadways, or in some additional turn movements at some intersections.

Another impact on the LOS at some intersections in the corridor would be the increase in delay due to either new at-grade rail crossings, or increased train travel at existing at-grade crossings. The traffic analysis of the LPAP2 estimated the increase in delay at each intersection that would be adjacent to the at-grade crossing due to the loss in effective "green time" when the tracks are cleared prior to a train arrival. This loss in green time lowers the effective capacity of the intersection, and increases delay. The increase in delay could be enough at some intersections to change their LOS. Section 3.3.7 discusses these potential impacts.

Tables 3.3-10 and 3.3-11 show the levels of service under the LPAP2, and allow comparisons to the other project alternatives. The impacts on intersection levels of service from the LPAP2 are discussed below. The intersections are judged by the criteria for the appropriate jurisdiction.

3.3.6.2 LPAP2 INTERSECTION IMPACTS

The LPAP2 locates a 2,000 space parking structure in the *just south of the main college entrance off of Bruceville Road* and includes an extension of an internal CRC roadway to a new driveway on Old Calvine Road, about 500 feet west of Bruceville Road. *The LPAP2 project also includes a grade separation over Cosumnes River Boulevard between Center Parkway and Bruceville Road.* The LPAP2 is projected to have the following impacts on intersections in the City of Sacramento in *2030:*

- Center Parkway and CRB – During the AM peak hour, the intersection operating condition deteriorates from LOS *D* to LOS *E,* and the average delay increases from *48.0* to *62.4 seconds. During the PM peak hour, the intersection operating condition deteriorates by more than 5 seconds of delay, and the average delay increases from 86.1 to 94.9* seconds.
- *Franklin Boulevard and Consumes River Boulevard* – During the AM peak hour, the intersection operating condition deteriorates by more than 5 seconds of delay, and the average delay increases from *47.8 to 56.9 seconds. During the PM peak hour, the intersection operating condition*

[13] All traffic impacts, except the construction phase impacts are termed long-term traffic impacts.

deteriorates by more than 5 seconds of delay, and the average delay increases from 37.6 to 48.7 seconds.

- Bruceville Road and *Cosumnes* River College - During the *AM* peak hour*,* the intersection operating condition deteriorates from LOS C to *LOS* D and average delay increases from *21.5 seconds* to *35.7 seconds. During the PM peak hour, the intersection operating condition deteriorates from LOS C to LOS D and average delay increases from 33.6 seconds to 39.7 seconds.*
- Bruceville Road and Old Calvine Road –During the PM peak hour the intersection operating condition deteriorates from LOS C to *E,* and average delay increases from *32.6* to *65.2.*
- Cosumnes River College New South Access and Old Calvine Road – During the PM peak hour the proposed intersection would operate at an overall LOS of D, which is below the City of Sacramento's goal of LOS C.,

The LPAP2 is projected to have *the following* impact on intersections in Sacramento County *in 2030.*

- *Auberry Drive and Calvine Road – During the AM peak hour, the intersection operating condition deteriorates by more than 5 seconds* of *delay, and the average delay increases from 60.2 to 67.8 seconds.*

3.3.7 Delays at Grade Crossings

Under the LPAP2, year *2030* LRT service to Cosumnes River College would operate on directional headways averaging 10 minutes during weekday peak periods, 15 minutes weekday midday and early evening, and 30 minutes weekday evenings after 7:00 PM. At-grade crossings for the LPAP2 would include grade crossing protection consisting of flashers, alarms and crossing gates.

Vehicular traffic on cross streets would be delayed when crossing protection equipment is activated and LRT trains occupy the crossing. Therefore, an intersection queuing analysis and an intersection efficiency analysis were completed to more completely evaluate the Project's traffic impacts.

Queuing analyses were completed for the *three* potential at-grade LRT crossings considered as part of the LRT project: the mid-block crossing *at* Meadowview Road*,* and the intersection crossings at CRB/Franklin Boulevard and CRB/Center Parkway. Queuing analyses were conducted to estimate 95th percentile queue lengths for the No-Action, TSM, and LPAP2 alternatives. Tables 3.3-12 and 3.3-13 present the results of the queuing analysis.

Intersection efficiency analyses were completed for intersections affected by the Project. The addition of light rail operations to signalized intersections decreases the vehicular capacity available to non-rail vehicles. The interruption of the standard sequence of traffic signal phasing, as well as the necessary clearance intervals to ensure that there are no vehicles on the tracks, result in less "green" time for the motoring public. Table 3.3-14 summarizes the results of an intersection efficiency analysis completed to help assess the impact of this loss in capacity based upon the anticipated LRT headways. As shown in the table, the three affected intersections would experience a small decrease in efficiency of from approximately two to *eight* percent.

3.3.8 Circulation Impacts in Station Areas

3.3.8.1 NO-ACTION ALTERNATIVE

The growth of traffic in the vicinity of the Meadowview Station, the Phase 1 end-of-the-line station, would cause increasing congestion over the study period. LOS at the intersection of *Detroit* Boulevard *and Meadowview Road* is projected to decrease from LOS *B* to LOS D between *2007* and *2030* under the No-Action Alternative *in the PM Peak Hour. LOS at the intersection of Center Parkway and Cosumnes River Boulevard is also projected to decrease from C to D between 2007 and 2030 under the No-Action Alternative in the AM Peak hour and degrade to LOS F in the PM peak hour.*

3.3.8.2 TSM ALTERNATIVE

The proposed transit center at CRC would be a bus transfer point with large (1,400 space) park-and-ride lot. The park-and-ride facilities would be expected to affect local circulation due to increased auto traffic on access roadways. These circulation impacts were considered in the traffic analysis presented in Section 3.3.5 above, and potential impacts would be minimized by implementing intersection and related improvements at each location.

3.3.8.3 LPAP2

Four new stations are included in the LRT extension to the Bruceville Road entrance to Cosumnes River College, of which three include park-and-ride lots. The four new stations are as follows:

- Morrison Creek Station (bus and auto drop-off, parking lot with 50 spaces)
- Franklin Boulevard (bus and auto drop-off, parking lot with up to 650 spaces)
- Center Parkway (bus and auto drop-off on street)
- CRC (bus and auto drop-off, parking lot with up to 2,000 spaces)

The vehicle circulation impacts in station areas were included in the traffic analysis and mitigation measures were identified to address the overall traffic impacts (as described in Section 3.3.5 above). The project is expected to change circulation patterns, but with the mitigation measures there would be no adverse impact. In all cases vehicular and pedestrian access to surrounding land uses would be maintained.

Table 3.3-12: Year *2030* Design Queue Lengths at Grade Crossings (95th percentile queue, per lane in vehicles) - AM Peak Hour

Location	Alternative											
	No-Action				TSM				LPAP2			
	NB	SB	EB	WB	NB	SB	EB	WB	NB	SB	EB	WB
Intersection Crossings												
Franklin Blvd / Cosumnes River Blvd	*27*	*17*	*10*	*21*	*27*	*16*	*10*	*24*	*27*	*16*	*10*	*24*
Center Pkwy / Cosumnes River Blvd	*25*	*20*	*15*	*24*	*23*	*20*	*17*	*24*	*25*	*21*	*15*	*22*
Mid-block Crossings												
UPRR/Meadowview Rd	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	*23*	*34*

Worst case queue for each approach is listed, based upon unmitigated intersection geometrics.
Source: DKS Associates, *2007.*

Table 3.3-13: Year *2030* Design Queue Lengths at Grade Crossings (95th percentile queue, per lane in vehicles) - PM Peak Hour

Location	Alternative											
	No-Action				TSM				LPAP2			
	NB	SB	EB	WB	NB	SB	EB	WB	NB	SB	EB	WB
Intersection Crossings												
Franklin/*Cosumnes* River Blvd	*16*	*20*	*21*	*13*	*15*	*20*	*20*	*13*	*16*	*20*	*20*	*14*
Center Pkwy/ Cosumnes River Blvd	*16*	*27*	*27*	*22*	*17*	*22*	*25*	*21*	*17*	*23*	*28*	*22*
Mid-block Crossings												
UPRR /Meadowview Road	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	*38*	*33*

Worst case queue for each approach is listed, based upon unmitigated intersection geometrics.
Source: DKS Associates, *2007.*

Table 3.3-14: Year 2030 Intersection Efficiency Changes (percent change in seconds of green time per hour)

Intersection	Alternative					
	No Action		TSM		LPAP2	
	AM	PM	AM	PM	AM	PM
Franklin Blvd/Mack Rd	n/a	n/a	0.0%	0.0%	0.0%	0.0%
Franklin PNR/Cosumnes River Blvd	n/a	n/a	0.0%	0.0%	0.0%	0.0%
Franklin/Cosumnes River Blvd	n/a	n/a	0.0%	0.0%	*-8.0%*	*-8.0%*
Center Pkwy/Cosumnes River Blvd	n/a	n/a	0.0%	0.0%	*-8.0%*	*-5.9%*
Bruceville/Cosumnes River Blvd-Calvine Rd	n/a	n/a	0.0%	0.0%	0.0%	0.0%
SR 99 SB Ramps/Cosumnes River Blvd	n/a	n/a	0.0%	0.0%	0.0%	0.0%
SR 99 NB Ramps/Cosumnes River Blvd	n/a	n/a	0.0%	0.0%	0.0%	0.0%
Power Inn Rd/Calvine Rd	n/a	n/a	0.0%	0.0%	0.0%	0.0%
Auberry/Calvine Rd	n/a	n/a	0.0%	0.0%	0.0%	0.0%
Bruceville Rd/West Stockton Blvd	n/a	n/a	0.0%	0.0%	0.0%	0.0%
Bruceville Rd/CRC-Cotton Ln	n/a	n/a	0.0%	0.0%	*-2.0%*	*-2.0%*
Bruceville Rd/Old Calvine Rd	n/a	n/a	0.0%	0.0%	0.0%	0.0%
Bruceville Rd/ Sheldon Rd	n/a	n/a	0.0%	0.0%	0.0%	0.0%
24th Street/Cosumnes River Blvd	n/a	n/a	0.0%	0.0%	0.0%	0.0%
Detroit Blvd/Cosumnes River Blvd	n/a	n/a	0.0%	0.0%	0.0%	0.0%
CRC North P&R/Cosumnes River Blvd	n/a	n/a	n/a	n/a	n/a	n/a
Source: DKS Associates, *2007*						

3.3.9 Mitigation Measures

3.3.9.1 TSM ALTERNATIVE

Based upon projected conditions in *2030,* one intersection under the TSM Alternative would exceed City of Sacramento thresholds for project impacts during the *PM* peak hour, as illustrated in Table *3.3-11.* Mitigation measures would require physical improvements at each intersection to avoid exceeding these thresholds, should any measures be considered feasible. These improvements focus on physical capacity improvements, such as lane additions through *re-striping* or widening of intersections.

In the City of Sacramento*,* mitigation is proposed at *one intersection -* Bruceville Road and *Cosumnes* River College*.* The *following* mitigation is *recommended:*

TT-1 *Bruceville Road and Cosumnes River College: Add a second* eastbound *left turn lane and add a shared through–right turn lane so the eastbound approach has two* left turn lanes, *one through-right turn lane and one dedicated right turn lane. This will* improve *the* LOS at the intersection *from D* to C in the PM *peak hour*.

3.3.9.2 LPAP2

Two types of mitigation measures are recommended for the LPAP2 should the measures be considered feasible: improvements to intersections to achieve LOS standards and improvements to mitigate delays caused by LRT trains crossing roadways.

Six intersections are projected to require improvements based upon projected conditions in *2030* under the LPAP2. The intersections of Center Parkway/CRB, *Franklin Boulevard/CRB,* Bruceville Road/CRC, Bruceville Road/Old Calvine *Road,* and Old Calvine Road/CRC South Access would exceed the City of Sacramento thresholds for project impacts during peak hours. *The intersection of Auberry Road/ Calvine Road would exceed the County of Sacramento thresholds for project impacts during peak hours.*

The following mitigation measures are recommended:

T-1 Center Parkway and CRB: add a second southbound left turn lane *and provide overlap for all right turn phases.* With this modification, the intersection would operate at LOS *D,* and the impact would be reduced to below the *thresholds.* This mitigation would require widening the bridge over Union House Creek (the cost of which is included in the project costs).

T-2 *Franklin Boulevard and Cosumnes River Boulevard: provide overlap for all right turn phases. This would improve LOS to D in the AM and PM peak hours.*

T-3 Bruceville Road and *Cosumnes* River College: *Add a second* eastbound *left turn lane and add a shared through–right turn lane so the eastbound approach has two* left turn lanes, *one through-right turn lane and one dedicated right turn lane. This will improve the LOS at the intersection from D to C in the PM peak hour.*

T-4 *Bruceville Road and Old Calvine Road: provide overlap signal phasing on the right turn to improve LOS at the intersection to C in the PM peak hour.*

T-5 *Cosumnes River College New South Access and Old Calvine Road: Signalize the intersection. This would improve LOS at the intersection to C or better in the AM and PM peak hour.*

T-6 *Auberry Drive and Calvine Road: provide protected phasing for the northbound and southbound approaches,* which would improve LOS at the intersection to *D* in the AM peak hour.

To reduce impacts of LRT grade crossings on roadway operations, RT will implement the following measures:

T-7 RT will implement crossing signal control measures at LRT grade crossings adjacent to stations. These would minimize the amount of time gates are down while LRT trains are stopped for loading and unloading passengers at stations before they cross the roadway. A timed delay mechanism will be installed that activates the crossing gates just prior to the train departing the station platform.

T-8 *RT will implement "near side" crossing signal control measures at the intersections of Center Parkway and CRB, Franklin Boulevard and CRB, and Bruceville Road and Cosumnes River College to provide additional safety.*

T-9 Express trains not stopping at a near side station would have equipment to bypass the timed delay.

The results of mitigation measures discussed above are presented below in Table *3.3-15.*

3.4.1 2012 Opening Day Arterial And Intersection Impacts

Table 3.4-1 shows average daily traffic volumes on arterials for year 2007 under existing conditions, and year 2012 under both the No-Action Alternative and the LPAP2.

Table 3.4-2 shows the level of service under the No-Action and the LPAP2 for year 2012 conditions. Table 3.4-3 shows the level of service under the LPAP2 for year 2012 conditions with mitigation.

3.4.2 2012 LPAP2 Intersection Impacts

The LPAP2 locates a 2,000 space parking structure just south of the main college entrance off of Bruceville Road and includes an extension of an internal CRC roadway to a new driveway on Old Calvine Road, about 500 feet west of Bruceville Road. The LPAP2 is projected to have the following impacts on intersections in the City of Sacramento in 2012:

- *Franklin Boulevard and Cosumnes River Boulevard – During the AM peak hour, the intersection operating condition deteriorates by more than 5 seconds of delay, from 65.2 to 86.0 seconds. During the PM peak hour, the intersection operating condition deteriorates by more than 5 seconds of delay, from 44.2 to 64.8 seconds.*
- *Center Parkway and Cosumnes River Boulevard – During the AM peak hour, the intersection operating condition deteriorates by more than 5 seconds of delay, from 50.0 to 61.7 seconds. During the PM peak hour, the intersection operating condition deteriorates by more than 5 seconds of delay, from 55.9 to 97.4 seconds.*
- *Bruceville Road and Cosumnes River Boulevard – During the AM peak hour, the intersection operating condition deteriorates by more than 5 seconds of delay, from 50.3 to 100 seconds.*
- *Bruceville Road and Sheldon Road – During the PM peak hour, the intersection operating condition deteriorates by more than 5 seconds of delay, from 36.5 to 42.3 seconds.*

Table 3.3-15: Year 2030 Intersection LOS Mitigations - TSM and LPAP2

Intersection	No-Action		TSM				LPAP2			
			No Mitigation		With Mitigation		No Mitigation		With Mitigation	
	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay
AM Peak Hour										
Franklin Blvd/CRB	D	47.8	-	-	-	-	**E**	**56.9**	D	51.2
Center Parkway/CRB	D	48.0	-	-	-	-	**E**	**62.4**	D	44.4
Bruceville Road/CRC	C	21.5	-	-	-	-	**D**	**35.7**	C	32.3
Auberry Drive/ Calvine Road	E	60.2	-	-	-	-	**E**	**67.8**	D	46.5
PM Peak Hour										
Franklin Blvd/CRB	D	37.6	-	-	-	-	**D**	**48.7**	D	41.5
Center Parkway/CRB	F	86.1	-	-	-	-	**F**	**94.9**	E	75.6
Bruceville Road/CRC	C	33.6	**D**	**41.3**	C	30.7	**D**	**39.7**	C	30.0
Bruceville Road/ Old Calvine	C	32.6	-	-	-	-	**E**	**65.2**	C	26.5
Old Calvine Road/CRC South[1]	-	-	-	-	-	-	**D (F)**	**33.5 (229)**	B	16.4

Shaded cells denote impacts, as defined in Subsection 3.3.3, Criteria for Assessing Project-Specific Impacts on Vehicular Traffic.

Note: 1. TWSC = Two-Way Stop Control – 2000 HCM Methodology – average control delay (worst-case approach delay)

Source: DKS Associates, 2007.

Table 3.4-1: Daily Traffic Volumes on Study Area Arterial Roadways – No Action and LPAP2 Alternatives

Roadway	Segment		Lanes		Average Weekday Traffic Volume		
					Year 2007	Year 2012	
			2007	2012		No-Action	LPAP2
Cosumnes River Blvd	SR 99	Bruceville Road	6	6	47,100	51,600	52,700
	Bruceville Road	Center Parkway	2	2	21,100	23,400	23,100
	Center Parkway	Franklin Boulevard	2	2	18,600	20,100	19,800
	Franklin Boulevard	24th Street	0	4	0	4,600	4,400
	24th Street	I-5	0	6	0	4,300	4,200
Calvine Road	SR 99	Power Inn Road	6	6	58,400	64,700	65,500
	Power Inn Road	Auberry Drive	4	4	44,100	47,800	47,800
	Auberry Drive	Elk Grove-Florin Rd	4	4	40,700	44,000	44,000
Sheldon Road	Bruceville Road	SR99	6	6	16,500	20,800	21,500
Mack Road	Center Parkway	Franklin Boulevard	4	4	28,200	28,700	28,000
	Franklin Boulevard	24th Street	4	4	35,500	34,400	34,900
Center Parkway	Mack Road	Cosumnes River Blvd	4	4	10,100	11,800	11,700
	Cosumnes River Blvd.	Calvine Road	4	4	11,200	12,500	12,300
	Calvine Road	Bruceville	2	2	10,800	12,000	12,000
Franklin Boulevard	Mack Road	Cosumnes River Blvd	4	4	28,600	29,200	28,500
	Cosumnes River Blvd	Calvine Road	4	4	20,200	21,500	21,300
Power Inn Road	Stockton Boulevard	Calvine Road	4	4	28,800	31,800	32,200
	Calvine Road	Old Calvine Road	4	4	19,200	23,700	23,700
Auberry Drive	Spengler	Calvine Road	2	2	4,900	6,000	6,200
	Calvine Road	Old Calvine Road	0	2	0	900	1,000
Bruceville Road	Cosumnes River Blvd	West Stockton Blvd	4	6	28,000	34,000	35,700
	West Stockton Blvd	Cosumnes River College	2	6	28,000	32,900	34,600

Source: DKS Associates, 2007.

Table 3.4-2: Year 2012 Intersection Levels of Service

Intersection	AM Peak Hour				PM Peak Hour			
	2012 No-Action		2012 LPAP2		2012 No-Action		2012 LPAP2	
	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay
Franklin Blvd/Mack Rd	C	32.6	C	31.9	D	39.9	D	39.0
Franklin Blvd PNR/Cosumnes River Blvd	-	-	A	3.3	-	-	A	8.3
Franklin Blvd/Cosumnes River Blvd	E	65.2	F	86.0	D	44.2	E	64.8
Center Pkwy/Cosumnes River Blvd	D	50.0	E	61.7	E	55.9	F	97.4
Bruceville Rd/Cosumnes River Blvd	D	50.3	F	100.0	D	46.7	D	40.6
SR 99 SB Ramps/Cosumnes River Blvd	C	21.1	B	18.3	C	25.4	C	25.2
SR 99 NB Ramps/Cosumnes River Blvd	B	10.5	B	13.0	B	11.0	B	10.3
Power Inn Rd/Calvine Rd.	D	36.5	D	39.4	D	50.0	D	42.8
Auberry Dr/Calvine Rd	C	24.6	C	26.0	B	16.6	B	14.1
Bruceville Rd/W Stockton Blvd	A	5.5	A	5.3	A	6.6	A	7.9
Bruceville Rd/CRC-Cotton Ln	B	11.7	C	20.1	B	17.7	C	25.5
Bruceville Rd/Old Calvine Rd.	C	23.8	C	29.6	C	20.7	C	28.8
Bruceville Rd/Sheldon Rd	C	32.6	C	26.4	D	36.5	D	42.3
24th Street/Cosumnes River Blvd	A	2.7	A	3.2	A	3.7	A	3.4
Detroit Blvd/Cosumnes River Blvd	A	0.7	A	1.0	A	0.7	A	8.2
Detroit Blvd/Meadowview Rd	B	19.5	B	19.2	C	23.1	C	21.4

Notes: "-" future intersection
Source: DKS Associates, 2007.

Table 3.4-3: Year 2012 Intersection LOS Mitigations - LPAP2

Intersection	No-Action		LPAP2			
			No Mitigation		With Mitigation	
	LOS	Delay	LOS	Delay	LOS	Delay
AM Peak Hour						
Franklin Blvd/CRB (1)	E	65.2	**F**	**86.0**	-	-
Center Parkway/CRB	D	50.0	**E**	**61.7**	D	50.9
Bruceville Road/CRB	D	50.3	**F**	**100.0**	C	34.2
PM Peak Hour						
Franklin Blvd/CRB (1)	D	44.2	**E**	**64.8**	-	-
Center Parkway/CRB	E	55.9	**F**	**97.4**	E	60.8
Bruceville Road/Sheldon	D	36.5	**D**	**42.3**	C	27.6

Shaded cells denote impacts, as defined in Subsection 3.3.3, Criteria for Assessing Project-Specific Impacts on Vehicular Traffic
Mitigation Measure: (1) Add second southbound left turn lane (to be added by City of Sacramento upon widening Cosumnes River Boulevard to four lanes between Franklin Boulevard and Center Parkway, anticipated to occur after Year 2012)
Source: DKS Associates, 2007.

Table 3.4-4: Year 2012 Design Queue Lengths (number of vehicles per lane)
(95th percentile queue per lane in vehicles)

Location		Year 2012 LPAP2	
		AM	PM
Intersection Crossings			
Franklin Blvd /Cosumnes River Blvd	Eastbound	9	20
	Westbound	18	13
Center Pkwy/ Cosumnes River Blvd	Eastbound	25	33
	Westbound	20	20
Mid-Block Crossings			
Meadowview Rd between Detroit/Tisdale and Shining Star Drive	Eastbound queue from the crossing gate back to Detroit Blvd	20	31
	Westbound queue from the crossing gate back to Brookfield	29	26
	Westbound queue from Detroit Blvd back to the crossing	15	13

Worst case queue for each approach is listed, based upon unmitigated intersection geometrics.
EB and WB capacities at two intersections (Franklin @ CRB, and Center Pkwy @ CRB) assumed one lane each direction. EB and WB capacities at the Meadowview @ Detroit intersection assumed two lanes in each direction.
Source: DKS Associates, 2007.

3.4.3 2012 INTERSECTION MITIGATIONS

The following mitigation measures are recommended for the intersections in the City of Sacramento:

T-10 Center Parkway and Cosumnes River Boulevard: add a second southbound left turn lane and provide overlap for all right turn phases and restripe the eastbound approach to one left, one through and one through right. With this modification, the intersection would operate at LOS D in the AM Peak hour and E in the PM peak hour, and the impact would be reduced to below a level of significance. This mitigation would require widening the bridge over Union House Creek (the cost of which is included in the project costs). The second southbound left turn lane and the second eastbound through lane will be added along with the widening of CRB between Center Parkway and Bruceville Road.

T-11 Bruceville Road and Cosumnes River Boulevard: provide overlap for all right turn phases, which would improve LOS at the intersection to C in the AM peak hour.

T-12 Bruceville Road and Sheldon Road: provide overlap for all right turn phases, which would improve LOS at the intersection to C in the PM peak hour.

3.5 PARKING

There are currently park-and-ride lots for RT's express bus services in the South Sacramento Corridor at the following locations:

- Elk Grove Boulevard/SR 99 (Route 60 buses)
- Sheldon Road/SR 99 (Route 59 and 60 buses)
- Calvine Road/SR 99 (Route 60 buses)
- Franklin Boulevard/Laguna Boulevard (Route 52 buses)

3.5.1 No-Action Alternative

The No-Action Alternative would not add park-and-ride spaces for transit services or displace any parking in the South Sacramento Corridor. Growing demand for parking and a need to increase parking supply are anticipated at major activity centers in the South Sacramento Corridor.

The level of transit service in the South Sacramento Corridor will affect the demand for parking in Downtown Sacramento. Employment in the Downtown Sacramento is projected to increase from about 103,600 in 2000 to about 154,300 in *2030,* an increase of 50 percent. A proportional increase in parking demand would be expected in the absence of measures to alter the level of automobile travel to the Downtown area.

3.5.2 TSM Alternative

The TSM Alternative relies primarily on operational improvements rather than capital improvements, and includes direct express bus service to Downtown Sacramento via SR-99 and I-5 from PNR lots and a new bus park-and-ride lot at Cosumnes River College (CRC). Table *3.5-1* defines the parking demand expected at these locations. These trips to PNR lots reflected in the intersection LOS shown in Table 3.3-10 and Table 3.3 -11, show increased number of trips, of shorter duration, to PNR lots and LRT Stations and reduced number of trips, of longer duration, to downtown Sacramento.

Under the TSM Alternative, approximately of 1,370 park-and-ride spaces are planned for the CRC Station. Of these spaces, at least 1,100 spaces would be on the lot east of Bruceville Road. The remaining 290 spaces would be located on the north side of the campus and south of Consumes River Boulevard. Although those are the spaces that RT will be constructing for the increased parking demand, parking at the RT CRC PNR lot and on the CRC campus would be shared by both transit riders and students.

Per a cooperative agreement to be developed between RT and CRC, park-and-ride spaces off the campus and college parking spaces on the campus may require a $1 daily fee for parking, with the parking revenues going to CRC. CRC would provide security for the park-and-ride vehicles on and off campus. The fee is consistent with the current parking policy on the CRC campus, with all parking lots charging $1 per day.

Table *3.5-*1: Year *2030* Changes in Parking Demand

Year *2030* Parking Demand (Vehicles) at Park-and-Ride Lots			
Station/Stop Area	**Alternative**		
	No Action	**TSM**	**LPAP2**
Morrison Creek Station	*--*	*--*	*30*
Franklin Station/Bus PNR	*--*	*--*	*520*
Center Pkwy. Station	*--*	*--*	*--*
CRC Station/Transit Center	*--*	*1,370*	*1,830*
Calvine Rd./SR 99 Bus PNR	*180*	*180*	*--*
Elk Grove Blvd./SR 99 Bus PNR	*130*	*--*	*--*
Sheldon Road/SR 99 Bus PNR	*180*	*--*	*--*
Franklin Blvd./Laguna Blvd. Bus PNR	*220*	*--*	*--*
Phase 2 Area Total	710	1,550	2,380
Meadowview	1,010	990	790
Year *2030* Change in Parking Demand in Downtown Sacramento (Relative to No-Action Alternative)			
Downtown Sacramento	--	-900	-1,300
Source: DKS Associates, August *2007.*			

This environmental analysis evaluated the complete parking requirements expected for the forecast year *(2030)* and proposes construction of parking facilities for this ultimate demand. Right of way requirements and cost estimates presented in this analysis are for this ultimate level of parking. However, it is expected that demand for parking will grow as development in the area takes place; therefore, the parking facilities will likely be constructed in phases based on monitoring of actual use.

Under the cooperative agreement, about 1100 of the proposed park-and-ride spaces would be designated as the base parking at CRC, while the remaining amount could be designated to be leased parking. The leased parking would be subject to a monitoring program, with the anticipation that the amount of leased

parking would decline over time as LRT extensions are implemented and park-and-ride lots are built further south.

By diverting trips from auto to bus, the TSM Alternative would reduce the growth in overall parking demand in Downtown Sacramento, which due to constrained parking would probably benefit the most from such a mode shift. Based on projected changes in trip ends in *2030,* the TSM Alternative is projected to save about 900 parking spaces in Downtown Sacramento compared to the No-Action Alternative.

Other than the relocation of some CRC spaces for the bus transfer station and kiss-and-ride, which will be replaced as part of the project, no displacement of parking is anticipated under the TSM Alternative.

3.5.3 LPAP2

The LPAP2 would reduce parking demand by shifting some trips from auto to transit. The benefits would be realized primarily in Downtown Sacramento, but would also occur at some major activity centers in the vicinity of RT's LRT stations. Based on projected changes in trip ends in *2030,* the LPAP2 is projected to save about 1,300 parking spaces in Downtown Sacramento compared to the No-Action Alternative.

Construction of park-and-ride lots as part of the LPAP2 would create up to about 2,700 spaces for LRT parking at the Morrison Creek, Franklin and CRC stations. As shown in Table *3.5-1* this would satisfy the expected parking demand at the park-and-ride lots in the year *2030.* The anticipated size of the parking lots, as defined in here and in Chapter 2, is slightly larger than the projected parking demand to allow for uncertainties in the demand projections. The parking lots may be constructed in phases based on monitoring of actual use.

The new Center-Parkway Station does not include a park-and-ride lot because passengers are projected to access the new station via bus transfers or walking. Some commuters may still park in areas adjacent to the station.

Parking plans at the Cosumnes River College Station would be developed in coordination with the College. A cooperative parking agreement is expected to be developed between RT and CRC. Under the LPAP2, approximately of 2,000 park-and-ride spaces are planned for the CRC Station. RT will be constructing spaces for the increased parking demand. Parking at the RT CRC PNR lot and on the CRC campus would be shared by both transit riders and students.

A parking structure with capacity for at least 2,000 spaces on the north side of the CRC entrance is also in consideration as an option to a parking structure on the south side of the CRC entrance.

Per a cooperative agreement to be developed between RT and CRC, park-and-ride spaces off the campus and college parking spaces on the campus may require a $1 daily fee for parking, with the parking revenues going to CRC. The fee is consistent with the current parking policy on the CRC campus, with all parking lots charging $1 per day. As an expected provision of the cooperative agreement to be developed between RT and CRC, about 1,100 of the proposed park-and-ride spaces would be designated as the base parking at CRC, while the remaining amount could be designated to be leased parking. The leased parking would be subject to a monitoring program, with the anticipation that the amount of leased parking would decline over time as a Phase 3 transit extension is implemented and park-and-ride lots are built further south and/or east.

By diverting trips from auto to bus, the LPAP2 would reduce the growth in overall parking demand in Downtown Sacramento, which due to constrained parking would probably benefit the most from such a mode shift. Based on projected changes in trip ends in *2030,* the LPAP2 is projected to save about 1,300

parking spaces in Downtown Sacramento compared to the No-Action Alternative. This reduction is 400 more spaces than the TSM Alternative.

Additionally, the need for approximately 200 parking spaces at the Meadowview LRT Station, and about 700 bus park-and-ride spaces elsewhere in the South Sacramento Phase 2 Corridor area, would be re-located at new LRT stations.

No other long-term adverse parking impacts on existing residents or businesses are anticipated in the South Sacramento Phase 2 Corridor. Other than the relocation of some CRC spaces for the bus transfer station and kiss-and-ride, which will be replaced as part of the project, no displacement of parking is anticipated under the LPAP2.

3.5.4 Mitigation Measures

Because transit improvements under either the TSM or LPAP2 alternatives would include park-and-ride lots with adequate spaces to match demand, and because these alternatives would reduce parking demand in Downtown Sacramento, there is expected to be a beneficial impact overall on parking supply.

If monitoring indicates commuter parking exceeds acceptable levels at the Center Parkway Station, a residential permit parking program will be implemented. It would provide preferential parking by imposing parking time limits in neighborhoods and providing residents with a permit that would exempt them from the time limits.

3.6 PEDESTRIAN AND BICYCLE FACILITIES

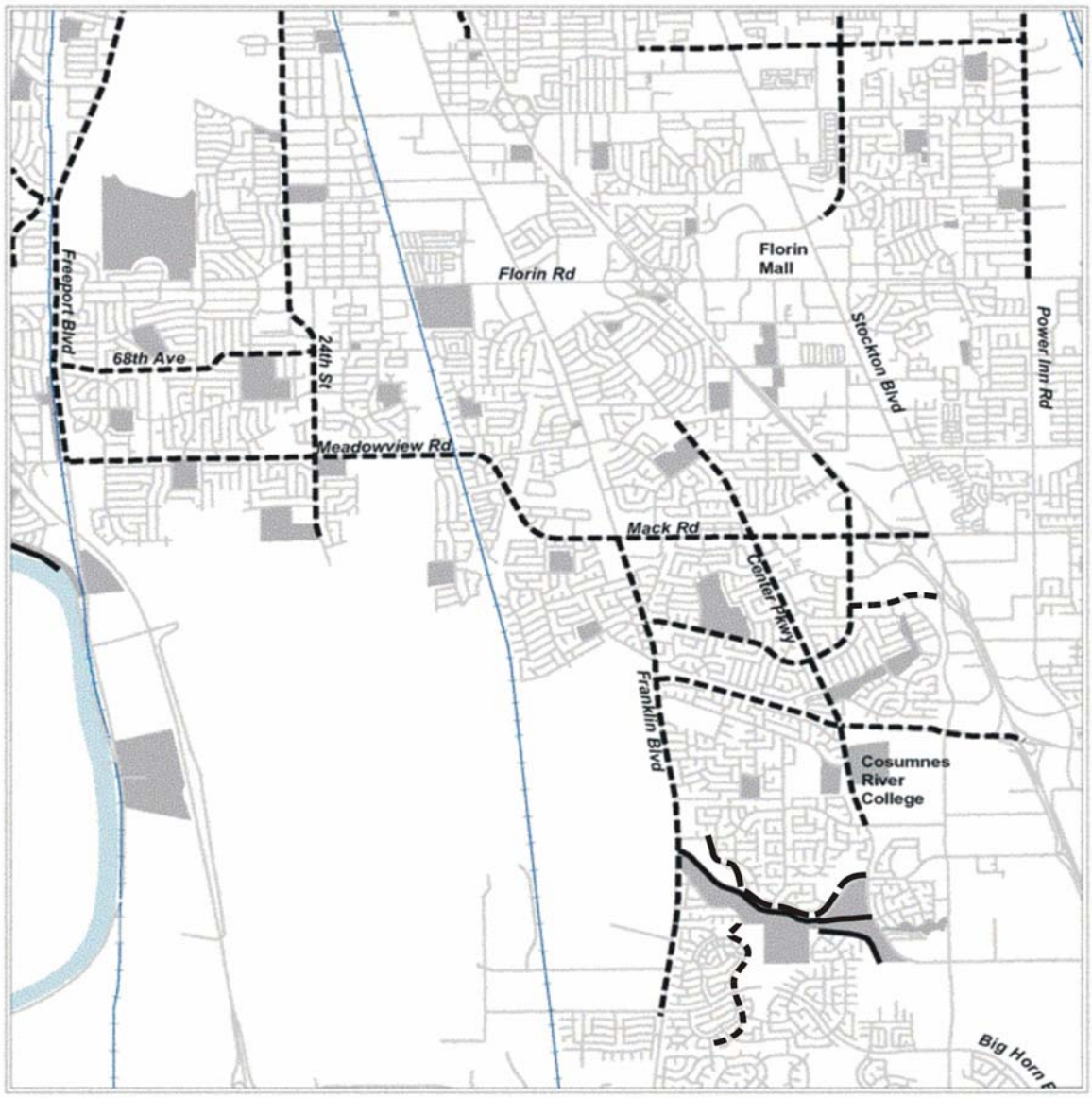
Currently pedestrians in the project area are accommodated on sidewalks, with at-grade crossings of major intersections. Bicycle facilities in the area are mostly Class II bicycle lanes (striped bike lane on roadway), as illustrated by Figure *3.6-1,* including Meadowview Road, CRB, Franklin Boulevard, and Center Parkway. There is also a bike trail parallel to the Union Pacific Railroad alignment from north of Florin Road to Meadowview Road. At present pedestrian and bicycle traffic is relatively low, reflecting the area's current low density of development.

3.6.1 No-Action Alternative

The planned extension of CRB to west of Franklin Boulevard will also extend the Class II bicycle lane on the CRB. The City of Sacramento has a planned bikeway along Morrison Creek, north of the planned extension of the CRB. This would be an extension of the existing bike trail parallel to the Union Pacific alignment. No other change to the existing pedestrian and bicycle facilities is anticipated under the No-Action Alternative.

3.6.2 TSM Alternative

There would be localized pedestrian and bicycle access improvements associated with proposed park-and-ride lots in the Cosumnes River College (CRC) area. No additional change to the existing pedestrian and bicycle facilities is anticipated under the TSM Alternative.



Existing Bicycle Facilities

- Existing Bike Trail
- Existing On-street
- Parks

Regional Transit

South Sacramento Corridor Phase 2 Project

EXISTING BICYCLE FACILITIES
Figure 3.6-1

3.6.3 LPAP2

There would be localized pedestrian and bicycle access improvements associated with the proposed LRT stations at Franklin Boulevard, Center Parkway, and CRB. These improvements are included in the project cost estimates. The two pedestrian/bicycle bridges and pathways across Union House Creek to the Franklin Station and to the Center Parkway Station (as described in Chapter 2, Section 2.4.5) are included in the capital costs.

The bikeway planned by the City of Sacramento along Morrison Creek, north of the planned extension of CRB, will most likely be located along the north and west side of Morrison Creek. The bikeway would need to cross under the LRT Alignment where the LRT would bridge over the creek. The design of the LRT Bridge will be coordinated with the City to ensure that it would accommodate the bikeway.

The planned extension of CRB to west of Franklin Boulevard will extend the Class II bicycle lane on the CRB. *The LPAP2 project also includes a grade separation over Cosumnes River Boulevard between Center Parkway and Bruceville Road.*

3.6.4 Mitigation Measures

South Sacramento Corridor transit improvements under both the TSM and LPAP2 Alternatives would increase pedestrian and bicycle use in the long term. There would be no displacement of pedestrian and bicycle facilities requiring mitigation.

CHAPTER 4: AFFECTED ENVIRONMENT, ENVIRONMENTAL CONSEQUENCES, AND MITIGATION

This chapter describes the affected environment, environmental consequences of the project alternatives, and recommended measures to mitigate impacts. The No-Action Alternative provides the basis for evaluation of TSM and LPAP2 impacts under NEPA and CEQA. Comparison of the TSM and LPAP2 alternatives provides the basis for the FTA's evaluation of the project's worthiness for federal funding. The chapter includes 17 sections describing different types of impacts (e.g., air quality). The physical area affected for each type of impact would vary by impact type and therefore the specific study area considered in each analysis is described in the sections. For example, the study area considered in evaluation of biological resources is the footprint for the alternative (i.e., the area on which the alternative would be built) and any areas adjoining this footprint that could be affected, while the study area considered in evaluating socioeconomic impacts consists of the U.S. Census tracts adjoining the LPAP2 alignment.

4.1 AESTHETICS

4.1.1 Overview

Aesthetics and urban design are subjective fields, and visual changes that are favored or accepted by one person may be disliked by another. For this reason, the effects of visual changes are open to interpretation. The following section describes the existing visual or aesthetic environment of the LPAP2 Project vicinity and visual changes anticipated as a result of the project alternatives. For purposes of this analysis, sensitive visual receptors are defined as residents and business occupants, recreational users of parks and preserved natural areas, and students of schools in the vicinity of the proposed LPAP2 alignment. Scenic views are defined as long-range views towards preserved natural areas or recognized visual and/or historic landmarks. A visual change would be considered adverse if it introduced obtrusive elements substantially out of character with existing land uses or substantially obscured a scenic view or vista available to sensitive receptors in the vicinity of the proposed project alternative feature.

4.1.2 Visual Character

As described in Section 4.10, land uses near the LPAP2 alignment are primarily urban, including residential, commercial, industrial, public, recreational, agricultural and open space. The existing UPRR railroad is the dominant visual element along the northern segment of the LPAP2 alignment. Single-family residences are located on both sides of the existing freight rail alignment. At the Morrison Creek crossing of the UPRR, the LPAP2 Project would leave the UPRR alignment and veer to the west side of Morrison Creek heading south through agricultural land and the undeveloped Stone Family Trust property. Residences on the west side of the UPRR corridor and north of the undeveloped Stone Family Trust property have distant views across the site to the south and southeast of riparian vegetation near the Morrison Creek levee. This property, however, consists primarily of highly disturbed vegetation, fallow croplands and debris.

After leaving the Morrison Creek Station, the LPAP2 would cross Union House Creek and continue eastward over the Sacramento Regional County Sanitation District (SRCSD) bufferlands and the city-

operated flood control basin to Franklin and Cosumnes River boulevards. Residential properties north of Union House Creek have limited views of this open space area. A SMUD substation, located just west of Franklin Boulevard, is visible from the road and from some residences to the north. Residential uses predominate on both sides of the proposed LPAP2 LRT alignment as it continues eastward along the north side of Cosumnes River Boulevard (CRB). A wall on the backsides of each of these residential areas mostly obscures views of the roadway and Union House Creek. South of the LPAP2 alignment, between Center Parkway and Bruceville Road, the Cosumnes River College (CRC) and its recreational facilities are the primary visual features. Between Center Parkway and Bruceville Road, the alignment would *on a bridge structure over* CRB to *the west side of* Bruceville Road and continue in the landscaped strip to the LRT terminus just north of the CRC entrance. The College Square Development *is* located east of Bruceville Road and south of CRB. The proposed Shasta Park site (by others) would be located at Bruceville Road and Shasta Avenue on property that is primarily undeveloped with several residences and an area of cultivated land.

The proposed optional shuttle lot would be located south of Calvine Road and east of Auberry Drive. The Edward Harris Middle School and Monterey Trails High School *are* situated to the southeast of the proposed rail terminus, and a water quality basin and Strawberry Creek are located to the northeast.

As described above, the LPAP2 alignment lies adjacent to some residential areas where residents may have views of and across the proposed rail line along the UPRR alignment or along CRB, Bruceville Road, or Calvine Road. In general, the residences are arranged so that they face away from these arteries, so views of and from the rears of houses exist along the LPAP2 alignment. Views of the alignment and surrounding landscape and land uses are provided to motorists and others traveling along roadways in the vicinity.

4.1.3 Locations Possessing Sensitive Visual Receptors or Offering Scenic Views

The locations described below were selected either because they are proximate to sensitive visual receptors or presently offer opportunities for scenic views. Other locations along the LPAP2 alignment are not discussed due to the absence of such features or the limited nature of visual changes anticipated under the alternatives. Descriptions proceed from north to south and thence east.

Proposed Meadowview Road Crossing Location. In addition to the UPRR railroad right-of-way, the primary land uses in the vicinity of the LPAP2 alignment crossing of Meadowview Road are the Meadowview Station site, located north of Meadowview Road, and single-family residential areas, located on both the north and south sides of Meadowview Road. As shown in Figure 4.1-1, other prominent visual elements include the railroad crossing gates, telephone and electrical power poles along Meadowview Road, and the UPRR right-of-way. Residents currently view the tops of the utility poles and railroad crossing gates above the fences, walls, and landscaping surrounding their property.

Proposed Morrison Creek Station and PNR Lot. The proposed Morrison Creek Station and PNR Lot would be constructed on the undeveloped Stone-Boswell property located west of Morrison Creek and north of the planned extension of CRB. Residences on the north side of this property have distant views across the site to the south and southeast of riparian vegetation near the Morrison Creek levee. The property, however, consists primarily of highly disturbed vegetation, fallow croplands and debris.

Existing privacy walls that extend along the backside of residences east of the alignment in the Deer Creek neighborhood block views of the railroad corridor and Morrison Creek.

Figure 4.1-1: View of Meadowview Road and Meadowview Station Site (Looking East)

Proposed UPRR/Union House Creek Bridge Location. The proposed Union House Creek Bridge would be located at the UPRR track crossing of Union House Creek. To the south, the CRB extension (by others) would be constructed on SRCSD bufferlands. Single-family homes to the north, as shown in Figure 4.1-2, have views of the tops of the power poles that run along the railroad tracks. Due to backyard fences and landscaping, views of the creek and open space area are limited.

Figure 4.1-2: Homes North of UPRR/Union House Creek Bridge Location (Looking Southwest)

Proposed Franklin Boulevard Station and PNR Lot Location. The proposed Franklin Boulevard LRT station platform and PNR lot would be located west of Franklin Boulevard on SRCSD bufferlands in the vicinity of a city-operated flood control basin. The CRB extension (by others) would be located south of the proposed station. Long-range views of the bufferlands are available from the residential area located northeast of the site. Some of these views are obscured by fencing and foliage.

Proposed Franklin Boulevard Crossing Location. Existing land uses west of Franklin Boulevard at CRB, as shown in Figure 4.1-3, include the SRCSD bufferlands and a Sacramento Municipal Utility District (SMUD) substation. A single-family residential area is located north of the site. East of Franklin Boulevard, an undeveloped property and single-family residential areas are located, respectively, north and south of CRB. The bufferlands provide long-distance views for residents as well as for motorists traveling on Franklin and Cosumnes River boulevards.

Figure 4.1-3: View of Franklin Boulevard/Cosumnes River Boulevard Intersection (Looking North down Franklin Boulevard)

Proposed Center Parkway Station Location. The proposed Center Parkway LRT station platform would be located north of the future widened CRB (by others) and west of the Center Parkway intersection with CRB. Single-family residences located north and south of CRB at this location have limited views of the roadway due to a wall that extends along the backside of houses.

Proposed CRB Flyover Location. As shown in Figure 4.1-4, the primary land use in the vicinity of the Bruceville Road/CRB intersection is CRC *and the College Square development*. A prominent visual feature is the large architectural signage that is located on top of the berm at the northeast corner of the college stadium. The area between the stadium berm and Bruceville Road is landscaped. A single-family residential area is located north of CRB just west of Bruceville Road. Views of the busy intersection from these residences are partially blocked by the wall that surrounds the residential area.

Figure 4.1-4: View of Bruceville Road/Cosumnes River Boulevard Intersection and Cosumnes River College (Looking Southwest)

Proposed Cosumnes River College Station and Parking Structure Location. The proposed CRC station platforms would be located north of the college entrance from Bruceville Road The parking structure would be located *just south of the CRC main entrance off of Bruceville Road*. A PNR lot would also be located across Bruceville Road and on the northern portion of the campus under the TSM Alternative. Existing land uses at this location include the parking lot at the college entrance and the *College Square development* east of Bruceville Road.

Proposed Optional Shuttle Lot Location. The proposed optional shuttle lot would be located on RT property located south of Calvine Road and east of Auberry Drive. Some residences located north of Old Calvine Road just east of the proposed station location have limited views of the undeveloped property that consists primarily of disturbed vegetation. The Edward Harris Middle School and Monterey Trails Highway School *are* located to the southeast of the proposed optional shuttle lot at Calvine/Auberry.

4.1.4 Visual Changes under the TSM or LPAP2 Alternatives

As described in Section 4.1.3, the locations discussed below were selected for impacts evaluation either because they are proximate to sensitive visual receptors or presently offer opportunities for scenic views. Other locations along the LPAP2 alignment are not discussed either because of their lack of such features or the limited nature of visual changes anticipated under the project alternatives. No project facilities are proposed to be built under the No-Action Alternative; therefore this alternative would not result in any visual changes. The discussion below focuses on the TSM and the LPAP2 alternative and design options.

4.1.4.1 TSM ALTERNATIVE

There would be visual changes associated with construction of one PNR lot under the TSM Alternative. These are described below.

Proposed Cosumnes River College PNR Lot Location. The proposed CRC PNR lot would not substantially degrade the visual quality of the area, which is dominated by the existing college entrance from Bruceville Road and adjacent parking areas. A PNR lot on the east side of Bruceville Road would result in visual changes due to the paving of undeveloped vacant property, however, this would not introduce visual elements substantially out of character with the existing land uses including CRC, Bruceville Road and the College Square Development (by others).

Design requirements, RT practices and proposed mitigation measures to minimize visual effects under the TSM Alternative are described in Section 4.1.5.

4.1.4.2 LPAP2

Under the LPAP2, visual changes would primarily be associated with construction of LRT stations and PNR lots and structure, and overhead structures at several locations along the LPAP2 LRT alignment, as described below. In addition, residents who live along segments of the LPAP2 alignment between the proposed station locations would have limited views of the LPAP2 alignment including the tops of catenary poles and overhead wires. As noted in Section 4.12.7, sound attenuation barriers/walls are proposed at various locations along the LPAP2 alignment, specifically in areas where residences would be near the proposed LRT facilities. These noise barriers, in addition to the existing privacy walls, would provide visual screening of the LPAP2 alignment from residences and in some locations, would block views from the LRT vehicles of residential homes and yards. Construction of sound walls along the LTR alignment would also result in visual changes due to added bulk on the elevated structures and increased shading of residential properties.

Proposed Meadowview Crossing Location. Visual changes at the Meadowview Road crossing would vary depending on the LPAP2 design option selected. The LPAP2 includes an at-grade crossing and views from residences would be limited to the tops of catenary poles and wires. Under the first design option, as shown in Figure 4.1-5, the LRT would cross over the roadway on an elevated structure, leaving the UPRR to cross at grade.

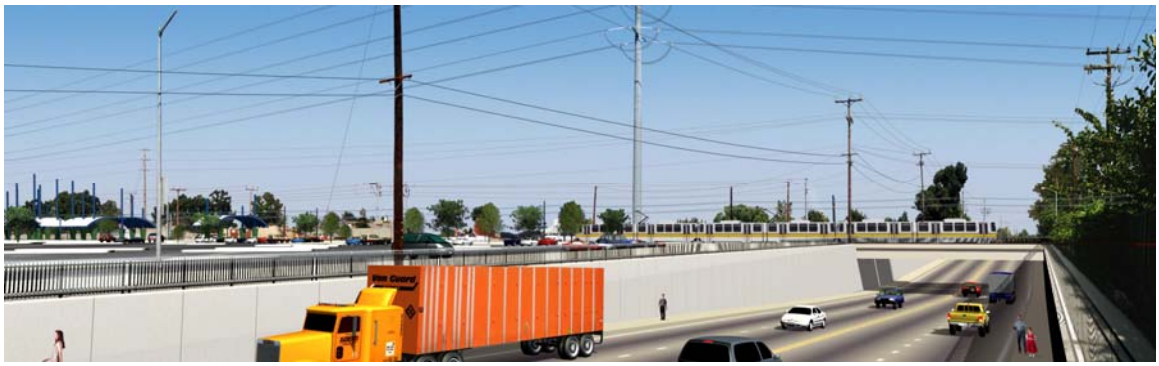
Visual changes would be evident to motorists traveling on Meadowview Road, however, the visual features associated with the elevated LRT structure, passing trains and catenary poles and wires would not be inconsistent with the Phase 1 LRT Meadowview Station and PNR lot, the UPRR railroad and roadway facilities, and the existing utility poles and wires. Views of the structure from the residential neighborhood to the south would be generally blocked by backyard fences and landscaping, however, residents may see some features above the fences such as the top of catenary

poles. Proposed noise walls on the structure would not entirely block views of and from intermittent trains, and they would result in visual changes by increasing bulk of the elevated structure.

Figure 4.1-5: Meadowview Road LRT Flyover

Under the second design option, Meadowview Road would be depressed to cross beneath both the LRT and the UPRR tracks, which would be at grade. As shown in Figure 4.1-6, the proposed underpass would eliminate long range views for motorists for a limited distance along Meadowview Road. Views of the at-grade crossing of the LRT from residential areas would be limited to the tops of catenary facilities. The depressed roadway would not be visible from residences.

Figure 4.1-6: Meadowview Road Underpass



Proposed Morrison Creek Station, PNR Lot. Long-range views from single-family residences located to the north of the proposed Morrison Creek Station and PNR lot would be changed. Instead of looking across vacant, undeveloped land, some residents would have distant views of the LRT Station, PNR lot and rail alignment. These changes, however, would not introduce visual elements that would substantially degrade a scenic vista or be out of character with existing and planned land uses, including the proposed future extensions of Cosumnes River and Detroit boulevards. These proposed roadway extensions and other planned future land uses around the proposed station would also result in visual changes. Views of the Morrison Creek Station from across the Creek in the Deer Creek neighborhood would be generally blocked by the existing property walls, the railroad corridor and the Morrison Creek levee.

Proposed UPRR/Union House Creek Bridge. Views of the proposed UPRR/Union House Creek Bridge from the residences located to the north would be partially obscured by the backyard fences and landscaping that surround the residential area. As shown in Figure 4.1-7, some residences may have views from their second-story windows of the LRT facilities, including the LRT/UPRR separation structure, catenary poles and wires. The LPAP2 LRT facilities would be located approximately 100 to 200 feet from the residential properties, and would be approximately 29 feet at their highest point, a lesser height than the existing electric power poles that are currently visible from these residences.

Figure 4.1-7: View of UPRR/Union House Creek LRT Bridge from Homes to the North

Proposed noise walls on the flyover structure would not entirely block views of and from intermittent trains, and they would result in visual changes by increasing the bulk of the elevated structure. The planned CRB extension (by others) would also cross over the UPRR corridor on a separation structure just to the south of the LPAP2 LRT/UPRR separation structure.

Proposed Franklin Boulevard Station and PNR Lot Location. The Franklin Boulevard LRT Station and PNR lot would be located to the north of the proposed CRB extension (by others) and would be constructed on engineered fill at approximately the same level expected for the roadway extension. The proposed LRT station and PNR lot would be designed to accommodate the future roadway geometry and would be consistent with the visual features of the roadway extension. Long-range views of the proposed Franklin Boulevard LRT Station and PNR lot would be partially obscured by fencing and foliage. Views from residences without solid screens of landscaping or fencing would be changed. Instead of looking across vacant, undeveloped land, residents would see some or all of the LRT Station and PNR lot with lights in the foreground. These changes would be noticeable to people most familiar with the immediate vicinity; they would not substantially degrade scenic views or introduce obtrusive visual elements substantially out of character with existing land uses and the proposed future extension of CRB.

Proposed Franklin Boulevard Crossing Location. Visual changes at the Franklin Boulevard LRT crossing would vary depending on the design option selected. Construction of the at-grade crossing options would also not detract from the existing visual character of the Franklin Boulevard/CRB intersection. The proposed Franklin Boulevard flyover options would elevate the LRT tracks approximately 30 feet above the roadway along the northern side of CRB. As shown in Figure 4.1-8, the Franklin flyover structure would be visually apparent to motorists traveling on Franklin and Cosumnes River boulevards. Some residential areas to the north would have long-range views of the LRT structure and catenary facilities. Proposed noise walls on the structure would not block views of and from intermittent trains, and they would also result in visual changes by adding bulk to the elevated crossing. Although the proposed overcrossing facilities would be visually apparent to residents and motorists, these visual changes are not substantially inconsistent with the existing roadway intersection and the proposed future CRB extension.

Figure 4.1-8: Franklin Boulevard LRT Flyover

Proposed Center Parkway Station and Pedestrian Overcrossing. The proposed Center Parkway LRT station platform would be located north of the future widened CRB directly west from Center Parkway. The proposed station facilities would be visually consistent with the widened roadway and would not be noticeable from residences due to walls surrounding the residential areas. The proposed pedestrian overcrossing would be visible to motorists traveling on CRB, however, this structure would not be substantially out of character with the roadway nor would it obscure scenic views or vistas. Some residents in the neighborhoods located north and south of CRB would have views of the top of the pedestrian overcrossing and lighting facilities from their back yards or second-story windows.

CRB Flyover Location. The CRB flyover, as shown in Figure 4.1-9, would be visually apparent to motorists traveling in the vicinity of the intersection of CRB and Bruceville Road, however, the LRT structure and catenary poles and wires would not be inconsistent with the existing roadway intersection, traffic signals and utility poles. The single-family residential area north of CRB just west of Bruceville would have limited views of the flyover structure due to existing privacy walls and the distance between the proposed flyover and edge of residential properties. Proposed noise walls on the flyover structure would not entirely obscure views of and from intermittent trains and would result in visual changes by adding bulk to the LRT flyover. The crossing would be designed to accentuate the architectural character of the college gateway. Therefore, no substantially adverse visual impacts would occur.

Figure 4.1-9: Bruceville Road LRT Flyover

Proposed Cosumnes River College Station and Parking Structure. Long-range views of and from the CRC entrance would be interrupted by features of the new station, including *the 2,000 space parking structure,* platforms, shelters, signs, and light poles. The parking structure would be designed to be consistent with the campus setting, which is already occupied with campus educational and institutional structures. Catenary poles and wires associated with LRT operation would also be visible. These visual changes would be consistent with the existing visual quality of the college entrance and parking areas, Bruceville Road and the College Square Development (by others) located east of the college. No scenic views are currently available; therefore, none would be

obscured. During evening hours, the area around the station would be somewhat lighter than the college entrance and parking lot areas are today, since there would be 24-hour lighting associated with the new facility. As outlined below (4.1.5) this lighting would be directed to minimize light pollution on surrounding areas. This lighting is necessary to provide effective security. Ambient light currently is produced at the college entrance and parking areas.

Optional Shuttle Lot at Calvine/Auberry. Construction of the proposed optional shuttle lot at Calvine/Auberry would have minor effects on views from residential areas located north of Calvine Road. Most residential properties in the vicinity are walled off from the existing roadway and are located a considerable distance from the proposed location of the optional shuttle lot. Visual elements of the optional shuttle lot would include bus shelters and lighting associated with the new facility. This lighting is necessary to provide effective security.

4.1.5 Mitigation Measures

The following mitigation measures will be applied:

V&A-1 RT will invite public participation regarding station design during the final design phase of the project.

V&A-2 RT will incorporate landscaping into the final design to soften views of LPAP2 LRT stations, PNR lots parking structure, and substations.

V&A-3 RT will control potential light and glare by directing lighting associated with proposed LPAP2 LRT stations, PNR lots, parking structure, substations, and the optional shuttle lot onto the premises of each facility and away from surrounding land uses.

4.2 AGRICULTURE

Existing land uses along the LPAP2 alignment are primarily urban, as described in Section 4.10, Land Use and Planning. Agricultural resources in the LPAP2 alignment area are located at the Stone Family Trust property and north of Cotton Lane, east of Bruceville Road.

4.2.1 Regulatory Setting

4.2.1.1 THE FARMLAND PROTECTION POLICY ACT

The Farmland Protection Policy Act (7 CFR Ch. VI Part 658) requires federal agencies to take into account the adverse effects of their projects on the protection of farmland, in part, by requiring an inventory, description, and classification of affected farmlands as well as early consultation with the Natural Resources Conservation Service (NRCS) and processing of Form NRCS–CPA-106 (Farmland Conversion Impact Rating Form).

4.2.1.2 WILLIAMSON ACT

Known formally as the California Land Conservation Act of 1965, the Williamson Act (California Government Code Section 51291) was designed as an incentive to retain prime agricultural land and open space in agricultural use, thereby slowing its conversion to urban and suburban development. The program entails a 10-year contract between the city and an owner of land whereby land kept in

agricultural use is taxed on the basis of its agricultural use rather than its market value. Notification provisions of the Act require an agency to notify the Director of the Department of Conservation of the possible acquisition of Williamson Act contracted land for a public improvement. The local governing body responsible for the administration of the agricultural preserve must also be notified.

4.2.1.3 CITY OF SACRAMENTO GENERAL PLAN

The City of Sacramento General Plan's agricultural goal is to retain land for agricultural use until the need arises for development, and support actions of Sacramento County to similarly conserve its land until needed for urban growth. Almost all the remaining agricultural land in the City of Sacramento is located in the North Natomas Community and adjacent County lands. Accordingly, the implementation of *North Natomas Community Plan* policies regarding conversion of farmland to urban uses is the only policy applicable within the City's boundaries.

4.2.2 Farmland Impacts

No-Action Alternative. Under the No-Action Alternative, no right-of-way would be acquired for transportation facilities, and no farmland would be affected.

TSM Alternative. *No farmland would be affected by the* TSM Alternative.

LPAP2. The LPAP2 would require approximately *5.6* acres of farmland (*in addition to 19.1 acres of SRCSD Bufferlands used for cattle grazing)*. Construction of the LPAP2 LRT rail alignment on the Stone-Boswell property west of the Morrison Creek Station would require 3.6 acres of farmland. Approximately 2.0 acres of farmland would be required for construction of the proposed Morrison Creek Station and PNR lot. The location, Williamson Act status, and the size of the affected parcels are summarized in Table 4.2-1.

Table 4.2-1: Farmland Impacts with the TSM and LPAP2 Alternatives

Facility	Location (milepost)	Williamson Act Contract	Farmland Impact (Acres)
LPAP2			
LRT Rail Alignment	395+00 – 415+00	No	3.6
Morrison Creek Station and PNR Lot	405+00	No	2.0

In compliance with the Farmland Protection Policy Act, Parts I and III of Form NRCS-CPA-106 and maps for the proposed LPAP2 alignment were submitted to the NRCS for its determination of whether any part of the agricultural property that would be acquired for the project alternative is farmland subject to the Act. Following their completion of Parts II, IV, and V, a total site farmland assessment criteria score will be determined. Final processing of Form AD 1006 may be necessary, depending on the rating achieved.

The Sacramento County Tax Assessors Office was contacted in December 2002 and confirmed that the LPAP2 would not acquire any parcel of land currently under a Williamson Act contract.

4.2.3 Mitigation Measures

No mitigation is required.

4.3 AIR QUALITY

4.3.1 Setting

This section describes regional, state, and federal air pollutant standards and presents information regarding existing air quality in the region and the LPAP2 alignment area.

4.3.1.1 FEDERAL, STATE, AND LOCAL AIR QUALITY STANDARDS

Air quality in the United States is governed by the Federal Clean Air Act (CAA), which resulted in the adoption of federal air pollutant standards, known as National Ambient Air Quality Standards (NAAQS), for pollutants including carbon monoxide (CO), ozone (O_3), sulfur dioxides (SO_2), nitrogen dioxides (NO_2), lead (Pb), particulate matter less than 10 microns in diameter (PM_{10}), and fine particulate matter ($PM_{2.5}$). Federal NAAQS are shown in Table 4.3-1.

Table 4.3-1: Federal and State Ambient Air Quality Standards

Pollutant	Averaging Time	National Standard	California Standard
Ozone (O_3)	1 hour 8 hour	--- *0.075* ppm	0.09 ppm 0.07 ppm
Carbon Monoxide (CO)	1 hour 8 hour	35 ppm 9 ppm	20 ppm 9*.0* ppm
Nitrogen Dioxides (NO_2)	1 hour annual	--- 0.053 ppm	0.*18* ppm *0.030 ppm*
Sulfur Dioxide (SO_2)	1 hour 24 hour annual	--- 0.14 ppm 0.03 ppm	0.25 ppm 0.04 ppm ---
Suspended Particulates (PM_{10})	24 hour annual	150 $\mu g/m^3$	50 $\mu g/m^3$ 20 $\mu g/m^3$
Particulate Matter - Fine ($PM_{2.5}$)	24 hour annual	*35* $\mu g/m^3$ 15 $\mu g/m^3$	---------- 12 $\mu g/m^3$
Lead (Pb)	30 day average calendar quarter	--- 1.5 $\mu g/m^3$	1.5 $\mu g/m^3$ ---

Notes:
ppm = parts per million
$\mu g/m^3$ = micrograms per cubic meter
Source: California Air Resources Board, *April 1, 2008*.

In addition to being subject to the requirements of the CAA, air quality in California is also governed by more stringent regulations under the California Clean Air Act (CCAA). The California air pollutant standards are known as the California Ambient Air Quality Standards (CAAQS) and are generally more stringent than the NAAQS. CAAQS are shown in Table 4.3-1. Existing compliance (i.e., area "attainment") with the NAAQS and CAAQS for criteria pollutants is discussed below, along with existing pollutant concentrations.

At the federal level, the CAA is administered by the United States Environmental Protection Agency (US EPA). In California, the CCAA is administered by the California Air Resources Board (CARB) at the state level and by the Air Quality Management Districts at the regional and local levels. The project alternatives are located in the Sacramento Valley Air Basin (SVAB). The Sacramento Metropolitan Air Quality Management District (SMAQMD) is the agency principally responsible for air pollution control in the SVAB.

SMAQMD has developed daily construction and operations emissions thresholds for reactive organic gases (ROG) and nitrogen oxides (NO_x). Because SMAQMD does not have construction thresholds for CO sulphur oxides, (SO_x) or PM_{10}, the analysis conducted for the project alternatives used the federal emissions thresholds for these criteria pollutants. The federal daily construction and operations emissions thresholds are provided in Table 4.3-2.

4.3.1.2 EXISTING AIR QUALITY AND REGIONAL ATTAINMENT STATUS

The topography and climate of the SVAB combine to give the area high pollutant potential. Air quality within the SVAB is degraded by pollution from dense population centers, heavy vehicular traffic and industry – combined with meteorological influences.

Table 4.3-2: Federal Emissions Thresholds[1]

Pollutant	Pounds per Day
CO	550.0
ROG	140.0
NO_X	140.0
SO_X	550.0
PM_{10}	550.0

1. Federal thresholds are expressed in tons per year. For ease of comparison, the Federal thresholds have been converted to pounds per day.

Source: United States Code of Federal Regulations, Title 40, Part 51.

In summer months, air quality problems are created when a layer of warm valley air overlays a layer of cool air that blows in through the Carquinez Strait from San Francisco Bay. The warm upper layer forms a cap over the marine layer and inhibits the air pollutants from dispersing upward. The horizontal dispersal of the pollutants is limited by the surrounding mountains, and light summer breezes. This concentration of pollution allows the summer sunlight to generate high levels of smog.[1]

During the fall and winter, air quality problems in the SVAB result from carbon monoxide (CO) and nitrogen dioxide (NO_2) emissions. Since CO is produced almost entirely from automobiles, the highest CO concentrations in the SVAB are associated with heavy traffic. CO concentrations are generally worst during the morning commute, due to the large number of cars and cold temperatures – and around 10:00 p.m., due to stagnant atmospheric conditions trapping CO in the area. Nitrogen dioxide (NO_2) levels are also generally higher during autumn or winter days.

[1] Ozone in the lower atmosphere is the chief component of urban smog. It can damage vegetation and interfere with the transfer of oxygen to sensitive tissues in the heart and brain. In the upper atmosphere high levels of ozone occur naturally and have the beneficial effect of blocking harmful rays from the sun.

Existing air quality conditions in the region are reflected by measurements taken at SMAQMD monitoring stations. The nearest monitoring station to the LPAP2 alignment is the T Street monitoring station in Sacramento, which is approximately 8.7 miles north of the alignment. Criteria pollutants monitored at the T Street monitoring station include ozone, CO *(through 2005 only)*, NO_2, *fine particulate matter ($PM_{2.5}$)* and respirable particulate matter (PM_{10}). The nearest station that monitors sulfur dioxide (SO_2) *and CO from 2006 to 2007* is the Sacramento - Del Paso Manor monitoring station, which is approximately 10.9 miles north of the LPAP2 alignment. Historical data from the Sacramento – T Street and Del Paso Manor air monitoring stations were used to characterize existing conditions and to establish a baseline for estimating future conditions with and without the project alternatives.

Table 4.3-3 presents three years of data from the Sacramento – T Street and Del Paso Manor air monitoring stations to demonstrate pollution trends. SO_2 data are from the Del Paso Manor monitoring station; all other data are from the T Street station. The table also indicates federal and state standards for these pollutants, and where these pollutant standards have been exceeded.

Table 4.3-3: Air Quality Standards, Ambient Measurements and Violations, in the Project Vicinity

Pollutant	Federal Standard	State Standard	Year	Maximum Level	Violation Days (Federal/State)
Ozone (O_3) 1 hour	*N/A*	0.09 ppm	*2005* *2006* *2007*	*0.108* *0.106* *0.109*	*NA/4* *NA/6* *NA/2*
Ozone (O_3) 8 hour	*0.075* ppm	*0.07 ppm*	*2005* *2006* *2007*	*0.087* *0.090* *0.090*	*1/5* *3/14* *2/7*
Particulates (PM_{10}) 24 hours	150 µg/m^3	50 µg/m^3	*2005* *2006* *2007*	*53.0/55.0* *109.0/111.0* *53.4/57.4*	*0/4* *0/8* *0/5*
Particulates ($PM_{2.5}$) *Annual*	*15 µg/m^3*	*12 µg/m^3*	*2005* *2006* *2007*	*10.9/12.5* *NA/12.9* *11.9/NA*	*No/Yes* *NA/Yes* *No/NA*
Carbon Monoxide (CO) 8 hour	9.0 ppm	9.0 ppm	*2005* *2006* *2007*	*3.51* *3.49* *2.90*	*0/0* *0/0* *0/0*
Nitrogen Dioxides (NO_2)	0.053 ppm – annual	0.*18* ppm – 1 hr	*2005* *2006* *2007*	*0.016/0.071* *0.016/0.077* *0.015/0.064*	*0/0* *0/0* *0/0*
Sulfur Dioxide (SO_2)	0.14 ppm – 24 hr	0.25 ppm – 1 hr	*2005* *2006* *2007*	*0.003* *0.002* *0.004*	*0/0* *0/0* *0/0*

Notes:
ppm = parts per million
µg/m^3 = micrograms per cubic meter
NA = not available
Violation days = number of days exceeding federal or State standard
Source: California Air Resources Board Website, July *2008*.

As shown in Table 4.3-3, federal or State standards for carbon monoxide, nitrogen dioxide, or sulfur dioxide were not exceeded during the three-year period. *The State one-hour ozone standard was exceeded from two to six times between 2005 and 2007.* Federal standards for *eight-hour* ozone were exceeded one to three times between *2005* and *2007*; state ozone standards were exceeded two to six times during the same period. While the federal standard for PM_{10} was not exceeded, the State standard was exceeded *from one to eight times between 2005 and 2007. In addition, the federal $PM_{2.5}$ annual concentration was exceeded in 2005 and 2006.*

On the basis of regional monitoring data, the Sacramento County portion of the SVAB has been designated as a non-attainment area for ozone*, $PM_{2.5}$,* and PM_{10} under the California Clean Air Act. Under the federal Clean Air Act, it is classified as a "severe" non-attainment area for ozone and a "moderate" non-attainment area for PM_{10}.

An alternative would be considered to have a substantial contribution to an existing or project violation of federal Clean Air Act standards if the alternative were to emit pollutants at a level equal to or greater than five percent of the Clean Air Act standard.

4.3.1.3 AIR QUALITY CONFORMITY REQUIREMENTS

As amended in 1990, the federal Clean Air Act provides the current framework to ensure conformity of transportation projects with State Implementation Plans for air quality. The Clean Air Act defines conformity to mean:

> "Conformity to an implementation plan's purpose of eliminating or reducing the severity and number of violations of the national ambient air quality standards and achieving expeditious attainment of such standards . . ."

Section 176 of the Clean Air Act specifies that no federal agency may approve, support, or fund an activity that does not conform to the applicable implementation plan. In late 1993, the EPA promulgated final rules for determining conformity of transportation plans, programs, and projects. These final rules, contained in 40 CFR 93A (Code of Federal Regulations), govern the conformity assessment for the proposed project.

The SMAQMD is responsible for preparing air quality plans pursuant to the Federal and California Clean Air Acts. Under the Federal Clean Air Act, State Implementation Plans (SIPs) are required for areas that are designated as non-attainment for ozone, carbon monoxide, nitrogen dioxide, sulfur dioxide, or respirable particulate matter. For the SMAQMB, a SIP is required for ozone and PM_{10} since the region is currently designated as a federal non-attainment area for these pollutants. *The SMAQMB does not currently have a SIP that conforms to the federal 8-hour ozone requirements. Transportation conformity budgets were included in the Sacramento region's 8-hour ozone reasonable further progress plan for 2008.*[2] *These motor vehicle emissions were based on the CARB's improved emission factors (EMFAC2002 version2.2, Apr 03) and the travel activity projections prepared by the Sacramento Area Council of Governments (SACOG). In the March 14, 2006 Federal Register, US EPA found that the motor vehicle emissions budgets for 2008 were determined to be adequate for transportation conformity purposes. SACOG was able to demonstrate that the 2006 Metropolitan Transportation Plan and the 2006/08 Metropolitan Transportation Improvement Program for the Sacramento region were below the 2008 budgets.*

[2] *SMAQMD, Sacramento Regional Nonattainment Area 8-Hour Ozone Rate-of-Progress Plan, February 2006.*

The Sacramento Regional Nonattainment Area 8-Hour Attainment Demonstration Plan currently being developed will update the allowable motor vehicle emissions budgets for ROG and NO_X for 2008 using the new EMFAC model (EMFAC2007) and population and travel activity figures. In addition, it will establish new budgets for several other years up to and including the attainment deadline year. After US EPA finds these new budgets adequate, SACOG must demonstrate that emissions from subsequent transportation plans will be below the emission budget levels established in this new air quality plan.

On March 24, 2008, the EPA published in the Federal Register a finding of Failure to Submit the 2011 Reasonable Further Progress Plan for the SFNA in the Federal Register. The Failure to Submit finding triggered sanctions clocks, which includes offset sanctions (more stringent emission mitigation requirements for new and modified businesses if a complete plan is not submitted within 18 months after EPA findings of failure to submit the plan) and federal highway funding sanctions (prohibiting transportation projects from receiving federal transportation funding if a complete plan is not submitted within 24 months after EPA findings). The sanctions clocks will stop when the SMAQMD submits the 2011 Reasonable Further Progress Plan and the EPA accepts the plan as complete.

Regarding transportation conformity, the LPAP2 Project is included in the 2006 Metropolitan (Regional) Transportation Plan (MTP) and the 2007/2009 Metropolitan (Regional) Transportation Improvement Program, which have been found by SACOG and the United States Department of Transportation to conform with the Clean Air Act.

4.3.2 Air Quality Analysis Methodology

To evaluate the air quality impacts of the alternatives, four air quality analyses were completed. These were: a burden analysis, a carbon monoxide hot spot analysis for intersections, a carbon monoxide analysis for park and ride (PNR) lots, and a PM_{10} analysis of diesel bus idling. Each of these analyses is outlined below.

A burden analysis was conducted to estimate future air quality impacts based on vehicle miles traveled (VMT). There is a direct relationship between VMT and air pollution. Mobile emissions are the primary source of air pollution near the LPAP2 alignment. A transportation project that would measurably increase or decrease regional VMT would also degrade or improve air quality within the transportation corridor. Motor vehicle emissions factors for each criteria pollutant were derived using *EMFAC2007.* Criteria pollutant emissions were then determined using estimated VMT and the *EMFAC2007* emission factors.

A CO hot spot analysis was conducted at intersections affected by increased traffic as a result of operation of the alternatives. The dispersion model CAL3QHC was used to model CO concentrations with emissions factors input from *EMFAC2007*. Within the urban setting, vehicle exhaust is the main source of CO, and the highest concentrations of CO are found in the vicinity of busy intersections. To provide a "worst-case" simulation of CO concentrations, CO concentrations were modeled at sidewalk locations adjacent to two intersections anticipated to be the most congested based on their traffic levels of service: *Franklin/CRB* and CRB/Center Parkway.[4]

[4] Level of service is used to indicate the quality of traffic flow on roadway segments and at intersections. Level of service ranges from LOS A (free flow, little congestion) to LOS F (forced flow, extreme congestion). The three intersections that are analyzed in this report are anticipated to have an LOS of E or F under the LPAP2.

Impacts of CO emissions at proposed park-and-ride lots (PNR lots) were evaluated using the US EPA Industrial Source Short Term Complex (ISSTC) dispersion model. CO emissions of vehicles are typically higher during a "cold start" – when the engine is started after being turned off for a few hours – than when the engine is started while still warm. A "worst-case" scenario was used, assuming simultaneous cold starts of all vehicles occupying the largest PNR lot for each build alternative analyzed.

As part of the LPAP2, a 2,000 vehicle parking structure will be developed on the southeast portion of the CRC campus. Vehicles using the parking structures would be a source of localized CO emissions and, as such, a CO hot spot analysis was completed for operation of the parking structure. The analysis was also conducted for a 2,000 vehicle parking structure north of the CRC main entrance off of Bruceville Road.

Project build-out year *2030* emission rates were obtained for three miles per hour (mph) for idle emissions and five mph for vehicle movement in the parking structure. It was assumed that only light-duty automobiles and light-duty trucks would utilize the parking structure, and thus, the emission rates were normalized to account for only these two types of vehicles. Impacts of CO emissions at proposed parking structures were evaluated using the ISSTC dispersion model. Within ISSTC, each parking structure level was modeled as an area source.

Construction of a parking structure instead of a PNR surface lot would result in the redistribution of traffic along local roadway segments. As such, a CO hot spot analysis was conducted at intersections affected by the parking structure. CO concentrations were modeled at sidewalk locations adjacent to three intersections anticipated to be affected the most by implementation of one the parking structure design options: Old Calvine/Bruceville, Bruceville/Main College Entrance, and Old Calvine/Proposed Entrance to South Garage Option.

As shown in Table 4.3-6, CO concentrations are expected to be notably lower in *2030* than existing conditions due to stringent state and federal mandates for lowering vehicle emissions. Although traffic volumes would be higher in the future both with and without the implementation of the LPAP2, CO emissions from vehicles are expected to be much lower due to technological advances in vehicle emissions systems, as well as turnover in the vehicle fleet.[5] In other words, increases in traffic volumes are expected to be offset by increases in cleaner-running cars as a greater percentage of the entire vehicle fleet on the road.

A PM_{10} "hot spot" analysis was conducted to assess the impact of diesel buses idling as passengers board or leave the buses. The USEPA ISCST3 dispersion model was used to calculate PM_{10} concentrations at the transit stations. A "worst case" scenario was used, assuming that all buses serving the transit stations are diesel; however, the RT bus fleet includes buses powered by compressed natural gas (CNG), which is typically less polluting.

4.3.3 Impacts

Air quality construction impacts are provided in Chapter 5, Section 5.2.3. Air quality impacts associated with operation of the No-Action, TSM, and LPAP2 Alternatives are provided below.

[5] California Air Resources Board.

4.3.3.1 NO-ACTION ALTERNATIVE

Criteria pollutant emissions were estimated for the No-Action Alternative and the results were used to compare with the TSM and LPAP2 alternatives. Results of the burden analysis are shown in Table 4.3-4. Table 4.3-5 provides a comparison of the changes in criteria pollutant emissions that would result under the TSM and LPAP2 alternatives when compared to the No-Action Alternative. As shown in Table 4.3-5, the No-Action Alternative has higher criteria pollutant emissions than both the TSM and LPAP2 alternatives.

Table 4.3-4: Criteria Pollutant Emissions (Burden Analysis)

Project Alternative	Daily VMT (thousands)	Criteria Pollutant Emissions (pounds per day)					
		CO	ROG	NO_X	SO_X	PM_{10}	$PM_{2.5}$
No-Action	75,551	170,725.4	9,494.0	31,979.8	832.8	3,997.5	3,677.7
TSM	75,539	170,698.3	9,492.5	31,974.7	832.7	3,996.8	3,677.1
LPAP2	75,512	170,637.3	9,489.1	31,963.3	832.4	3,995.4	3,675.8

VMT = Vehicle miles of travel
Source: Terry A. Hayes Associates, 2008.

Table 4.3-5: Criteria Pollutant Emissions Comparison (Burden Analysis)

Project Alternative	INCREMENTAL CHANGE FROM NO-ACTION CONDITIONS						
	Daily VMT (thousands)	Criteria Pollutant Emissions (pounds per day)					
		CO	ROG	NO_X	SO_X	PM_{10}	$PM_{2.5}$
TSM vs. No-Action	-11	-27.1	-1.5	-5.1	-0.1	-0.6	-0.6
LPAP2 vs. No-Action	-38	-88.1	-4.9	-16.5	-0.4	-2.1	-1.9
LPAP2 vs. TMS	-27	-61.0	-3.4	-11.4	-0.3	-1.4	-1.3

VMT = Vehicle miles of travel
Source: Terry A. Hayes Associates, 2008.

Table 4.3-6 presents results of the CO hot spots analyses. As shown in Table 4.3-6, the No-Action Alternative one-hour CO concentrations would range from approximately 2.2 parts per million (ppm) to 2.3 ppm. Eight-hour CO concentrations would range from 1.5 ppm to 1.6 ppm. These estimates include the one- and eight-hour background concentrations of 1.9 ppm and 1.3 ppm, respectively. In both cases, CO concentrations are not anticipated to exceed the State or federal one-hour standards of 20 ppm and 35 ppm, respectively; nor are they anticipated to exceed the eight-hour state and federal CO standard of 9 ppm. Thus, there are no air quality impacts anticipated for the No-Action Alternative. The proposed project alternatives do not contain lead emissions sources. Therefore, emissions and concentrations related to this pollutant are not analyzed in this report.[6]

[6] Prior to 1978, mobile emissions were the primary source of lead resulting in air concentrations. Between 1978 and 1987, the phase-out of leaded gasoline reduced the overall inventory of airborne lead by nearly 95 percent. Currently, industrial sources are the primary source of lead resulting in air concentrations. Since the proposed project does not contain an industrial component, lead emissions are not analyzed in this report.

Table 4.3-6: Carbon Monoxide (CO) Concentrations (parts per million)						
	One-Hour Concentration			Eight-Hour Concentration		
Intersection	No-Action	TSM	LPAP2	No-Action	TSM	LPAP2
Franklin & CRB	2.2	2.2	2.2	1.5	1.5	1.5
Center Pkwy & CRB	2.3	2.3	2.2	1.6	1.6	1.5

Note: All concentrations include year 2030 one-hour ambient concentrations of 1.9 ppm. Assuming a typical persistence factor of 0.7, the estimated eight-hour ambient concentration in 2030 is approximately 1.3 ppm.

Source: Terry A. Hayes Associates, 2008.

4.3.3.2 TSM ALTERNATIVE

Burden Analysis. The results of the burden analysis indicate that the TSM Alternative will have a beneficial impact on air quality, due to the overall decrease in VMT, when compared with the No-Action Alternative. As shown in Table 4.3-5, regional criteria pollutant emissions are projected to decrease by 27.1 pounds per day (ppd) for CO, 1.5 ppd for ROG, 5.1 ppd for NO_X, 0.1 ppd for SO_X, 0.6 ppd for $PM_{2.5}$, and 0.6 ppd for PM_{10}, respectively, when compared to the No-Action Alternative.

CO Hot Spot Analysis. The CO hot spot analysis was completed using traffic data from the intersection analysis. As shown in Table 4.3-6, the TSM Alternative one-hour CO concentrations would range from approximately 2.2 parts per million (ppm) to 2.3 ppm. Eight-hour CO concentrations would range from approximately 1.5 ppm to 1.6 ppm.[7] In both cases, CO concentrations are not anticipated to exceed the State or federal one-hour standards of 20 ppm and 35 ppm, respectively; nor are they anticipated to exceed the eight-hour state and federal CO standard of 9 ppm. Thus, there are no air quality impacts anticipated for the TSM Alternative.

PNR Lot CO Hot Spot Analysis. The TSM Alternative would have a PNR lot at CRC. As discussed in Section 4.3.3.3, below, CO concentrations at this PNR lot would also not exceed the State or federal CO standards.

***$PM_{2.5}$ and* PM_{10} Hot Spot Analysis**. The $PM_{2.5}$ and PM_{10} hot spot analyses conducted for the LPAP2 (described below in Section 4.3.3.3) also posited a worst-case scenario, which assumed that all 80 buses required to serve the proposed LPAP2 LRT stations would run on diesel fuel. In contrast, the TSM Alternative would require the use of fewer buses (60), and many of these would run on CNG (all of RT's newer vehicles are fueled by CNG). It was predicted that ambient $PM_{2.5}$ and PM_{10} concentrations near the project site would exceed the State and federal standards. This analysis considered a project-related five percent increase in ambient concentrations to be a substantial change in concentration and a resulting significant impact. Since the project's incremental increase in $PM_{2.5}$ and PM_{10} concentrations would be less than five percent of the ambient concentration from the worst case analysis, it follows that $PM_{2.5}$ and PM_{10} concentrations from the TSM Alternative would also not exceed that five-percent threshold.

[7] One- and eight-hour CO concentrations include the 2030 background concentrations of 1.9 ppm and 1.3 ppm, respectively.

Summary. As shown in Table 4.3-5, operations of the TSM Alternative would decrease VMT in the region and thereby achieve emissions reductions in the region. Emissions of CO, ROG, NO_X, SO_X and PM_{10} under the TSM Alternative would be less than for the No-Action Alternative. The alternative is also not anticipated to create localized CO or PM_{10} Hot Spot impacts that exceed federal and state standards.

4.3.3.3 LPAP2

Burden Analysis. Results of the burden analysis (Table 4.3-5) indicate that the LPAP2 would have a beneficial impact on air quality. For the LPAP2, criteria pollutant emissions are anticipated to be reduced by approximately *88.1* ppd for CO, *4.9* ppd for ROG, *16.5* ppd for NO_X, *0.4* ppd for SO_X, *1.9 ppd for $PM_{2.5}$,* and *2.1* ppd for PM_{10}, when compared to the No-Action Alternative.

CO Hot Spot Analysis. The CO hot spot analysis was completed using traffic data from the intersection analysis.[8] As shown in Table 4.3-6, the LPAP2 one-hour CO concentrations *would be approximately 2.2* parts per million (ppm) and eight-hour CO concentrations *would be approximately 1.5* ppm. In both cases, CO concentrations are not anticipated to exceed the State or federal one-hour standards of 20 ppm and 35 ppm, respectively; nor are they anticipated to exceed the eight-hour state and federal CO standard of 9 ppm. Thus there are no air quality impacts anticipated for the LPAP2.

PNR Lot CO Hot Spot Analysis. The CRC PNR facility has the greatest number of parking spaces among the LPAP2's PNR lots, and it was, therefore, used for this the PNR lot CO analysis. Since the other PNR lots are smaller than the CRC PNR lot, CO concentrations at these smaller lots are anticipated to be lower since these PNR lots would have fewer cars. Assuming a worst-case scenario of simultaneous cold starts of all vehicles in this lot, it was estimated that the highest CO concentration would occur at the perimeter of the lot. The one-hour CO concentration in this area is anticipated to be approximately *2.2* ppm. The eight-hour CO concentration is estimated to be approximately *1.4* ppm.[9] These worst case levels are below the federal and State CO standards, and therefore CO concentrations from the PNR lots under the LPAP2 are not anticipated to exceed the State or federal CO standards. Since CO concentrations resulting from this worst case PNR lot were found not to exceed State or federal CO standards, it follows that CO concentrations from any of the other smaller LPAP2 PNR lots would not exceed those standards, even under worst case conditions.

The CRC parking structure under the LPAP2 would generate CO emissions as vehicles travel slowly through the structures and as they queue to enter or exit. Sensitive receptors at the perimeter of the parking structures may be exposed to increased CO concentrations.

Results of the dispersion analysis indicate that the one-hour CO concentration related to parking structure activity would *range from* approximately *2.5* ppm *to 2.7 ppm*. The eight-hour CO concentration would *range from* approximately *1.6* ppm *to 1.7 ppm*. These worst case levels are below the federal and State CO standards, and therefore CO concentrations from the parking structures under the LPAP2 are not anticipated to exceed the State or federal CO standards.

Implementation of one of the LPAP2 parking structure or the design option to the north would result in the redistribution of traffic along local roadway segments. The CO hot spot analysis was completed using traffic data from the intersection analysis. As shown in Table 4.3-7, one-hour and

[8] One- and eight-hour CO concentrations include the *2030* background concentrations of *1.9* ppm and *1.3* ppm, respectively.
[9] *Ibid.*

eight-hour CO concentrations are not anticipated to exceed the State or federal one-hour standards of 20 ppm and 35 ppm, respectively; nor are they anticipated to exceed the eight-hour state and federal CO standard of 9 ppm. Therefore, no impact is anticipated.

***$PM_{2.5}$ and* PM_{10} Hot Spot Analysis**. Under the LPAP2, areas near the proposed transit stations would likely experience increased concentrations of *$PM_{2.5}$ and* PM_{10} due to buses idling as passengers board or leave the buses. *It was predicted that ambient $PM_{2.5}$ and PM_{10} concentrations near the project site would exceed the State and federal standards. This analysis considered a project-related five percent increase in ambient concentrations to be a substantial change in concentration and a resulting significant impact.* The PM_{10} hot spot analysis indicated that the idling of diesel buses would incrementally increase the 24-hour PM_{10} concentration by approximately *0.4* µg/m^3*.The predicted future* ambient *PM_{10}* concentration *is 134.2* µg/m^3 *and the project incremental increase would be less than five percent of the ambient concentration. This would not be considered a substantial increase and the proposed project would not result in a PM_{10} hotspot.*

The $PM_{2.5}$ hot spot analysis indicated that the idling of diesel buses would incrementally increase the 24-hour $PM_{2.5}$ concentration by approximately 0.4 µg/m^3. The predicated future ambient $PM_{2.5}$ concentration is 77.6 µg/m^3 and the project incremental increase would be less than five percent of the ambient concentration. This would not be considered a substantial increase and the proposed project would not result in a $PM_{2.5}$ hotspot.

Table 4.3-7: Carbon Monoxide (CO) Concentrations With Parking Structure Design Options (parts per million)

Intersection	One-Hour Concentration		Eight-Hour Concentration	
	No-Action	LPAP2 – With Parking Structure	No-Action	LPAP2 – With Parking Structure
Old Calvine & Bruceville [1]	*2.6*	*2.7*	*1.6*	*1.7*
Bruceville & Main College Entrance [2]	*2.6*	*2.7*	*1.6*	*1.7*
Old Calvine & South Structure Entrance [3]	N/A	*2.5*	N/A	*1.6*

Note: All concentrations include year *2030* one-hour ambient concentrations of *1.91* ppm. Assuming a typical persistence factor of 0.7, the estimated eight-hour ambient concentration in *2030* is approximately *1.34* ppm.

[1] The highest CO concentrations would be during the AM peak hour.

[2] The highest CO concentrations would be during the AM peak hour.

[3] The highest CO concentrations would be during the AM peak hour. The intersection of Old Calvine & South Structure Entrance does not exist under No-Action.

Source: Terry A. Hayes Associates, *2008*.

Summary. As shown in Table 4.3-5, operations of the LPAP2 would decrease VMT in the region compared to the No-Action Alternative and thereby achieve emissions reductions in the region. Emissions of CO, ROG, NO_X, *$PM_{2.5}$,* and PM_{10} under the LPAP2 would be less than for the No-Action Alternative. The alternative is also not anticipated to create localized CO*, $PM_{2.5}$,* or PM_{10} Hot Spot impacts that exceed federal and state standards.

4.3.3.4 AIR QUALITY CONFORMITY

FTA cannot approve funding for project activities beyond preliminary engineering until it has reviewed the project in accordance with the EPA transportation air quality conformity regulations (40 CFR Part 93A) and has found that the project conforms. This regulation, which became effective in December 1993, establishes criteria for project conformity. The conformity criteria that the TSM or LPAP2 Alternative must satisfy are listed below, along with explanations of how these criteria have been met. *The US EPA recently issued new guidance for assessing potential conformity impacts. These documents, Transportation Conformity Guidance for Qualitative Hot-spot Analyses in $PM_{2.5}$ and PM_{10} Nonattainment and Maintenance Areas (March 2006) and Reflecting the Revised $PM_{2.5}$ National Ambient Air Quality Standards in NEPA Evaluations (June 25, 2007), were reviewed prior to completing the conformity analysis.*

Regional Conformity

Regional conformity must be determined based on a full study at least every three years. In California, it is determined at least every two years when the State-required Regional Transportation Plan (RTP) updates are completed. In addition, a new federal TIP is required every two years, for which a conformity determination is required. Amendments to both the RTP and (Transportation Improvement Plan) TIP between mandated conformity analysis also must have conformity demonstrated, including a full-scale revision of the regional analysis if regionally significant projects are added, deleted, or significantly modified. Regional conformity is demonstrated by showing that the project is included in a conforming RTP and TIP with substantially the same design concept and scope that was used for the regional conformity analysis. The design concept and scope of the proposed project is consistent with the regional goals, policies, and objectives in the 2006 Metropolitan (Regional) Transportation Plan (MTP) and the assumptions in the Sacramento Area Council of Governments (COG) most recently adopted regional emissions analysis. As such, the proposed project and alternatives conforms with federal regulation.

Project Level Conformity

Project level conformity is demonstrated by showing the proposed project would not cause localized exceedances of CO, $PM_{2.5}$, and/or PM_{10} standards, and would not interfere with "timely implementation" of Transportation Control Measures called out in the State Implementation Plan. As presented above, the TSM and the LPAP2 Alternatives would not result in a CO, $PM_{2.5}$, or PM_{10} hot spot. The TSM and the LPAP2 Alternatives would be consistent with Conformity regulations and there would not be a project-level conformity impact.

4.3.3.5 GLOBAL CLIMATE CHANGE

On September 27, 2006, Assembly Bill (AB) 32, the California Global Warming Solutions Act of 2006 was enacted by the State of California. The legislature stated that "global warming poses a serious threat to the economic well-being, public health, natural resources, and the environment of California." AB 32 caps California's greenhouse gas (GHG) emissions at 1990 levels by 2020. AB 32 defines GHG emissions as all of the following gases: carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons and sulfur hexaflouride. This bill represents the first enforceable Statewide program in the United States to cap all GHG emissions from major industries and include penalties for non-compliance. While acknowledging that national and international actions will be necessary to fully address the issue of global warming, AB 32 lays out a program to

inventory and reduce GHG emissions in California and from power generation facilities located outside the State that serve California residents and businesses.

AB 32 charges CARB with the responsibility to monitor and regulate sources of GHG emissions in order to reduce those emissions. CARB has adopted a list of discrete early action measures to reduce GHG emissions. By January 1, 2008, CARB must define the 1990 baseline emissions for California and adopt that baseline as the 2020 statewide emissions cap. CARB is then tasked to establish a set of rules that is scheduled for adoption by January 1, 2011, for reducing GHG emissions to achieve the emissions cap by 2020. These rules must take effect no later than 2012. In designing emission reduction measures, CARB must aim to minimize costs, maximize benefits, improve and modernize California's energy infrastructure, maintain electric system reliability, maximize additional environmental and economic co-benefits for California, and complement the State's efforts to improve air quality.

At this time, the USEPA does not regulate GHG emissions. In April 2007, the USEPA issued an important ruling in its first case on global warning. In the case of Massachusetts v. USEPA, the United States Supreme Court reviewed a USEPA decision not to regulate GHG emissions from cars and trucks under the Clean Air Act. The Court found that Massachusetts was injured by global warming. The lawsuit focused on Section 202 of the Clean Air Act. The case resolved the following legal issues: (1) the Clean Air Act grants the USEPA authority to regulate GHG emissions, and (2) USEPA did not properly exercise its lawful discretion in deciding not to promulgate regulations.

LPAP2 would result in a reduction of approximately 4,168,000 vehicle miles traveled per year by 2030 over No-Action conditions. The removal of these vehicle miles from the roadway system would directly reduce regional GHG emissions. For example, implementation of the proposed project would reduce carbon dioxide emissions by approximately 772.6 tons per year. The proposed project would also reduce methane and nitrous oxide emissions. The proposed project would reduce regional vehicle miles traveled and associated GHG emissions thus providing a net benefit of GHG emissions.

4.3.4 Mitigation Measures

The alternatives would result in beneficial air quality impacts during their operation, and therefore no mitigation is indicated.

4.4 BIOLOGICAL RESOURCES

4.4.1 Regulatory Context

Federal Endangered Species Act. The Federal Endangered Species Act (ESA) of 1973, (16 U.S.C. 1531-1543) provides a means to conserve the ecosystems upon which endangered species and threatened species depend. It also provides a program for the conservation of such endangered and threatened species. Section 7 requires each federal agency, in consultation with and with the assistance of the Secretary of the Interior, U.S. Fish and Wildlife Service (USFWS), to ensure that actions authorized, funded, or carried out by the agency do not jeopardize the continued existence of any endangered or threatened species, or result in the destruction or adverse modification of habitat of such species, unless the agency has been granted an exemption for the proposed action. Consistent with this requirement a listing of threatened, endangered, and candidate species that may occur in the vicinity of the project alternatives was requested from the USFWS.

Migratory Bird Treaty Act. The Migratory Bird Treaty Act establishes a federal prohibition, unless permitted by regulations, to "pursue, hunt, take, capture, kill, attempt to take, capture or kill, possess, offer for sale, sell, offer to purchase, purchase, deliver for shipment, ship, cause to be shipped, deliver for transportation, transport, cause to be transported, carry, or cause to be carried by any means whatever, receive for shipment, transportation or carriage, or export, at any time, or in any manner, any migratory bird, included in the terms of this Convention . . . for the protection of migratory birds . . . or any part, nest, or egg of any such bird."

Section 404 of the Clean Water Act. The U.S. Army Corps of Engineers (ACOE) has jurisdiction over wetlands and other waters of the United States, through Section 404 of the Clean Water Act. Hydrophytic vegetation, wetland hydrology and hydric soils all must be present to qualify a site as a jurisdictional wetland (Environmental Laboratory 1987) as defined in Section 404 of the Clean Water Act. The ACOE requires that: (1) impacts to wetlands be avoided; (2) unavoidable impacts be minimized to the maximum extent practicable; and (3) when unavoidable, impacts be mitigated to achieve no-net-loss of wetland functions and values. A Memorandum of Understanding among the western states establishes a multi-agency NEPA-404 integration process, and FHWA has established interim thresholds that invoke this process when projects would affect 5 acres of special aquatic sites or 5 acres of other waters of the U.S. The NEPA-404 integration process is not applicable to the present project.

Executive Order 11990 - Protection of Wetlands. Executive Order 11990 requires that federal agencies implement the following procedures for any federal action that involves wetlands: (1) provide an opportunity for early public involvement; (2) consider alternatives that would avoid wetlands, and if avoidance is not possible, measures to minimize harm to wetlands must be included in the action; (3) prepare a "Wetlands Only Practicable Alternative Finding" for actions that require an EIS.

USDOT Order 5660.1A – Preservation of the Nation's Wetlands. The U.S. Department of Transportation (USDOT) Order 5660.1A sets forth USDOT policy for interpreting Executive Order 11990, Protection of Wetlands, as described above. It requires that transportation facilities be planned, constructed and operated to assure protection, preservation, and enhancement of the nation's wetlands to the fullest extent practicable, and it establishes procedures for implementation of the policy.

Executive Order 13112: Prevention and Control of Invasive Species. Directs federal agencies to prevent and control introductions of invasive species in a cost-effective and environmentally sound matter. Each federal agency whose actions may affect the status of invasive species shall, to the extent practicable and permitted by law, subject to the availability of appropriations, and within Administration budgetary limits, use relevant programs and authorities to: (i) prevent the introduction of invasive species; (ii) detect and respond rapidly to and control populations of such species in a cost-effective and environmentally sound manner; (iii) monitor invasive species populations accurately and reliably; (iv) provide for restoration of native species and habitat conditions in ecosystems that have been invaded; (v) conduct research on invasive species and develop technologies to prevent introduction and provide for environmentally sound control of invasive species; and (vi) promote public education on invasive species and the means to address them. It established a Invasive Species Council (ISC) composed of federal agencies and departments and a supporting Invasive Species Advisory Committee (ISAC) composed of state, local, and private entities. NISC and ISAC prepared a national invasive species management plan that recommends objectives and measures to implement the Executive Order and to prevent the introduction and spread of invasive species.

California Streambed Alteration Agreement. The California Department of Fish and Game (CDFG) focuses on minimizing and otherwise mitigating adverse effects on wetland communities that provide wildlife habitat through section 1600, et seq., of the State Fish and Game Code (Streambed Alteration Agreement). All ACOE wetlands are CDFG wetlands; however, CDFG wetlands also include habitat with hydrophytic vegetation regardless of whether the habitat meets the hydrology or hydric soils criteria. CDFG's requirements regarding avoidance and mitigation of impacts are identical to the ACOE requirements listed above.

Fully Protected Species. The California Fish and Game Code provides protections from take for a variety of species. Certain species are considered fully protected. Fully protected species or parts thereof may not be taken or possessed at any time, except as provided in Section 2081.7 of the Fish and Game Code. No provision of the Fish and Game Code or any other law shall be construed to authorize the issuance of permits or licenses to take any fully protected species, and no permits or licenses heretofore issued shall have any force or effect for that purpose. However, the department may authorize the taking of those species for necessary scientific research, including efforts to recover fully protected, threatened, or endangered species. Lists of the fully protected species are provided in Sections 3511 (birds), 4700 (mammals), 5050 (amphibians and reptiles), and 5515 (fishes) of the Fish and Game Code.

California Endangered Species Act. The California Endangered Species Act, (Fish and Game Code, Section 2050, et seq.) declares that it is the policy of the state to conserve, protect, restore, and enhance any endangered species or any threatened species and its habitat. It requires state lead agencies to adopt reasonable and prudent alternatives or modifications to a project when the CDFG finds that the project would jeopardize the continued existence of such species or result in the destruction or adverse modification of habitat essential to the continued existence of such species.

California Native Plant Protection Act. The California Native Plant Protection Act, (Fish and Game Code 1900-1913) requires all state agencies to utilize their authority to carry out programs to conserve endangered and rare native plants.

City of Sacramento Heritage Tree Ordinance. *The City of Sacramento Municipal Code (Title 12, Chapter 12.64) defines a "heritage tree" as:*

- *Any tree of any species with a trunk circumference of one hundred (100) inches [32-inch diameter at breast height (DBH)] or more, which is of good quality in terms of health, vigor of growth and conformity to generally accepted horticultural standards of shape and location for its species;*
- *Any native Quercus species (oak), Aesculus californica (California buckeye), or Platanus racemosa (California sycamore), having a circumference of thirty-six (36) inches [11.5-inch DBH] or greater when a single trunk, or a cumulative circumference of thirty-six (36) inches [11.5-inch DBH] or greater when a multi-trunk;*
- *Any tree thirty-six (36) inches [11.5-inch DBH] in circumference or greater in a riparian zone. The riparian zone is measured from the center line of the water course to thirty (30) feet beyond the high water line; or*
- *Any tree, grove of trees or woodland trees designated by resolution of the city council to be of special historical or environmental value or of significant community benefit. (Prior code § 45.04.211).*

During construction activity on any property upon which is located a heritage tree, the following rules shall apply. Unless the express written permission of the director is first obtained, no person shall:

- *Change the amount of irrigation provided to any heritage tree from that which was provided prior to the commencement of construction activity;*
- *Trench, grade or pave into the drip line area of a heritage tree;*
- *Change, by more than two feet, grade elevations within thirty (30) feet of the drip line area of a heritage tree;*
- *Park or operate any motor vehicle within the drip line area of any heritage tree;*
- *Place or store any equipment or construction materials within the drip line area of any heritage tree;*
- *Attach any signs, ropes, cables or any other items to any heritage tree;*
- *Cut or trim any branch of a heritage tree for temporary construction purposes;*
- *Place or allow to flow into or over the drip line area of any heritage tree any oil, fuel, concrete mix or other deleterious substance.*

Where written permission of the director is sought under this section, the director may grant such permission with such reasonable conditions as may be necessary to effectuate the intent and purpose of this chapter. (Prior code § 45.04.216).

CEQA Guidelines. Section 15380 of the California Environmental Quality Act (CEQA) Guidelines, identifies impacts to California species of special concern (CSC) and California Native Plant Society (CNPS) lists 1B and 2 species as significant if a proposed project would result in one of the following: a) direct mortality, b) permanent loss of existing habitat, c) temporary loss of habitat that may result in increased mortality or lowered reproductive success, or d) avoidance of biologically important habitat for substantial periods that increases mortality or causes lower reproductive success.

4.4.2 Methodology

Study Area. For purposes of the biological resources analysis, the study area was defined as the area within the LPAP2 footprint and directly adjacent to the footprint that would be directly affected by project impacts to biological resources.

Data, Research and Resources. Data sources consulted for the biological resources evaluations included the California Natural Diversity Database (CNDDB) for sensitive species reported in the project vicinity; the California Native Plant Society (CNPS) list; updated habitat maps; and a listing of endangered, threatened, proposed and candidate species requested from the USFWS, the *SRCSD Bufferlands Master Plan* and the *ACOE South Sacramento County Streams Investigation EIS/EIR*. The research and methodology for the biological studies conducted in preparation of this SDEIS/SDEIR are detailed in this document as well as the *Wetlands Delineation Report* and *Biological Assessment* that are summarized below. The reports are available for review at RT's offices.

Field Surveys. A field survey was conducted of the portions of the project study area in February 2002. On June 26, August 15, August 21, 2002, and May 18, 2004, biologists conducted foot surveys of the project area to determine which, if any, special status plants and/or wildlife habitat occur in the project area. Detailed species-specific studies were not conducted for wildlife during this field inventory; therefore, all areas with at least a moderate potential to provide suitable habitat for a particular special-status species were evaluated in the inventory. A delineation of wetlands and other

waters of the U.S. were also conducted on these dates. Additional wetland delineation fieldwork was conducted in April and June 2005.

Special-status plant surveys were conducted within the project study area on May 18 and June 27, 2006. Elderberry surveys were conducted coincident with the special-status plant surveys and during a subsequent visit on July 18, 2006. The elderberry shrubs located on the SRCSD Bufferlands, adjacent to Franklin Boulevard, were not surveyed during this effort as they were previously surveyed by a Jones and Stokes biologist (City of Sacramento and the Federal Highway Administration 2006).

Consultations with Resource Agencies. A delineation of potential jurisdictional wetlands and other waters of the U.S. in the project area was prepared and submitted to the ACOE in February 2005. The ACOE reviewed the various sites in the field on March 20, 2006 and returned their jurisdictional determination on May 17, 2006 (Regulatory Branch File No. 200500580). A copy of ACOE letter is included in Appendix E. The USFWS was initially contacted on February 11, 2002 for a listing of endangered, threatened, and candidate species that may occur in the project area. A subsequent request for a listing was made in August 2002 to address special-status species at locations of additional facilities proposed with the project. An official list of federally listed, proposed, and candidate species that may potentially occur within the "Florin, California" 7.5-minute quadrangle was created using the USFWS database on July 10, 2006 (USFWS 2006). Copies of the listings received from the USFWS on August 27, 2002 and July 10, 2006 are included in Appendix E. The *Preliminary Biological Assessment* was submitted to USFWS in October 2006. *A revised Biological Assessment was prepared to address modifications to the project and comments provided by the USFWS, which was subsequently submitted to the USFWS in November 2007. The USFWS issued a Biological Opinion (BO) (81420-2008-F-0285) for the project on April 18, 2008. (See Appendix J)*

4.4.3 Overview of Existing Natural Resources

4.4.3.1 VEGETATION AND WILDLIFE

Biological communities within the project corridor include non-native annual grassland, ruderal/disturbed sites and agricultural fields, vernal pools, seasonal and freshwater marsh, and Great Valley mixed riparian forest. A description of each community and its associated wildlife assemblage is provided below. Figures 4.4-1 and 4.4-2 show the general locations of the habitat areas.

Non-native Grassland. This community is typically found on fine-textured, usually clay soils, which may range from moist, possibly even waterlogged, during the rainy season to very dry during the dry season. It is primarily composed of non-native annual grasses; however, a number of native annual forbs ("wildflowers") may also be present during years of favorable precipitation. Non-native grassland communities are found in the valleys and foothills throughout much of the state. Characteristic species include *Avena* spp., *Bromus* spp., Italian ryegrass (*Lolium multiflorum*), California poppy (*Eschscholzia californica*), lupine (*Lupinus* spp.), and baby blue-eyes (*Nemophila menziesii*). Grasslands provide foraging and nesting habitat for a wide variety of wildlife species including raptors, seed eating birds, small mammals, amphibians, and reptiles. Wildlife species typically associated with grasslands include western skink (*Eumeces skiltonianus*), Pacific gopher snake (*Pituophis melanoleucus catenifer)*, common garter snake (*Thamnophis sirtalis*), deer mouse (*Peromyscus maniculatus)*, western harvest mouse (*Reithrodontomys megalotis*), California vole (*Microtus californicus*), black-tailed deer (*Odocoileus hemionus),* western meadowlark (*Sturnella neglecta*), and savannah sparrow (*Passerculus sandwichensis*). Grasslands also provide important foraging habitat for raptors such as the American kestrel (*Falco sparverius*), white-tailed kite (*Elanus*

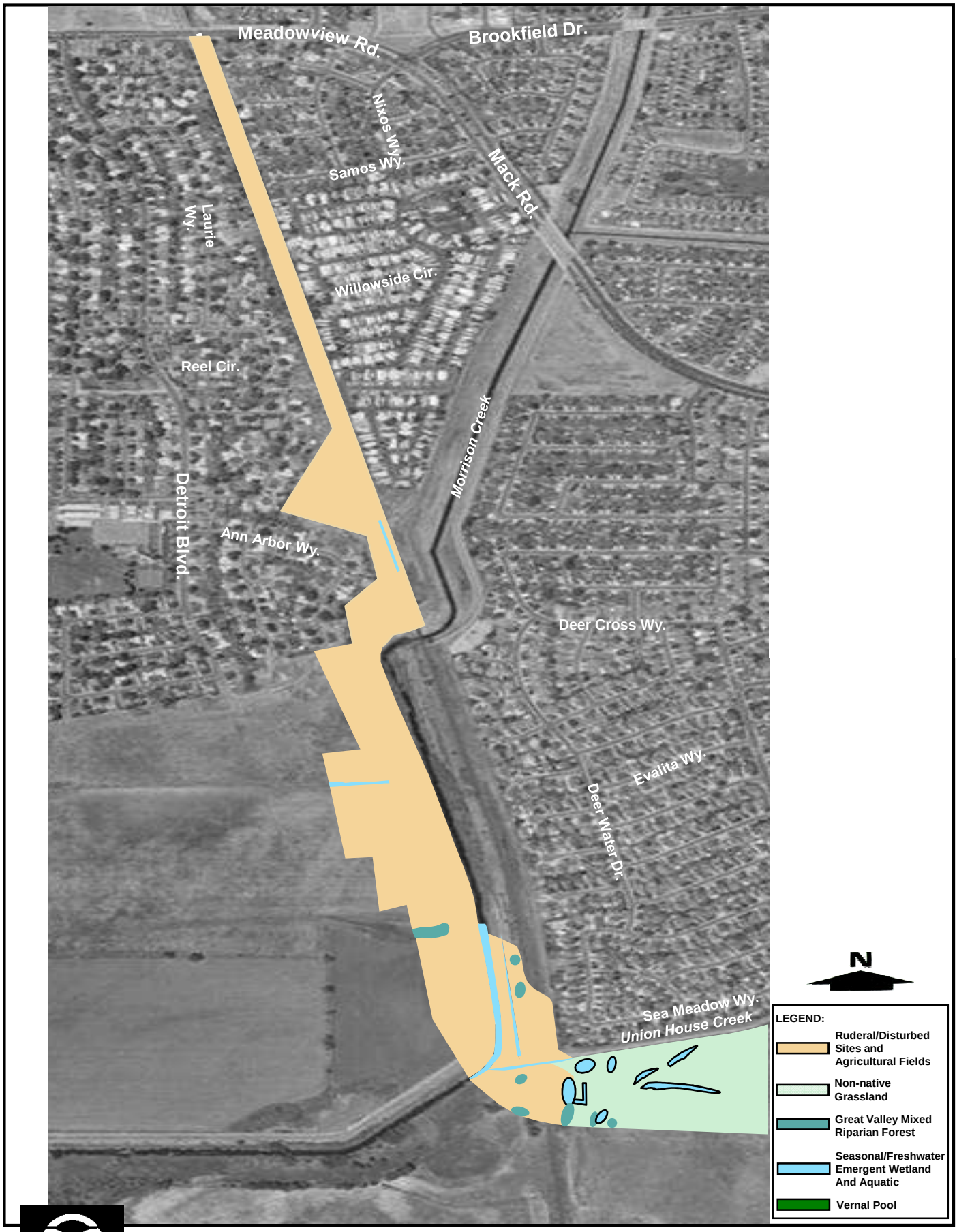
leucurus), northern harrier (*Circus cyaneus*), and red-tailed hawk *(Buteo jamaicensis*). Within the project area, non-native grasslands occur on the Sacramento Regional County Sanitation District (SRCSD) Bufferlands, in the open rangeland between CRC and SR 99 north of Cotton Lane, and between Old Calvine Road and Calvine Road near Strawberry Creek. SRCSD Bufferland areas have been previously mapped as "annual grassland" (Jones & Stokes Associates, Inc. 2000).

Ruderal/Disturbed Sites. Within the project vicinity, ruderal/disturbed communities (including remnant landscape ornamental plantings) occur along the UPRR right-of-way, on the upland sides of the excavated channels of Morrison and Union House Creeks, west of Morrison Creek, within the SRCSD Bufferland areas, in the area between CRB and Union House Creek, adjacent to Bruceville Road and CRC. This community type encompasses urban development, highly disturbed vegetation communities, highly eroded/disturbed areas, erosion control areas, and active or fallow croplands. The ruderal areas observed within the area that would be disturbed by the project typically had a high incidence of exotic plant invasion. Commonly identified exotics include fennel (*Foeniculum vulgare*), black mustard (*Brassica nigra*), and yellow star-thistle (*Centaurea soltitialis*).

A distinguishing characteristic of urban habitats is the mixture of native and exotic plant species. Exotic plant species may provide valuable habitat elements such as cover for nesting and roosting, as well as food sources such as nuts or berries. Native and introduced animal species that are tolerant of human activities often thrive in urban habitats. These species include western fence lizard (*Sceloporus occidentalis*), barn swallow (*Hirundo rustica*), European starling (*Sturnus vulgaris*), house sparrow (*Passer domesticus*), house finch (*Carpodacus mexicanus*), house mouse (*Mus musculus*), raccoon (*Procyon lotor*), striped skunk (*Mephitis mephitis*), and Virginia opossum (*Didelphis virginianus)*.

Vernal Pools. *Vernal pools are a unique habitat type formed in depressions in valley grasslands, often on terrace soils. The principal terrace soil in the project area belongs to the San Joaquin series, as mapped by the Natural Resources Conservation Service (NRCS). The impervious nature of the underlying hardpan clay soil allows water to form pools during the rainy season. An example of hardpan (known as durapan) was seen at the base of the ditch west of Strawberry Creek. During the hot summer months, evaporation causes the pools to dry completely. Due to the extreme differences in the seasonal composition of this habitat, many of the species that it supports are completely dependent on this habitat type for their existence. Almost half of the known California special-status plants are associated with vernal pools. These species include dwarf downingia (Downingia humilis), Bogg's Lake hedge-hyssop (Gratiola heterosepela), legenere (Legenere limosa), slender Orcutt grass (Orcuttia tenuis), and Sacramento Orcutt grass (Orcuttia viscida). Wildlife species that are dependent upon vernal pool habitats include special-status invertebrates such as vernal pool fairy shrimp (Branchinecta lynchi), midvalley fairy shrimp (Branchinecta mesovallensis), vernal pool tadpole shrimp (Lepidurus packardi), and California linderiella (Linderiella occidentalis). Additionally, a number of amphibian species such as Pacific treefrog (Hyla regilla) utilize vernal pools to lay their eggs and complete their life cycle.*

A single, degraded vernal pool occurs within the project footprint. The pool is located south of Union House Creek on the SRCSD Bufferlands west of Franklin Boulevard. A topographic depression exists at this location that is vegetated with pennyroyal (*Mentha pulegium*), bracteate allocarya (*Plagiobothrys* [*Allocarya*] *bracteata*), *curly dock (Rumex crispus), rough cockle-bur (Xanthium spinosum), and creeping spikerush (Eleocharis macrostachya).*



Regional Transit

South Sacramento Corridor
Phase 2 Project

GENERAL VEGETATION MAP
Figure 4.4-1

N

LEGEND:

- Ruderal/Disturbed Sites and Agricultural Fields
- Non-native Grassland
- Great Valley Mixed Riparian Forest
- Seasonal/Freshwater Emergent Wetland And Aquatic
- Vernal Pool

Regional Transit

South Sacramento Corridor
Phase 2 Project

GENERAL VEGETATION MAP
Figure 4.4-2

Seasonal and Freshwater Emergent Wetlands. Seasonal wetlands, including the floor of flood control channels, unlike vernal pools, are often formed when humans excavate ditches and depressions. Former vernal pools and marsh that have been partially filled with rock, soil, and debris often change into seasonal wetlands by becoming populated by plants species such as creeping spikerush, water knotweed (*Polygonum lapathifolium*), water evening primrose (*Ludwigia peploides*), alkali wildrye (*Leymus triticoides*), *annual rabbit-foot* grass (*Polypogon monspeliensis*), barnyard grass (*Echinochloa crus-gallii*), and *tall flat*sedge (*Cyperus eragrostis*). These plant species are either low-growing, tenacious perennials that tolerate the annual maintenance activities being carried out in the channels, or are annuals that tolerate seasonal wetness and produce seed for the next season but later die. The edges of these wetlands are often dominated by non-native annual weeds including annual ryegrass (*Lolium perenne*), alkali mallow (*Malvella leprosa*), peppergrass (*Lepidium latifolium*), bristly ox-tongue (*Picris echoides*), and mat-forming perennials such as frog-bit (*Phyla nodiflora*). Seasonal wetlands occur just south of Meadowview Road, west of the Morrison Creek levee, north and south of the confluence of Morrison Creek and Union House Creek in the UPRR right-of-way, on the floor of both Morrison Creek and Union House Creek, and in the ruderal field in the northeast corner of the CRC campus.

Freshwater marshes are among the most productive wildlife habitats in California. They provide food, cover, and water for more than 160 species of birds, and a variety of mammals, reptiles, and amphibians. Species that could utilize these areas in the project vicinity include Pacific treefrogs, bullfrogs (*Rana catesbeiana*), giant garter snake (*Thamnophis gigas*), and western pond turtle (*Clemmys marmorata*).

Great Valley Mixed Riparian Forest. This community is found on relatively fine-grained alluvial soils and clays located away from river channels but subject to over bank flooding, which recharges groundwater. When not disturbed by farming and urbanization, this plant community is a tall, dense, winter-deciduous, broadleafed riparian forest. Characteristic species include red willow (*Salix laevigata*), Gooding's willow (*Salix gooddingii*), shining willow (*S. lucida* ssp. *lasiandra*), Fremont cottonwood (*Populus fremontii*), box elder (*Acer negundo* var. *californicum*), western sycamore (*Platanus occidentalis*), and black walnut (*Juglans californica* var. *hindsii*). Great Valley mixed riparian forest may provide a wide range of resources to wildlife, such as movement and migration corridors, cover (nesting, resting, thermal, etc.), water, and a variety of foraging opportunities. Examples of wildlife that may occur in this community include the Pacific treefrog, bushtit (*Psaltriparus minimus*), Wilson's warbler (*Wilsonia canadensis*), black phoebe (*Sayornis nigricans*), Anna's hummingbird (*Calypte anna*), spotted towhee (*Pipilo maculatus*), raccoon, Virginia opossum, European starling (*Sturnus vullgaris*), American crow (*Corvus brachyrhynchos*), western scrub jay (*Aphelocoma californica*), house finch, house mouse, and Norway rat (*Ratus norvegicus*). Great Valley mixed riparian forest is found in small remnant patches north of Morrison Creek, west of the Morrison Creek levee, between the channel of Morrison Creek and the existing UPRR tracks, and in remnant patches south of Union House Creek on the SRCSD Bufferlands.

4.4.3.2 INVASIVE SPECIES

The introduction and spread of invasive plant species can result in a number of deleterious effects including, but not limited to, displacement of native plants and wildlife. For the purposes of this document, noxious weeds include species listed by the California Invasive Plant Council (Cal-IPC) and the California Department of Food and Agriculture (CDFA). Table 4.4-1 identifies invasive plant species from these two lists that have been observed in the project area. The majority of these species were observed within the non-native grassland communities and ruderal/disturbed sites, as described in Section 4.4.3.1, Vegetation and Wildlife.

Table 4.4-1: Noxious Weeds Observed Within the Project Area

Scientific Name	Common Name	Cal-IPC[1]	CDFA[2]
Brassica rapa	Field mustard	Limited	--
Bromus diandrus	Ripgut brome	Moderate	--
Bromus hordeaceus	Soft brome	Limited	--
Carduus pycnocephalus	Italian thistle	Moderate	C
Centaurea solstitialis	Yellow star-thistle	High	C
Cirsium vulgare	Bull thistle	Moderate	*
Convolvulus arvensis	Field bindweed	Not Listed	C
Cynodon dactylon	Bermuda grass	Moderate	C
Dittrichia graveolens	Stinkwort	Moderate	--
Erodium cicutarium	Filaree	Limited	--
Eucalyptus globulus	Blue gum	Moderate	--
Foeniculum vulgare	Sweet fennel	High	--
Geranium dissectum	Cut-leaved geranium	Moderate	--
Hordeum marinum	Mediterranean barley	Moderate	--
Hordeum murinum	Barley	Moderate	--
Lepidium latifolium	Peppergrass	High	B
Lolium multiflorum	Ryegrass	Moderate	--
Ludwigia peploides	Water primrose	High	--
Lythrum hyssopifolia	Hyssop loosestrife	Moderate	--
Malvella leprosa	Alkali mallow	Not listed	C
Medicago polymorpha	Bur clover	Limited	--
Mentha pulegium	Pennyroyal	Moderate	--
Picris echioides	Bristly Ox-Tongue	Limited	--
Plantago lanceolata	English plantain	Limited	--
Poa pratensis spp. *pratensis*	Kentucky bluegrass	Limited	--
Polypogon monspeliensis	Annual rabbit-foot grass	Limited	--
Raphanus sativus	Purple wild radish	Limited	--
Rubus discolor	Himalayan blackberry	High	--
Rumex acetosella	Sheep sorrel	Moderate	--
Rumex crispus	Curly dock	Limited	--
Salsola tragus	Russian thistle	Limited	C
Silybum marianum	Milk thistle	Limited	--
Taeniatherum caput-medusae	Medusahead grass	High	C
Vinca major	Greater periwinkle	Moderate	--
Vulpia myuros	Rat-tail vulpia	Moderate	--

[1] Cal-IPC ratings are defined as follows:

High = These species have severe ecological impacts on physical processes, plant and animal communities, and vegetation structure. Their reproductive biology and other attributes are conducive to moderate to high rates of dispersal and establishment. Most are widely distributed ecologically.

Moderate = These species have substantial and apparent, but generally not severe, ecological impacts on physical processes, plant and animal communities, and vegetation structure. Their reproductive biology and other attributes are conducive to moderate to high rates of dispersal, though establishment is generally dependent upon ecological disturbance. Ecological amplitude and distribution may range from limited to widespread.

Limited = These species are invasive but their ecological impacts are minor on a statewide level or there was not enough information to justify a higher score. Their reproductive biology and other attributes result in low to moderate rates of invasiveness. Ecological amplitude and distribution are generally limited, but these species may be locally persistent and problematic.

Table 4.4-1: Noxious Weeds Observed Within the Project Area
[2] CDFA categories are defined as follows: **B** = An organism of known economic importance subject to: eradication, containment, control or other holding action at the discretion of the individual county agricultural commissioner. **C** = An organism subject to no state enforced action outside of nurseries except to retard spread. At the discretion of the commissioner. An organism subject to no state enforced action except to provide for pest cleanliness in nurseries.

Mitigation measures to prevent the introduction or spread of invasive species are described in Section 5.2.4.2, Biological Resources (Mitigation Measures).

4.4.3.3 SPECIAL-STATUS SPECIES

Special-status plant and wildlife species are species that have been afforded special recognition and protection by federal, state, and/or local resource conservation agencies and organizations. These species are generally considered rare, threatened, or endangered due to declining or limited populations.

RT contacted the USFWS for a listing of threatened, endangered, and candidate species that may occur in the project vicinity. A species list that included the giant garter snake (federally listed as threatened) and other federal special-status species was provided by the USFWS on August 27, 2002 and a subsequent list was obtained on July 10, 2006. Copies of the USFWS listings are included in Appendix E. Table 4.4-2 reviews the species of plants and animals that have special-status for one or more of the following reasons: (1) they are listed as threatened or endangered by USFWS or California Fish and Game Commission; (2) they are candidates or proposed for such listing; (3) they are designated species of special concern by CDFG; (4) plants considered by the California Native Plant Society (CNPS) to be "rare, threatened, or endangered in California" (Lists 1B and 2); (5) fully protected in California in accordance with the California Fish and Game Code, Sections 3511 (birds), 4700 (mammals), 5050 (amphibians and reptiles), and 5515 (fishes); and (6) birds designated as Birds of Conservation Concern by the USFWS; and evaluates the potential for each species to occur in the project area.

The study area is the maximum footprint of the proposed LPAP2 and the areas immediately adjacent - i.e., the area that would be directly affected by project impacts to sensitive species. Table 4.4-2 identifies the special-status species that have the potential to occur within the project area based on the presence of even marginally suitable habitat. They include up to six plants, five invertebrates, two reptiles and 13 bird species. Discussion of these species is provided below.

Natural Communities of Special Concern. Important natural communities are vegetation communities documented within the CDFG *Preliminary Descriptions of the Terrestrial Natural Communities of California* (Holland 1986) and the California Natural Diversity Data Base (CNDDB) as sensitive communities due to restricted distribution and/or threats. Northern hardpan vernal pool is the only sensitive plant community that has been previously documented within the project vicinity. In addition, degraded remnants of Great Valley mixed riparian forest, a natural community of special concern, occur within the project area, but were not previously identified in the CNDDB. Detailed descriptions of these communities are described above in Section 4.4.3.1.

Table 4.4-2: Special-Status Plant and Wildlife Species with Potential to Occur in the Study Area

Species	Federal	State	Other	Habitat Association	Potentially Suitable Habitat in Study Area	Potential Effect by Project
Plants						
Dwarf downingia *Downingia pusilla*	--	--	CNPS List 2	Valley and foothill grassland and vernal pools.	Degraded vernal pool south of Union House Creek.	Unlikely to affect. Species was not observed within the project area during rare plant surveys conducted in 2006.
Bogg's Lake hedge-hyssop *Gratiola heterosepala*	--	SE	CNPS List 1B	Marshes and swamps (lake margins) vernal pools/clay.	Degraded vernal pool south of Union House Creek.	Unlikely to affect. Species was not observed within the project area during rare plant surveys conducted in 2006.
Legenere *Legenere limosa*	--	--	CNPS List 1B	Vernal pools.	Degraded vernal pool south of Union House Creek.	Unlikely to affect. Species was not observed within the project area during rare plant surveys conducted in 2006.
Sacramento Orcutt grass *Orcuttia viscida*	FE	SE	CNPS List 1B	Vernal pools.	Degraded vernal pool south of Union House Creek.	Unlikely to affect. Species was not observed within the project area during rare plant surveys conducted in 2006.
Slender Orcutt grass *Orcuttia tenuis*	FT	SE	CNPS List 1B	Vernal pools.	Degraded vernal pool south of Union House Creek.	Unlikely to affect. Species was not observed within the project area during rare plant surveys conducted in 2006.
Sanford's arrowhead *Sagittaria sanfordii*	--	--	CNPS List 1B	Marshes and swamps, slow moving creeks and ditches (assorted shallow freshwater).	Morrison and Union House creeks, drainage features and select seasonal wetlands.	Unlikely to affect. Species was not observed within the project area during rare plant surveys conducted in 2006.

Table 4.4-2: Special-Status Plant and Wildlife Species with Potential to Occur in the Study Area

Species	Federal	State	Other	Habitat Association	Potentially Suitable Habitat in Study Area	Potential Effect by Project
Invertebrates						
Vernal pool fairy shrimp *Branchinecta lynchi*	FT	--		Inhabits a variety of different vernal pool types, from small, clear, sandstone rock pools to large, turbid, alkaline, grassland valley floor pools.	Degraded vernal pool and possibly seasonal wetlands south of Union House Creek.	May affect. Avoidance and minimization measures to minimize potential harm to the species.
Midvalley fairy shrimp *Branchinecta mesovallensis*	--	--	CNDDB	Typically occurs in small, shallow vernal pools, swales, and various artificial ephemeral wetlands types (e.g., roadside puddles, scapes and ditches, and railroad toe-drain pools) (Belk and Fugate 2000, USFWS 2004).	Degraded vernal pool and possibly seasonal wetlands south of Union House Creek.	May affect. Avoidance and minimization measures recommended to minimize potential harm to the species.
Vernal pool tadpole shrimp *Lepidurus packardi*	FE	--		Occurs in vernal pools containing clear to highly turbid water, ranging in size from 5 square meters (54 ft^2) to 36 hectare (89 acre) (USFWS 1994).	Degraded vernal pool and possibly seasonal wetlands south of Union House Creek.	May affect. Avoidance and minimization measures recommended to minimize potential harm to the species.

Table 4.4-2: Special-Status Plant and Wildlife Species with Potential to Occur in the Study Area

Species	Federal	State	Other	Habitat Association	Potentially Suitable Habitat in Study Area	Potential Effect by Project
California linderiella *Linderiella occidentalis*	--	--	CNDDB	Seasonal pools in unplowed grasslands with old alluvial soils underlain by hardpan or in sandstone depressions. Water in pools has very low alkalinity, conductivity, and total dissolved solids (TDS).	Degraded vernal pool and possibly seasonal wetlands south of Union House Creek.	May affect. Avoidance and minimization measures recommended to minimize potential harm to the species.
Valley elderberry longhorn beetle *Desmocerus californicus dimorphus*	FT	--	--	Elderberry shrubs serve as the exclusive host species.	Elderberry shrubs located on the Bufferlands adjacent to Franklin Boulevard.	May affect. Avoidance, minimization, and mitigation measures recommended to minimize potential harm to the species.
Reptiles						
Western pond turtle *Clemmys marmorata*	--	CSC	--	Ponds, marshes, rivers, streams, and irrigation ditches with aquatic vegetation and basking sites.	Morrison Creek and Union House Creek.	May affect. Avoidance measures recommended to minimize potential harm to the species.
Giant garter snake *Thamnophis gigas*	FT	ST		Prefers freshwater marsh and low gradient streams. Has adapted to drainage canals and irrigation ditches.	Morrison Creek and Union House Creek and adjacent upland areas.	May affect. Avoidance measures recommended to minimize potential harm to the species.

Table 4.4-2: Special-Status Plant and Wildlife Species with Potential to Occur in the Study Area

Species	Federal	State	Other	Habitat Association	Potentially Suitable Habitat in Study Area	Potential Effect by Project
Birds						
Double-crested cormorant *Phalacrocorax auritus*	--	CSC	--	Typical habitat includes seacoasts, bays, harbors, freshwater lakes, rivers, and marshes (Small 1994). Double-crested cormorants are colonial nesters, and rookeries are typically found within riparian communities.	Suitable foraging habitat at Morrison Creek wetland and riparian areas.	Unlikely to affect.
American bittern *Botaurus lentiginosus*	--	--	CNDDB	An inhabitant of fresh or saline emergent wetlands.	Suitable foraging habitat at Morrison Creek wetland and riparian areas.	Unlikely to affect.
Snowy egret *Egretta thula*	--	--	CNDDB	Inhabits fresh and saline emergent wetlands, coastal estuaries, ponds, slow-moving rivers, irrigation ditches, and wet fields.	Suitable foraging habitat at Morrison Creek wetland and riparian areas.	Unlikely to affect.
Great egret *Ardea alba*	--	--	CNDDB	Colonial nester in large trees. Rookery sites located near marshes, tide-flats, irrigated pastures, and margins of rivers and lakes.	Suitable foraging habitat at Morrison Creek wetland and riparian areas.	Unlikely to affect.
Great blue heron (rookery sites) *Ardea Herodias*	--	--	CNDDB	Colonial nester in tall trees, cliff sides, and sequestered spots on marshes. Rookery sites in close proximity to foraging areas, marshes, lake margins, tide-flats, rivers and streams, and wet meadows.	Suitable foraging habitat at Morrison Creek wetland and riparian areas.	Unlikely to affect.

Table 4.4-2: Special-Status Plant and Wildlife Species with Potential to Occur in the Study Area

Species	Federal	State	Other	Habitat Association	Potentially Suitable Habitat in Study Area	Potential Effect by Project
White-tailed kite *Elanus leucurus*	--	CFP	--	Low rolling foothills/valley margins with scattered oaks and river bottomlands or marshes adjacent to deciduous woodland. Open grasslands, meadows, or marshes are utilized for foraging. Isolated, dense-topped trees in close proximity to foraging areas are used for nesting and perching.	Suitable foraging and nesting habitat at Morrison Creek/Union House Creek riparian areas and scattered trees in adjacent grasslands and agricultural fields.	May affect. Avoidance measures recommended to minimize potential harm to the species.
Northern harrier *Circus cyaneus*	--	CSC	--	Typical nesting substrates include emergent wetland/marsh, open grasslands, or savannah habitats. Foraging occurs within a variety of open settings, such as marshes, agricultural fields, and grasslands.	Suitable foraging and nesting habitat along Morrison and Union House creeks and adjacent grassland and agricultural fields.	May affect. Avoidance measures recommended to minimize potential harm to the species.
Cooper's hawk *Accipiter cooperii*	--	CSC	--	Nests in riparian, oak woodland, and other forest communities.	Suitable foraging and nesting habitat at Morrison Creek/Union House Creek riparian areas	May affect. Avoidance measures recommended to minimize potential harm to the species.

Table 4.4-2: Special-Status Plant and Wildlife Species with Potential to Occur in the Study Area

Species	Federal	State	Other	Habitat Association	Potentially Suitable Habitat in Study Area	Potential Effect by Project
Swainson's hawk *Buteo swainsoni*	--	ST	BCC	In the Central Valley, nests are generally found in scattered trees or along riparian systems adjacent to agricultural fields, pastures, or annual grasslands (CDFG 1994).	Suitable foraging and nesting habitat at Morrison Creek/Union House Creek riparian areas, as well as adjacent grasslands.	May affect. Avoidance measures recommended to minimize potential harm to the species.
Short-eared owl *Asio flammeus*	--	CSC	--	Open areas, such as annual and perennial grasslands, prairies, meadows, irrigated lands, and fresh emergent wetlands.	Winter visitant. Suitable foraging habitat at SRCSD Bufferlands.	Unlikely to affect.
Western burrowing owl *Athene cunicularia hypugaea*	--	CSC	BCC	Burrow sites occur in open, dry annual or perennial grasslands, deserts, and scrublands characterized by low-growing vegetation. A subterranean nester, dependent upon burrowing mammals, most notably, the California ground squirrel.	Suitable habitat at CRC Stadium berm and along levees of Union House Creek and Morrison Creek.	May affect. Avoidance measures proposed to minimize potential harm to the species.
Loggerhead shrike *Lanius ludovicianus*	--	CSC	BCC	Inhabits open areas with sparse shrubs, trees, and other perches.	Suitable foraging habitat at SRCSD Bufferlands.	May affect. Avoidance measures proposed to minimize potential harm to the species.

Table 4.4-2: Special-Status Plant and Wildlife Species with Potential to Occur in the Study Area

Species	Federal	State	Other	Habitat Association	Potentially Suitable Habitat in Study Area	Potential Effect by Project
Tricolored blackbird *Agelaius tricolor*	--	CSC	BCC	Nests primarily within cattail/tule marshes, although also known to use blackberries, willows, thistles, etc.	Suitable foraging habitat at SRCSD Bufferlands.	Unlikely to affect.

Legend:
- FE Listed as endangered under the Federal Endangered Species Act
- FT Listed as threatened under the Federal Endangered Species Act
- BCC U. S. Fish and Wildlife Service Bird of Conservation Concern (USFWS 2002)
- SE Listed as endangered under the California Endangered Species Act
- ST Listed as threatened under the California Endangered Species Act
- CSC Species of special concern as identified by the California Department of Fish and Game
- CFP Fish and Game Code of California Fully Protected Species (§3511-birds, §4700-mammals, §5050-reptiles/amphibians)
- CNPS List 1B Plant species that are rare, threatened, or endangered in California and elsewhere
- CNPS List 2 Plant species that are rare, threatened, or endangered in California, but are more common elsewhere
- CNDDB Species that is tracked by CDFG's Natural Diversity Database but does not have any of the above special-status designations

Special-status Plant Species. Six special-status plant species were identified as having potential to occur within the project area: dwarf downingia, Bogg's Lake hedge-hyssop, legenere, Sacramento Orcutt grass, slender Orcutt grass, and Sanford's arrowhead (*Sagittaria sanfordii*). None of these special-status plant species were detected during the surveys (June 26, August 15, August 21, 2002, and May 18, 2004). In addition, ECORP biologists conducted rare plant surveys within the project area on May 18 and June 27, 2006. The surveys were conducted in accordance with the methodologies outlined in the USFWS's *Guidelines for Conducting and Reporting Botanical Inventories for Federally Listed, Proposed and Candidate Plants* (USFWS 1996) and the California Native Plant Society's *Inventory of Rare and Endangered Plants of California, Sixth Edition* (CNPS 2001). No special-status plants were observed within the project area during these surveys.

Dwarf Downingia. The dwarf downingia is a vernal pool dwelling member of the bellflower family (Campanulaceae). It is an annual species that blooms from March to May as standing water in vernal pools and ditches recedes and dries or evaporates. The species is not found in all drainage ditches but only in t No indicators of Bogg's Lake hedge-hyssop plants were identified during the wetland delineation field survey of the vernal pool in the project area. The vernal pool is of low quality and has a high weedy component due to construction effects of the nearby regional detention basin. The probability of the species occurring in the project area is low. Bogg's Lake hedge-hyssop was not observed on-site during rare plant surveys conducted in 2006.

hose connected with vernal pools. The species has a low potential to occur within the vernal pool located west of Franklin Boulevard on the SRCSD Bufferlands. The closest known population is located approximately three miles southwest of the project area. Dwarf downingia was not observed on-site during rare plant surveys conducted in 2006.

Bogg's Lake Hedge-hyssop. The Bogg's lake hedge-hyssop is a vernal pool dwelling member of the figwort family (Scrophulariaceae). Vernal pools, vernal swales, and ditches formed from land leveling and road construction on vernal pool-containing terraces, have the potential to support Bogg's Lake hedge-hyssop populations. Bogg's lake hedge-hyssop is an annual species that blooms from March to May. It grows in wetlands nearly all year round but is confined to the outer edges of seasonally wet depressions, which begin to dry up late in the spring.

Legenere**.** A relative of downingia, legenere is a flowering plant found in vernal pools and wetlands. It is an annual species that blooms from April to June, as standing water in vernal pools and ditches recedes and dries or evaporates. The closest known population is approximately one mile south of the project corridor on the SRCSD Bufferlands. Legenere plants were not found within the project area during wetland delineation surveys (June 26, August 15, August 21, 2002, and May 18, 2004). In addition, the species was not observed on-site during rare plant surveys conducted in 2006.

Sacramento Orcutt Grass. Sacramento Orcutt grass is a vernal pool and ditch-dwelling member of the grass family (Poaceae). It is an annual species that blooms from March to May. There are no known populations recorded within the project area. Annual grasses such as the Sacramento Orcutt grass produce seed and die in the early summer. Shed seed from consecutive years builds-up on the floor of pools and swales, forming a "seed bank". During favorably wet years, the seed bank may yield new plants. The species has a moderate to low potential to occur within the vernal pool located west of Franklin Boulevard on the SRCSD Bufferlands. Sacramento Orcutt grass plants were not found within the project area during the wetland delineation field surveys (June 26, August 15, August 21, 2002, and May 18, 2004) or during rare plant surveys conducted in 2006.

Slender Orcutt Grass. Slender Orcutt grass occurs in vernal pools at elevations ranging from 115 to 5,775 ft (35 to 1,760 m) above mean sea level (CNPS 2001). Slender Orcutt grass is an annual herb that blooms from May through October (CNPS 2001), occurring primarily on substrates of volcanic origin (Crampton 1959, Corbin and Schoolcraft 1989; *as cited in* USFWS 2003). This species is known to occur in the same type of vernal pool complexes as Sacramento Orcutt grass in Sacramento County; however, these species have not been observed co-existing in the same vernal pool (USFWS 2003). The median area of pools occupied by populations studied by Stone et al. (1988, *as cited in* USFWS 2003) was 1.6 acres and ranged from 0.2 acre to 111.0 acres (USFWS 2003). Threats to this species include agriculture, residential development, grazing, and non-native plants (CNPS 2001). Slender Orcutt grass plants were not found within the project area during the wetland delineation field surveys (June 26, August 15, August 21, 2002, and May 18, 2004) or during rare plant surveys conducted in 2006.

Sanford's Arrowhead. Sanford's arrowhead is an herbaceous perennial that occurs in shallow freshwater marshes, swamps, ponds, and ditches up to 2,000 ft (607 m) in elevation (CNPS 2001), and blooms from May through October (CNPS 2001). The known range of Sanford's arrowhead includes Butte, Del Norte, Fresno, Kern, Merced, Orange, Sacramento, San Joaquin, Shasta, Tehama, and Ventura counties, although this species is believed to be extirpated from Orange and Ventura counties (CNPS 2001). Potentially suitable habitat within and adjacent to the project alignment occurs in portions of Union House Creek, Morrison Creek, and adjacent wetlands. The CNDDB contains an occurrence of this species located in Strawberry Creek near the intersection of Cosumnes River Boulevard and Bruceville Road (CDFG 2003). Sanford's arrowhead was not observed within the project area during field surveys conducted in support of the wetland delineation or during focused rare plant surveys conducted in 2006.

Protected Trees. A number of Valley oaks *(Quercus lobata), interior live oaks (Quercus wislizenii), and blue oaks (Quercus douglasii)* occur on the SRCSD Bufferlands *adjacent to Franklin Boulevard. These trees were planted in 1995 as part of the Trail of Trees effort. A number of the Valley oaks and interior live oaks associated with the Trail of Trees, located north-west of the intersection of CRB and Franklin Boulevard, occur within or adjacent to the project area. Mature riparian trees (e.g., Fremont cottonwood) occur within or adjacent to the project area in the vicinity of the confluence of Morrison and Union House Creeks. Mature willows (Salix species) occur in association with a linear depression (agricultural ditch, located south of the proposed Morrison Creek station. Some of these native oaks and mature riparian trees may meet the criteria for trees protected under the City of Sacramento Heritage Tree Ordinance. A number of ornamental tree species including Bradford pear (Pyrus calleryana 'Bradford') and crepe myrtle (Lagerstroemia indica) occur along the northern side of CRB. Based on information provided in the Arborist Report prepared for Segment 1 of the Freeport Regional Water Project, the ornamental trees along CRB are relatively small statured (Jones and Stokes 2007). Prior to project implementation, RT shall provide a qualified arborist to survey potentially affected trees within the project area, to record an accurate location, species, size (DBH), and canopy diameter. This information will be used to determine which of the trees that occur within the project area are protected pursuant to the City of Sacramento Heritage Tree Ordinance.*

Special-status Animal Species

Several special-status wildlife species have the potential to occur or are already known to occur within the project area as identified on Table 4.4-2. Each species is discussed in detail below.

Vernal Pool Fairy Shrimp, Midvalley Fairy Shrimp, Vernal Pool Tadpole Shrimp, and California Linderiella. The vernal pool fairy shrimp, midvalley fairy shrimp, vernal pool tadpole shrimp, and California linderiella live in ephemeral freshwater habitats such as vernal pools and swales. Federal and state status of each individual species is presented in Table 4.4-2. These invertebrates inhabit clear to turbid grass-bottomed vernal pools in grasslands and clear-water pools in unplowed grasslands. These inverts are ecologically dependent on seasonal fluctuations in their habitat such as presence or absence of water during specific times of the year, duration of water, and other environmental factors that include pH levels, salinity, temperature, and quantities of dissolved oxygen. *The project is located within the recognized range of these species, and potential habitat is present on-site and in the immediate vicinity of the project.* Each of these species has been previously documented as occurring within the project vicinity. *In the BO for the Interstate 5/Cosumnes River Boulevard Interchange Project (USFWS 2005), the USFWS determined that vernal pool tadpole shrimp and vernal pool fairy shrimp are reasonably certain to inhabit the proposed project's action area, which overlaps or is immediately adjacent to portions of the LPAP2 project area within the SRCSD Bufferlands, based on the known occurrences of these two species in wetlands throughout the SRCSD Bufferlands and the occurrence of potential habitat for these species on-site. Based on this information, the USFWS determined that there is a high likelihood that the vernal pool tadpole shrimp and vernal pool fairy shrimp inhabit the South Sacramento Corridor Phase 2 project area (USFWS 2008). Therefore, the presence of vernal pool branchiopods is assumed within features on-site that represent potential habitat and potential project-related effects are mitigated accordingly.*

Valley Elderberry Longhorn Beetle. The Valley elderberry longhorn beetle is completely dependent on its host plant, elderberry (*Sambucus* species), which occurs in riparian and other woodland and scrub communities (USFWS 1999). Female beetles lay their eggs in crevices on stems or on the leaves of living elderberry plants. When the eggs hatch, the larvae bore into the stems. The larval stage lasts for one to two years. The fifth instar larvae create exit holes in the stems and then plug the holes and remain in the stems through pupation (Talley 2003). Adults emerge through the exit holes from late March through June. Adult beetles, which are short-lived, forage on leaves and flowers of elderberry shrubs. The beetle's current distribution is patchy throughout California's Central Valley, from Shasta County to Kern County, and associated foothills up to an elevation of approximately 3,000 ft (USFWS 1999).

*In 2002, t*hirty-three elderberry shrubs occur*red* adjacent to Franklin Boulevard on the SRCSD Bufferlands property. These shrubs were planted in 1995 as part of a landscaping project on the SRCSD Bufferlands property (City of Sacramento and the Federal Highway Administration 2006). A Jones & Stokes biologist conducted a survey of these shrubs in February 2002. No exit holes or other evidence of Valley elderberry longhorn beetle occurrence were observed during this survey (City of Sacramento and the Federal Highway Administration 2006). No other elderberry shrubs have been observed within the project area. *In 2007, fourteen of these elderberry shrubs were directly affected by the Freeport Regional Water Project and transplanted to an off-site conservation bank (pers. comm. C. Consolini).*

Western Pond Turtle. The western pond turtle is designated as a CDFG species of special concern. The western pond turtles occur in a variety of fresh and brackish water habitats including marshes, lakes, ponds, and slow moving streams (Jennings and Hayes 1994). This species is primarily aquatic; however, they typically leave aquatic habitats in the fall to reproduce and to overwinter (Jennings and Hayes 1994). Deep, still water with abundant emergent woody debris, overhanging vegetation, and rock outcrops is optimal for basking and thermoregulation. Although adults are habitat generalists, hatchlings and juveniles require specialized habitat for survival through the first few years. Hatchlings require shallow water habitat with relatively dense submergent or short emergent vegetation in which to forage. Western pond turtles are typically active between March and

November. Mating generally occurs during late April and early May and eggs are deposited between late April and early August (Jennings and Hayes 1994). Eggs are deposited within excavated nests in upland areas, with substrates that typically have high clay or silt fractions, usually in the vicinity of aquatic habitats (Jennings and Hayes 1994). Morrison Creek and Union House Creek provide potentially suitable habitat for this species.

Giant Garter Snake. The giant garter snake is *designated* as a threatened species *in accordance with both the federal* and California *Endangered Species Acts*. The giant garter snake (GGS) once ranged throughout the wetlands of California's Central Valley from Buena Vista Lake near Bakersfield north to the vicinity of Chico. GGS appear to have been extirpated from the San Joaquin Valley south of Modesto, Fresno County. Giant garter snakes are commonly associated with permanent freshwater marshes, agricultural canals, ditches and drains associated with rice fields, streams, and sloughs, particularly with mud bottoms. Winter burrows are located predominantly in animal burrows or under debris. Factors leading to the decline of GGS include the fragmentation and loss of valley wetland habitat to agriculture, urbanization, and flood control; toxic chemicals associated with agriculture, industry, and urban runoff; and winter flooding which displaces resident GGS populations from floodplains into encroaching urbanization. Urban development threatens survival of the remaining GGS populations in the Sacramento Valley.

Potential giant garter snake habitat was identified along Morrison Creek within the project study area. The CNDDB contains records for the species within the Florin quadrangle. Table 4.4-3 contains known localities of the giant garter snake in the project vicinity. Previous surveys of the project area reported that Morrison Creek contains both active season habitat and dormant season habitat for the snake. Morrison Creek provides supporting habitat of the GGS within the Upper Beach Lake Wildlife Area west of the UPRR tracks. Potentially suitable habitat occurs along the channelized reaches of the creek (upstream from the confluence of Morrison and Laguna creeks) and along the meandering slough habitat downstream from the confluence of these creeks. The north levee of Morrison Creek from the UPRR tracks west to the Sacramento River and the UPRR grade itself provide suitable dormant season habitat for the GGS.

Union House Creek is an urban stream with few annual grasses and low-growing forbs within the channel right-of-way. The creek is entirely channelized with concrete-lined low-flow channels. Although GGS may venture into these reaches from more suitable habitats during downstream flooding or during other dispersal activities, the long-term survival here of individual GGS is unlikely.

Double-crested Cormorant. The double-crested cormorant (*Phalacrocorax auritus*) is not listed and protected pursuant to the California or federal Endangered Species Acts but is designated as a CDFG species of special concern. Typical habitat includes seacoasts, bays, harbors, freshwater lakes, rivers, and marshes (Small 1994). Double-crested cormorants are colonial nesters, and rookeries are typically found within riparian communities. Nesting season throughout most of northern California is April through August. Nesting by this species is considered unlikely within the project area; however, it may forage along Morrison Creek.

American Bittern. The American bittern (*Botaurus lintiginosus*) is not listed in accordance with either the federal or California ESAs; however, nesting locations of this species are tracked in the CNDDB. This species inhabits fresh emergent wetlands in the Central Valley where it is a common resident between October and April. Populations of American bitterns exist throughout the Central Valley. Species-specific surveys for the American bittern were not performed. Emergent wetland/riverine habitat does exist within the project study area; therefore, presence of the American bittern is a possibility. These habitat areas are extremely degraded, highly disturbed, and fragmented. Therefore, the probability of the presence of the American bittern is extremely low.

Table 4.4-3: Known Localities of the Giant Garter Snake in the Project Vicinity

Locality	County	Reference
Arno Road, west of Hwy 99	Sacramento	Hansen 1997
Snodgrass Slough W. Elliot Road	Sacramento	Hansen 1997
Franklin Blvd., 0.5 miles south of Hood Franklin Road	Sacramento	Hansen 1997
0.5 mile S Sheldon Road, 0.2 mile west of Hwy 99	Sacramento	Hansen 1997
Laguna Creek, 0.8 mile SE jct Bruceville Road at Sheldon Rd, Elk Grove	Sacramento	CDFG 2002, Hansen 1997
Laguna Marsh, along Sheldon Road, 0.3 mile west of Bruceville Road	Sacramento	CDFG 2002, Hansen 1997
Beach Lake Preserve, 1.5 mile south of Freeport	Sacramento	CDFG 2002, Hansen 1997
Elk Grove Creek, 0.4 mile west of Hwy. 99 and 0.5 mile north of Elk Grove Blvd.	Sacramento	CDFG 2002, Hansen 1997
South of South Beach Lake and west of I-5, vicinity of Lower Morrison Creek.	Sacramento	CDFG 2002

Snowy Egret, Great Egret, and Great Blue Heron. The snowy egret (*Egretta thula*), great egret (*Ardea alba*), and great blue heron (*Ardea herodias*) are not listed pursuant to either the federal or California ESAs; however, rookery locations are of stated interest to CDFG and are tracked by the CNDDB. These bird species inhabit shallow saline and freshwater emergent wetlands, ponds, backwater riverine areas, and irrigation ditches and are known to forage in wet agricultural fields. Nests are constructed of grass, twigs, and marsh vegetation, and are usually built off the ground in tall trees. Populations were decimated in the mid to late 19th century to support the plume trade. Agricultural fields may provide suitable foraging habitat for the species. No snowy egrets, great egrets, or great blue herons were observed during field surveys. Marginal emergent wetland/riverine habitat and irrigation ditches are within the project area. The habitat areas are extremely degraded, highly disturbed, and fragmented. Therefore, the probability that these species will nest within the project area is low.

White-tailed Kite. The white-tailed kite is not listed pursuant to either the California or federal Endangered Species Acts; however, white-tailed kites are fully protected pursuant to the Fish and Game Code of California Section 3511. This species is a yearlong resident in valley lowlands and is primarily found in or near foraging areas such as open grasslands, meadows, farmlands, savannahs, and emergent wetlands. White-tailed kites typically nest from March through June in trees within riparian, oak woodland, and savannah habitats of the Central Valley and Coast Range. Potentially suitable foraging and nesting habitats occur within the project area.

Northern Harrier. The northern harrier is not listed pursuant to either the California or federal Endangered Species Acts; however, it is considered to be a species of special concern by the CDFG. This species is known to nest within the Central Valley, along the Pacific Coast, and in northeastern California. The northern harrier is a ground nesting species, and typically nests in emergent wetland/marsh, open grasslands, or savannah habitats. Foraging occurs within a variety of open habitats such as marshes, agricultural fields, and grasslands. Potentially suitable foraging and nesting habitats occur within the project area.

Cooper's Hawk. Cooper's hawk (*Accipiter cooperii*) is designated as a species of special concern by the CDFG. Cooper's hawks are not listed pursuant to either the California or federal Endangered Species Acts. Typical nesting and foraging habitat includes riparian woodland, dense oak woodland, and other woodlands near water. Breeding generally occurs in the foothills of the Sierra Nevada and Coast Range, but in recent years, breeding has expanded to include the Sacramento Valley (CDFG 2003). Potentially suitable foraging and nesting habitats occur within the project area.

Swainson's Hawk. The Swainson's hawk (*Buteo swainsoni*) is listed as a threatened species *pursuant to the California Endangered Species Act* and is designated as a Bird of Conservation Concern by the USFWS. No critical habitat has been designated for this species. The species' breeding range includes western Canada, the western United States, and northern Mexico. The species migrates to South America following the breeding season. The Central Valley population is concentrated in Yolo, San Joaquin, and Sacramento counties. A small population of approximately 30 individuals has recently been discovered to be regularly wintering in the Sacramento/San Joaquin River Delta. Suitable foraging habitat is necessary to provide an adequate energy source for adults and nestlings. In the Central Valley, Swainson's hawks have adapted to forage for prey items primarily in agricultural fields. Typical nesting habitats are riparian corridors or isolated trees within flying distances of suitable foraging habitat. The Swainson's hawk population in California is estimated to have declined by as much as 91 percent since the turn of the century. The CDFG (1994) attributes this decline to the loss of native nesting and foraging habitats, and more recently, to the conversion of agricultural lands to urbanization and incompatible agricultural crops. In addition, pesticides, shooting, and disturbances at the nest site may have contributed to the population decline.

Although species-specific surveys were not conducted for the Swainson's hawk, suitable foraging and nesting habitat were identified within the project area. Cottonwoods within the project corridor may be used by Swainson's hawks for nesting while the surrounding tilled agricultural fields and grasslands may provide foraging habitat for the species. Additional cottonwoods were identified at the Sacramento Regional Wastewater Treatment Plant along a riparian corridor adjacent to the confluence of Morrison Creek and Union House Creek, within the project limits. These trees and surrounding grasslands may provide suitable breeding and foraging habitat for the Swainson's hawk.

Short-eared Owl. The short-eared owl (*Aiso flammeus*) is designated as a species of special concern by the CDFG. The short-eared owl inhabits open grasslands, meadows, prairies, agriculture lands, and emergent wetlands. Wintering short-eared owls arrive in the Central Valley during October and depart in April. Marginal habitat does exist within the project area for wintering short-eared owls. No short-eared owls were observed during the field surveys; however, the *SRCSD Bufferlands Master Plan* reported the presence of the short-eared owl at the SRCSD Bufferlands in 1991 and 1999.

Western Burrowing Owl. The western burrowing owl (*Athene cunicularia hypugaea*) is designated as a species of special concern by the CDFG and a Bird of Conservation Concern by the USFWS. The burrowing owl inhabits dry open rolling hills, grassland, desert floor, and open bare ground with gullies and arroyos. In the Central Valley, the burrowing owl is commonly found along earthen borders and dikes of irrigated channels. The burrowing owl was formerly common in central and southern California habitats, smaller interior valleys, and the Central Valley. Urbanization and agriculture have eliminated the bird from many parts of its historic range. Within the greater project vicinity, the burrowing owl is known to occur at many areas including various locations along the UPRR right-of-way, at the SRCSD Bufferlands, and along CRB at the CRC. There are both suitable habitat and known occurrences of the burrowing owl on the levees along Morrison Creek and Union House Creek, and at CRC.

Loggerhead Shrike. The loggerhead shrike (*Lanius ludovicianus*) is designated as a species of special concern by the CDFG and a Bird of Conservation Concern by the USFWS. The loggerhead shrike inhabits open areas with scattered shrubs, trees, or other perches; it is adapted to urbanized environments and agriculture lands so long as habitat characteristics and abundant prey are present. Many loggerhead shrikes winter in the Central Valley and in the Imperial Valley. Habitat does exist within the project area that would be suitable for loggerhead shrikes along the SRCSD Bufferlands. A loggerhead shrike was observed flying over the UPRR Bridge at Morrison Creek during the field survey.

Tricolored Blackbird. The tricolored blackbird (Agelaius tricolor) is not listed pursuant to either the California or federal Endangered Species Acts; however, it is designated as a species of special concern by the CDFG. This colonial nesting species is distributed widely throughout the Central Valley and Coast Range. Tricolored blackbirds nest in colonies that can range from several pairs to several thousand pairs, depending on prey availability, the presence of predators, or level of human disturbance. This nomadic species typically nests in emergent marsh, riparian thickets, and blackberry brambles, usually with some nearby standing water or ground saturation. Open grassland and agricultural fields are typical foraging areas with nesting generally occurring from April through June. The agricultural fields adjacent to Morrison Creek and the portion of the project within the SRCSD Bufferlands represent potential foraging habitat for this species.

Common Raptors. Common raptors and their nests are protected by Section 3503.5 of the Fish and Game Code of California and by the Federal Migratory Bird Treaty Act. These raptor species include red-tailed hawk, red-shouldered hawk (*Buteo lineatus*), American kestrel, and great horned owl (*Bubo virginianus*), among others. In general, raptor nesting occurs from late February/early March through late July/early August, depending upon the species and various environmental conditions.

4.4.3.3 WETLANDS AND OTHER WATERS OF THE U.S.

The U.S. Army Corps of Engineers (ACOE) has final authority in the regulation of wetlands and other waters of the U.S. including their jurisdiction, determination of area affected by the project, and type of permits and conditions required. A delineation of waters of the U.S., including wetlands, was conducted on June 26, August 15, and August 21, 2002; April 14, 2003; April 21, 2005; and June 2, 2005 in accordance with the Routine On-Site Determination Method as defined by the ACOE. Jurisdictional waters in the vicinity of the proposed project occur at the following locations:

- Seasonal wetlands north of Morrison Creek
- Seasonal wetlands west of Morrison Creek
- Morrison Creek
- Union House Creek (at the confluence of Morrison Creek, SRCSD Bufferlands, and Center Parkway)
- Seasonal wetlands south of Union House Creek on the SRCSD Bufferlands
- Vernal pool south of Union House Creek on the SRCSD Bufferlands
- Seasonal wetlands on CRC

Seasonal Wetlands. Between Meadowview Road and Morrison Creek, topographic depressions exist that collect run-off from the existing railroad line. These areas are similar to the seasonally wet depressions reported by Parsons and disclosed in the *1997 South Sacramento Corridor Final Supplemental Environmental Impact Statement/Final Subsequent Environmental Impact Report (SEIS/SEIR)* and they do not possess all wetland indicators. The only two depressions with all the

mandatory wetland indicators are located on either side of the UPRR right-of-way north of Morrison Creek.

Morrison Creek. The USGS Florin 7½-minute quadrangle map (USGS 1967 [photo revised 1980]) illustrates Morrison Creek as a perennial (blue-line) stream, at the UPRR mainline crossing of the creek. The USFWS classifies Morrison Creek in this reach as a riverine lower perennial, permanently flooded, excavated wetland. It possesses wetland indicators. Farther south at the confluence with Union House Creek, the channel of Morrison Creek widens to contain extensive beds of water knotweed, an obligate wetland plant species. Hydric soils here are covered with light colored sediments, probably derived from overwash.

Union House (Beacon) Creek. The LPAP2 would be built on a flyover structure to cross both the existing UPRR railroad line and Union House Creek at the northern end of the SRCSD Bufferlands. Union House Creek, known as Beacon Creek on the USGS Florin 7½-minute quadrangle map (USGS 1968 [photo revised 1980]) is a perennial (blue-line) stream. The National Wetlands Inventory (NWI) map illustrates the creek as a palustrine emergent wetland, excavated and temporarily flooded. Union House Creek parallels the LPAP2 LRT alignment along CRB. It is a low-flow flood control channel with a concrete bottom.

Seasonal Wetlands South of Union House Creek. Several seasonal wetlands were identified on the SRSCD Bufferlands south of Union House Creek, near its confluence with Morrison Creek. Plant species observed in these seasonal wetlands included ryegrass (*Lolium* species), hyssop loosestrife, broadleaf peppergrass (*Lepidium latifolium*), dock (*Rumex* species), and Mediterranean barley (*Hordeum marinum*).

Vernal Pool South of Union House Creek. The SRCSD Bufferlands contain one vernal pool located just to the east of a regional detention basin and west of Franklin Boulevard. The detention basin does not possess the mandatory wetland indicators. The pool *contains* patches of pennyroyal*,* bracteate allocarya*, and creeping spikerush (Eleocharis macrostachya)*, *all of which are* obligate wetland species; and round woolly marbles (*Psilocarphus tenellus* var. *globiferus*), a facultative wetland plant species found in disturbed vernal pools of the Sacramento Valley.

Seasonal Wetlands at Cosumnes River College. Four seasonal wetlands are located on the *CRC* campus near the intersection of *CRB* and Bruceville Road. Plant species identified within these seasonal wetlands included hyssop loosestrife (*Lythrum hyssopifolium*), slender popcorn flower (*Plagiobothrys stipitatus*), annual rabbit-foot grass, spiny-fruit buttercup (*Ranunculus muricatus*), and dock (*Rumex* species).

4.4.4 Impacts

No impacts on special status species, wetlands, or other waters of the U.S. would occur as a result of the No-Action Alternative; therefore, the following discussion focuses on the TSM and LPAP2 Alternatives.

4.4.4.1 IMPACTS TO VEGETATION/WILDLIFE HABITAT

TSM Alternative

Project-related impacts to vegetation/wildlife habitat associated with the TSM Alternative would be restricted to construction of the PNR lots. As shown in Table 4.4-4 and described below, construction of the PNR lot*s* for the TSM Alternative would affect up to *10.89 acres of non-native annual grassland*

and 4.07 acres of ruderal/disturbed vegetation that provide *potential* habitat for western burrowing owl.

Cosumnes River College PNR Lots. The CRC PNR lots would *include a lot* located *east of* Bruceville Road, adjacent to the CRC *(approximately 11 acres); a lot in the southeast corner of the CRC campus (approximately 3 acres); and a bus terminal (approximately 1 acre)*. Portions of the proposed PNR would be constructed within existing parking lots and open maintained lots on the college property. These areas are highly disturbed by development activities.

Table 4.4-4: Vegetation Community Impacts (acres) for the TSM Alternative

Vegetation Classification	Cosumnes River College PNR Lots
Ruderal/Disturbed	*4.07*
Non-native Grassland	*10.89*
Riparian	0.0
Freshwater Emergent Wetland/ Open Water	0.0
Vernal Pool	0.0

LPAP2

Project effects on vegetation communities with the LPAP2 are shown in Table 4.4-5. The LPAP2 would include all segments along the project corridor.

Table 4.4-5: Vegetation Community Impacts (acres) for the LPAP2

Vegetation Classification	LPAP2[1]
Ruderal/Disturbed	*66.85*
Non-native Grassland	*6.25*
Riparian	*0.34*
Freshwater Emergent Wetland/Open Water	*0.31*
Vernal Pool	0.00

[1] Vegetation community impacts include both permanent and temporary impacts

UPRR/Morrison Creek Segment. The UPRR/Morrison Creek segment begins at Meadowview Road and ends where the LRT crosses the UPRR railroad tracks onto the SRCSD Bufferlands. This segment contains *approximately 21.25* acres of ruderal/disturbed vegetation and *0.19* acre of riparian vegetation.

A portion of this segment, from *where* Morrison Creek *enters the project study area* to the confluence of Morrison Creek and Union House Creek, has previously been studied by the ACOE for a levee improvement project. Parsons biologists mapped two shallow linear depressions at the base of the UPRR embankment that support hydric soil, wetland hydrology, and wetland vegetation.

A small seasonal wetland with a patch of willow riparian occurs within the UPRR segment just north of *where* Morrison Creek *enters the project study area*. This area would be permanently displaced by the LPAP2. This seasonally wet area is highly disturbed by railroad maintenance. *Special*-status raptors such as the white-tailed kite and Swainson's hawk may nest in *areas of* riparian vegetation *that occur within and adjacent to this segment* and *therefore* have the potential to be affected by the project.

SRCSD Bufferlands Segment. The SRCSD Bufferland segment contains both non-native grasslands and ruderal/disturbed vegetation communities. The non-native grasslands may provide foraging habitat for a number of special-status bird species including: white-tailed kite, Swainson's hawk, short-eared owl, western burrowing owl, loggerhead shrike, and tricolored blackbird. A total of *approximately 33.22* acres of ruderal/disturbed vegetation and *6.25* acres of non-native grasslands that may provide suitable foraging habitat for these special-status birds would be affected *(includes temporary and permanent impacts)* by the LPAP2 along this segment.

A vernal pool that provides potential habitat for vernal pool associated plant species (dwarf downingia, Bogg's Lake hedge-hyssop, legenere, Sacramento Orcutt grass, and slender Orcutt grass), and invertebrates (vernal pool fairy shrimp, Midvalley fairy shrimp, vernal pool tadpole shrimp, and California linderiella) *may* be *indirectly* affected. A few seasonal wetlands are located to the south and east of the confluence of Morrison Creek and Union House Creek. As previously reported, there is no documented evidence that any of the crustaceans or plants are present in this vernal pool or the seasonal wetlands. In addition, the vernal pool and seasonal wetlands were surveyed for special-status plants in 2006, during which no special-status plant species were observed.

Thirty-three elderberry shrubs that represent potential Valley elderberry longhorn beetle habitat (i.e., shrubs containing one or more stems measuring one inch or greater in diameter at ground level) were documented adjacent to Franklin Boulevard during a survey conducted by a Jones & Stokes biologist in February 2002 (City of Sacramento and the Federal Highway Administration 2006). No exit holes or evidence of Valley elderberry longhorn beetle were found (City of Sacramento and the Federal Highway Administration 2006). The total number of stems according to size class were as follows: (1) ≥1-*≤*3 inches = 46, (2) *>*3-<5 inches = 7, and (3) ≥5 inches = 17 (City of Sacramento and the Federal Highway Administration 2006). *In 2007, 14 of these elderberry plants were directly affected and transplanted to an off-site conservation bank by the Freeport Regional Water Project.*

Small remnant patches of cottonwoods are located within the SRCSD Bufferlands. These cottonwoods may provide suitable nesting habitat for special-status raptors such as the white-tailed kite and Swainson's hawk, as well as common raptors.

Cosumnes River Boulevard/Center Parkway Segment. The CRB/Center Parkway segment begins at Franklin Boulevard and terminates at Bruceville Road. Up to *17.33* acres of ruderal/disturbed vegetation may be affected by the proposed LPAP2 along this segment. *A significant portion of this area was graded and paved in 2007, to provide auxiliary lanes for CRB during the installation of the Freeport Regional Water Project pipeline.* No special-status species would be affected by the removal or disturbance of ruderal/disturbed vegetation along this segment. Four seasonal wetlands (approximately 0.08 acre) are located in a ruderal field in the northeast corner of the CRC campus, adjacent to the intersection of Bruceville Road and CRB.

Cosumnes River College Segment. The CRC segment begins at the intersection of Bruceville Road and Cosumnes Boulevard, extending down Bruceville Road to include the proposed station and PNR lot options at CRC. This segment contains *approximately 13.42* acres of ruderal/disturbed vegetation that would be affected by the LPAP2. Up to *6.42* acres of the ruderal/disturbed vegetation along Bruceville Road *may* provide *potential* habitat for the western burrowing owl. *The*

raised embankment (approximately two acres) of the CRC Stadium, located adjacent to the track corridor and one of the PNR lots, may provide potential habitat for the western burrowing owl.

Calvine/Auberry Segment. The Calvine/Auberry segment includes the optional shuttle lot location north of Old Calvine Road at Calvine/Auberry. This segment includes 3.93 acres of non-native grassland that would be disturbed under the LPAP2. The non-native grassland community may provide suitable foraging habitat for a number of special-status bird species including: white-tailed kite, Swainson's hawk, short-eared owl, western burrowing owl, and loggerhead shrike.

4.4.4.2 IMPACTS TO HABITAT FOR SPECIAL-STATUS SPECIES

TSM Alternative

As shown in Table 4.4-6 below, the TSM Alternative would affect up to *14.96* acres of *potential* habitat for western burrowing owl.

Table 4.4-6: Special-status Species Habitat Impacts (acres) of the TSM Alternative

Common Name	Scientific Name	Cosumnes River College PNR Lot*s*	
Western burrowing owl	*Athene cunicularia hypugaea*	*14.96*	

LPAP2

Table 4.4-7 presents estimated special-status species habitat effects of the LPAP2. Construction of the LPAP2 would *directly* affect approximately 0.14 acre of seasonal wetlands *and indirectly affect approximately 0.99 acre of seasonal wetlands and a vernal pool* that may provide potential habitat for vernal pool fairy shrimp, midvalley fairy shrimp, vernal pool tadpole shrimp, and California linderiella; *0.34* to *66.85* acres of *riparian vegetation,* non-native grasslands, *and* ruderal/disturbed vegetation affording *potential* nesting and*/or* foraging habitat for a variety of special-status bird species; *0.001* acre of freshwater emergent wetlands within Morrison Creek that provide *potential* habitat for western pond turtle and giant garter snake*; and 0.46 acre of potential upland habitat for giant garter snake adjacent to Morrison Creek and Union House Creek*. The habitat impact acreages provided below are approximate. Acreage calculations for project-related impacts to *federally* listed species (e.g., vernal pool fairy shrimp and giant garter snake) *are in accordance with those stipulated in the USFWS's BO for the project (USFWS 2008)*.

4.4.4.3 IMPACTS TO WETLANDS AND OTHER WATERS OF THE U.S.

TSM Alternative. Construction of one bus PNR lot at CRC under the TSM Alternative would not affect wetlands or other waters of the U.S.

Table 4.4-7: Special-status Species Habitat Impacts (acres) for the LPAP2

Common Name	Scientific Name	LPAP2
Vernal pool fairy shrimp[1]	*Branchinecta lynchi*	0.14 *(direct[2])* *0.99 (indirect[3])*
Midvalley fairy shrimp	*Branchinecta mesovallensis*	0.14 *(direct)* *0.99 (indirect)*
Vernal pool tadpole shrimp[1]	*Lepidurus packardi*	0.14 *(direct)* *0.99 (indirect)*
California linderiella	*Linderiella occidentalis*	0.14 *(direct)* *0.99 (indirect)*
Western pond turtle	*Clemmys marmorata*	0.04 *(direct)* *0.99 (indirect)*
Giant garter snake[1]	*Thamnophis gigas*	*0.001* (aquatic) *0.46 (upland)*
Double-crested cormorant	*Phalacrocorax auritus*	*0.31* (foraging)
American bittern	*Botaurus lentiginosus*	*0.31* (foraging)
Snowy egret	*Egretta thula*	*0.31* (foraging)
Great egret	*Ardea alba*	*0.31* (foraging)
Great blue heron	*Ardea herodius*	*0.31* (foraging)
White-tailed kite	*Elanus leucurus*	Up to *44.00* (foraging) *0.34* (nesting)
Northern Harrier	*Circus cyaneus*	Up to *44.00* (foraging and nesting)
Swainson's hawk	*Buteo swainsoni*	Up to *44.00* (foraging) *0.34* (nesting)
Cooper's Hawk	*Accipiter cooperii*	*0.34* (nesting)
Short-eared owl	*Asio flammeus*	Up to *44.00* (foraging)
Western burrowing owl	*Athene cunicularia hypugaea*	Up to *76.70* (foraging and nesting)
Loggerhead shrike	*Lanius ludovicianus*	Up to *44.00* (foraging)
Tricolored blackbird	*Agelaius tricolor*	Up to *44.00* (foraging)

[1] Impact calculations for federally listed species are in accordance with those identified in the USFWS's BO for the project.
[2] If any part of an aquatic feature that represents potential vernal pool branchiopod habitat is proposed for impact, the entire feature was considered directly impacted.
[3] Pursuant to USFWS guidance, potential vernal pool branchiopod habitat that occurs within 250 feet of construction activities may be considered indirectly affected.

LPAP2

Jurisdictional wetland and other waters of the U.S. impacts for the LPAP2 are presented in Table 4.4-8. Construction of the LRT alignment, LRT stations, PNR lots and optional shuttle lot for the LPAP2 would permanently displace 0.14 acre of jurisdictional wetlands located north and west of the Morrison Creek levee, 0.001 acre of Morrison Creek, 0.03 acre of linear depressions located west of Morrison Creek levee, and 0.14 acre of seasonal wetlands located south of the confluence of Morrison Creek and Union House Creek at the SRCSD Bufferlands.

Table 4.4-8: Jurisdictional Wetlands and Other Waters of the U.S. Impacts (acres)
LPAP2
0.311

4.4.5 Agency Consultations

Consultation with the USFWS under Section 7 of the federal Endangered Species Act (ESA) and with the CDFG under the California Endangered Species Act (CESA) is required if the project will have impacts to special-status species. Consultation is being conducted with USFWS regarding potential project-related impacts to federally listed vernal pool crustaceans and plants, valley elderberry longhorn beetle, and giant garter snake. The Preliminary Biological Assessment and the SDEIS/SDEIR were distributed to USFWS and CDFG for their review and comment. The USFWS, in consultation with RT and FTA, issued a BO and Incidental Take Statement for the project that stipulates minimization and compensatory measures to fully address impacts to federally listed species and/or their habitat. Consultation under the federal ESA concluded with issuance of the BO. Subsequent to this issuance, CDFG will be requested to issue its determination that the conclusions, conservation measures, and other terms and conditions are consistent with the provisions and requirements of the CESA. It is anticipated that CDFG will now execute the consistency determination.

The Wetlands Delineation Report was submitted to the ACOE for their review in February 2005. The ACOE's jurisdictional determination was received on May 17, 2006 (Regulatory Branch File No. 200500580). A copy of the ACOE's letter is included in Appendix E. Because neither the TSM nor LPAP2 Alternative impacts to wetlands would exceed 0.5 acres, it is anticipated that the South Sacramento Corridor Phase 2 project will qualify for (a) Nationwide Section 404 permit(s). The NEPA-404 Integration Process does not apply to this undertaking.

4.4.6 Mitigation Measures

4.4.6.1 SPECIAL-STATUS SPECIES

Mitigation measures for impacts to vegetation communities affording habitat for special-status species and to jurisdictional areas will be formulated through consultations with USFWS, ACOE, and CDFG. The USFWS issued a BO for the project on April 18, 2008 (USFWS 2008). It is anticipated that the consistency determination will be issued by CDFG.

The following measures address the permanent impacts of the South Sacramento Corridor Phase 2 project. Construction-phase preventive measures are also recommended to avoid and minimize harm to species from project construction activities; see Section 5.2.4, Biological Resources.

B-1 *As stipulated in the BO, prior to the initiation of construction activities, RT will compensate for project-related impacts to vernal pool crustacean habitat through the purchase of the equivalent of 2.26 acres of preservation credits, and 0.14 acre of creation/restoration credits from a USFWS-approved conservation bank, or combination of banks, servicing the area where the project effects occur. If a conservation bank can not be found that offers creation/restoration credits servicing the area that includes the project, then, with USFWS approval, the project proponents may be allowed to purchase creation/restoration credits from a conservation bank that's service area does not include the proposed project (USFWS 2008).*

B-2 *According to the City of Sacramento, the Interstate 5 (I-5)/CRB Interchange Project is anticipated to initiate construction ahead of the LPAP2 2 Project at the location where the elderberry shrubs are located. Therefore, the I-5/CRB Interchange Project would be responsible for addressing the impacts to the affected elderberry shrubs. Based on this information, the USFWS concurred with the determination that the LPAP2 Project is Not Likely to Adversely Affect the Valley elderberry longhorn beetle. In the unlikely event that project timing is modified such that project-related activities associated with the LPAP2 Project occur at this location prior to the I-5/CRB Interchange Project, then it will be necessary for FTA and RT to reinitiate consultation with the USFWS and address impacts on Valley elderberry longhorn beetle. In addition, the Freeport Regional Water Project directly affected 14 elderberry shrubs located on the SRCSD Bufferlands adjacent to Franklin Boulevard and transplanted them to an off-site conservation bank. These 14 elderberry shrubs represented a subset of the shrubs that were to be directly affected by the I-5/CRB Interchange Project or the LPAP2 Project. As stipulated in the EIS/EIR for the I-5/CRB Interchange project, the project proponent will transplant directly affected elderberry shrubs and purchase the appropriate number of beetle habitat credits at a USFWS-approved conservation bank prior to ground breaking (USFWS 2005, City of Sacramento and Federal Highway Administration 2006).*

B-3 *As stipulated in the BO, prior to the initiation of construction activities, RT will purchase the equivalent of 9.823 acres of giant garter snake habitat credits from a USFWS-approved conservation bank servicing the area where the proposed project effects occur. This purchase shall compensate for 8.44 acres of temporarily affected giant garter snake habitat and 0.461 acres of permanently affected giant garter snake habitat (USFWS 2008). All temporary effects will be compensated at a 1:1 ratio, and all permanent effects will be compensated at a 3:1 ratio.*

B-4 RT will consult with the SRCSD Bufferlands manager to explore opportunities to compensate for impacts to grassland and riparian vegetation communities that provide suitable nesting and foraging habitat for special-status birds or to mitigate habitat impacts through improvements to Bufferland areas.

B-5 If necessary, RT will compensate for the loss of occupied western burrowing owl burrows and associated foraging habitat through the purchase of credits at a CDFG-approved mitigation bank. The number of credits to be purchased will be determined through consultation with CDFG.

B-6 Permanent impacts to *potential foraging habitat for* Swainson's hawk will be mitigated through payment into a mitigation bank program approved by CDFG. Credits will be purchased at a ratio or in amounts to be determined through consultation with CDFG.

B-7 *RT will compensate for loss of protected trees pursuant to the City of Sacramento Heritage Tree Ordinance. Removal of native oaks, mature native riparian trees, and any other protected trees, shall be avoided to the maximum extent practicable. Prior to project implementation, RT shall provide a qualified arborist to survey potentially affected trees within the project area, to record an accurate location, species, size (DBH), and canopy diameter. This information shall be submitted to the City of Sacramento Tree Services Department for review. RT shall develop and implement a mitigation plan, in accordance with the applicable ordinances, to compensate for removal of protected trees.*

4.4.6.2 WETLANDS AND OTHER WATERS OF THE U.S.

B-8 Before construction begins, the project proponent would obtain all necessary permits pertaining to affected waters of the U.S. Grading or other construction activities within Morrison Creek would require a Streambed Alteration Agreement from the CDFG. Discharge of fill into waters of the U.S. associated with bridge construction or other project activities would require a Clean Water Act (CWA) Section 404 permit from the ACOE and Section 401 certification from the Central Valley Regional Water Quality Control Board. Grading would require a CWA Section 402 permit and preparation of a Storm Water Pollution Prevention Plan (SWPPP). The permitting process would also require compensation for project-related impacts.

B-9 Mitigation for impacts of the South Sacramento Corridor Phase 2 project to wetlands will be provided to achieve ACOE "no net loss" policy objectives. It is recommended that LPAP2 impacts to wetlands would be compensated by RT's purchase of mitigation credits in an agency-approved wetland mitigation bank or an in lieu fee. Credits will be purchased at ratios to be determined in consultation with ACOE.

4.5 HISTORIC AND CULTURAL RESOURCES

4.5.1 Regulatory Compliance

Section 106 of the National Historic Preservation Act of 1966 requires federal agencies to take into account the effects of their activities and programs on historic properties. Section 110 of the Act lays out affirmative agency responsibilities with respect to historic properties and establishes the National Register of Historic Places (NRHP) for identifying and listing historic properties of importance to the nation, the states, and local communities.

Guidelines for implementing Section 106 requirements are promulgated by the Advisory Council on Historic Preservation (ACHP) in "Protection of Historic Properties" (36 CFR Part 800). These guidelines require agencies to comply also with other federal laws related to historic preservation, including the National Environmental Policy Act of 1969; the Archaeological and Historic Preservation Act of 1979; and Executive Order 11593 (1971), addressing "Protection and Enhancement of the Cultural Environment." Other agency-specific legislation requires consideration of the impacts of federal actions on cultural resources. Transportation projects must comply with the provisions of Section 4(f) of the Department of Transportation Act of 1966.

23 CFR Part 771.135 of the DOT Regulations implementing NEPA (citing Title 49 of the United States Code, Part 303) states that the Administration may not approve the use of land from a significant publicly owned public park, recreation area, or wildlife and waterfowl refuge, or any significant historic site unless there is no feasible and prudent alternative to the use of land from the property and the action includes all possible planning to minimize harm to the property resulting from such use. This provision is commonly termed, "Section 4(f)."

The State of California references cultural resources in the California Environmental Quality Act (CEQA—Public Resources Code (PRC) Division 13, Sections 21000-21178); archaeological and historical resources are specifically treated under Sections 21083.2 and 21084.1, respectively. California PRC 5020.1 through 5024.6 (effective 1992) creates the California Register of Historical Resources (CRHR) and sets forth requirements for protection of historic cultural resources.

City-designated structures and districts are presumed historic resources under the California Environmental Quality Act (CEQA) as they are on a local register. In addition, resources listed or determined eligible for listing in the CRHR or in the NRHP are also considered historic resources under CEQA.

4.5.1.1 ARCHAEOLOGICAL AREA OF POTENTIAL EFFECTS

An Area of Potential Effects (APE) for archaeological resources was delineated by FTA in consultation with the State Historic Preservation Officer (SHPO). This APE was defined as the extent of proposed construction for the project (i.e., the project "footprint"). Appendix G shows the APE for archaeological evaluation.

4.5.1.2 HISTORIC ARCHITECTURAL AREA OF POTENTIAL EFFECTS

The APE for historic architectural resources was also delineated by FTA in consultation with the SHPO. The APE was defined to take into account the potential impacts associated with the various project components. It encompasses the properties within the project footprint, as well as an area of one parcel deep on all sides immediately adjacent to the proposed locations of all components of the proposed project. Where flyovers, stations, PNR lots, traction power substations and the optional shuttle lot are proposed, the APE was extended to account for an expanded project footprint at those locations. Appendix H shows the APE for historic architecture.

4.5.1.3 HISTORIC PROPERTIES SURVEY REPORT

A Cultural Resources Inventory (CRI), Historic Resource Evaluation Report (HRER), and Historic Property Survey Report (HPSR) were prepared and submitted to the SHPO. These reports, prepared in accordance with California Department of Transportation guidelines, identify and assess the eligibility of cultural resources within the APE. The SHPO concurred in the determinations of eligibility on June 21, 2006. A copy of the SHPO's letter of concurrence is included in Appendix E. The following sections summarize information and National Register eligibility determinations contained in the CRI, HRER and HPSR; they also include available information regarding designations and eligibility at the local and State level.

4.5.2 Resources in the Area of Potential Effects

4.5.2.1 ARCHAEOLOGICAL RESOURCES

An archival records search was conducted at the North-Central Information Center of the California Historic Resources Information System (CHRIS), housed at California State University, Sacramento. Results of previous records searches for Sacramento County also were reviewed. Listings in the National Register of Historic Places were obtained from the website of the Advisory Council on Historic Preservation. Additional archival information was obtained from JRP Historical Consulting Services, the firm that conducted the architectural historical studies for the proposed project. The results of the archaeological study are reported in the CRI for the LPAP2 Alternative, which is summarized below.

Several portions of the proposed alignment had been surveyed as part of studies for other projects in the vicinity of the LPAP2 alignment. These surveys are summarized in Table 4.5-1. Previous surveys recorded two sites within the current APE: Old Calvine Road (CA-SAC-544H), and a collapsed historic structure near Bruceville Road (CA-SAC-616H).

The results of the records search indicated that the areas listed in Table 4.5-1 were adequately inventoried for other projects and do not require additional survey for the current study. Archaeological surveys were conducted between May 24 and July 25, 2002, and on November 19, 2002, on all other areas within the APE. Open fields and other exposed areas were surveyed on foot, although much of the survey area was covered in dense grasses, and visibility was low. Where portions of the LPAP2 alignment were paved, landscaped, or otherwise obstructed, the locations were visited, but no pedestrian survey was made.

Native American Coordination

The Native American Heritage Commission was consulted to request a Sacred Lands file search and obtain the names of Native American contacts who may have an interest in the project. The Commission reported no known Sacred Lands within the archaeological APE and provided a list of 13 Native American contacts. Each of the contacts on the list was sent a letter in June, 2002, notifying them of the preparation of the SFEIS/SFEIR for the LPAP2 project and asking them to share information, express concerns, or make recommendations concerning Native American cultural resources. Project team archaeologists followed the letters with personal contacts. These coordination efforts identified one individual with any concerns about the project. A coordination meeting was held with this individual, RT, and project archaeologists on March 30, 2004. Additional project particulars and contact information were provided to enable ongoing coordination.

Background Information

The LPAP2 alignment is located on the alluvial sediments of what were once seasonally wet grasslands, bounded by the Sacramento River to the west, the American River to the north, the Cosumnes River-Deer Creek drainage on the east, and to the south, the Sacramento-San Joaquin Delta. All four of these boundary features are known to have provided a rich base of resources for prehistoric and historic-era peoples living in the area. The native gallery forests that once occupied the higher ground along the Sacramento and Cosumnes rivers would have provided abundant wood, water, fish, game, and village locations. Between 1860 and 1930, the construction of dams, reservoirs, levees and diversions to create agricultural lands greatly changed the landscape. Only remnants of the gallery forests and surrounding wetlands remain.

Table 4.5-1: Previous Cultural Surveys and Known Sites Adjacent to/Overlapping with the Archaeological APE for the LPAP2 Alternative

Project	Location	Results	Reference
South Sacramento Phase 1 Corridor Project	Union Pacific Railroad tracks from Meadowview Road to Morrison Creek; Bufferlands; intersection of Bruceville Road and CRB; north side of Old Calvine Road	One (septic tank) is immediately adjacent to the LPAP2 area.[1]	Brown et al. 1994 (PAR Environmental Services, Inc.)
SMUD Rancho Seco-Pocket Transmission Line	UPRR tracks from north of Meadowview Rd. to Union House Creek (also known as Beacon Creek.)	No sites in the LPAP2 area	Peak & Assoc. 1980a, 1980b; Roark 2001
Morrison Stream Group (for proposed Vineyard Reservoir, never constructed)	Both banks of Morrison, Union House, and Strawberry creeks (before channelization)	No sites in LPAP2 area	Johnson 1974
Sacramento Regional Wastewater Treatment Plant Master Plan	Small area just west of Franklin Blvd. and south of Union House Creek	No sites in LPAP2 area	Maniery et al. 1994 (PAR Environmental Services, Inc.)
Cosumnes River Blvd.	Proposed road corridor and surrounding lands from Franklin Blvd. to the Sacramento River (including a portion of UPRR tracks in current project APE)	No sites in the LPAP2 area; recommends monitoring during construction at Morrison Creek crossing	Roark 2001
Proposed College Square Development	Area bounded by Highway 99 and Cotton Lane (north of existing residences)	No sites found	Dudock and Childress 2000
Cosumnes River College Area Land Use Plan	Old Calvine Road; location of old residence	Road recorded as historic feature (CA-SAC-544H); residence site recorded as CRU-93-Sac-7H	Derr 1993
Cosumnes River Blvd./Calvine Road Interchange	Both sides of Highway 99 at Old Calvine Road and continuing north (including Strawberry Creek)	Three historic sites adjacent to (but not within) LPAP2 area	Syda and Shapiro 1992; Mohlenbrok 1992

[1] Brown (1994) found this isolated septic tank to appear ineligible for the NRHP.

Source: Far Western Anthropological Research Group, 2003.

Soils over most of the area near the LPAP2 alignment have been mapped as Clear Lake clays, Galt clays, or San Joaquin silt-loams. The clays tend to be very sticky and plastic when moist, and are unsuitable for habitation, making it unlikely that they contain prehistoric or historic archaeological sites on or near the surface. Areas of Clear Lake or Galt clays include the Wastewater Treatment Plant Bufferlands, the route of CRB, and most of Bruceville Road. San Joaquin soils are moderately deep, moderately well drained soils on low terraces and are much more likely places for archaeological sites. San Joaquin soils are found along Calvine Road.

The area was occupied by Plains Miwok people when the first Euroamericans arrived there. At the time of the Spanish explorations – and probably prehistorically as well – the broad alluvial plains of the lower Sacramento Valley were inundated in late spring, and only narrow crests of natural levees (which supported Indian villages) remained above water. The area around Sacramento was among the first locations in the northern part of the state to be settled by Euroamericans, and the Plains Miwok villages were quickly devastated by disease and violence. There is little direct knowledge of the traditional life ways of these people, and it is only extrapolated that they were semi-sedentary hunter-gatherers with many of the same cultural and social traits as their neighbors.

Survey Results

The remains of a residence and garage were known to exist on the east side of Bruceville Road near Cotton Lane. This site (Site CA-SAC-616H) was recorded in 1993 and was revisited during the field inventory for the current project. It was originally recorded as a possible "small animal barn," although it was found to include the remains of at least two small structures, several segments of concrete (house) foundation, and non-native vegetation. The evaluation of this site concluded that it does not meet the criteria for listing in the NRHP or the CRHR. Archival research for the project conducted by JRP Historical Consulting Services (discussed in Section 4.5.2) turned up nothing to suggest that the former home site was associated in any way with events or individuals important to our cultural or historical heritage; nor can it be considered an example of a distinct "type, period, region, or method of construction," or that it "possesses high artistic value," as the structures are no longer standing, and all that remains of the main house is its slab foundation. This site appears to have no potential for information important to understanding local, state, or national history. Any data the site may possess have already been collected during its recordation.

Old Calvine Road (CA-SAC-544H), identified in Table 4.5-1 as a historic feature, was also evaluated for eligibility in the national and California registers. Within the APE of the present project nothing remains of the historic road. This portion of roadway is modern (i.e., less than 50 years old) and retains none of the historic integrity of the older feature. Nor is there any information to suggest that Old Calvine Road is related in any way to important events or individuals, or is a special engineering feature. Therefore it is considered ineligible for the NRHP or CRHR.

Tremaine and Associates Study

In the draft report prepared in 2002 for the CRB Extension Project, Tremaine and Associates note that the Bufferlands area would have been conducive to human habitation in prehistoric (as well as historic) times, given the proximity to natural water sources. Further, alluvial sediment deposition, which has occurred there over the last 10,000 years, has the potential to bury archaeological sites and features well below the modern ground surface.

As an exploratory measure, Tremaine and Associates conducted an archaeo-technical (remote sensing) study, which consisted of a non-invasive, electromagnetic survey of a triangular piece of land immediately north of the proposed CRB extension, bounded by Union House Creek, Franklin

Boulevard, and the UPRR tracks. The technique recorded three distinct electromagnetic "anomalies" (a fourth one was discounted because of its location within an existing detention basin), which Tremaine and Associates interpreted as "the most likely locations for buried archaeological deposits." The researchers recommended that sample cores be taken and analyzed in these areas before construction for the CRB project – or, that at a minimum, monitoring be conducted at these three locations during construction.

4.5.2.2 HISTORIC ARCHITECTURAL RESOURCES

No historical architectural resources were found to appear eligible for the NRHP or CRHR. The Historic Resource Evaluation Report (HRER) prepared for this project is summarized below.

A total of 354 buildings, structures and objects are located within the architectural APE. Of these, six buildings, structures or objects were constructed in or before 1957 and required survey or recordation for the proposed project. The remaining 348 buildings, structures and objects were constructed in or after 1958. Roads, freeways, signs, culverts, and other ubiquitous features were excluded from evaluation according to generally accepted cultural resources management practices because it is highly unlikely that these types of features are historically significant. For example, roads and freeways that intersect the project APE (including Calvine Road, Franklin Boulevard and Route 99) are ubiquitous or fragmentary infrastructure elements, and were specifically excluded from historic evaluation. JRP Historical Consulting Services concluded that the feature know as Calvine Road (recorded in 1993 by Derr) appears ineligible for the NRHP.

The project APE covers a large area that includes a community college and numerous commercial, industrial, and residential structures, as well as infrastructure. Two of the historic-era resources (constructed in 1957 or earlier) within the APE are infrastructure elements: (1) the flood control features of Union House (Beacon) Creek that run east-west intersecting with Morrison Creek near the western boundary of the APE, and (2) a half-mile segment of the Union Pacific Railroad (formerly Western Pacific Railroad), which includes two railroad trestles that span the waterways and levees of these same creeks. Both of these infrastructure resources are heavily modified and neither appears to be significant. Neither the flood control features, nor the railroad structure, appear to meet the criteria for listing on the NRHP and CRHR.

The other four historic period resources within the APE are single-family residences that were constructed in the period from about 1935 to about 1955. All of these buildings were built on small, semi-rural residential parcels, most ranging in size from roughly 1/3 acre to 1 1/2 acres. The subdivisions were a result of landowners dividing land and selling lots without actually constructing houses. Nearly all of the residences were constructed in the common Minimal Traditional, Ranch or Contemporary architectural styles, which were popular and economical designs that were very common for working class residences during this period. Regardless of the architectural style, in general, these buildings are typically modified one-story wood frame houses with simple plans ranging in size from about 600 to 1,000 square feet. Most of these buildings have been heavily modified by the replacement of original windows, siding, and the construction of additions, all of which compromises their historic integrity. Many have also suffered a loss of feeling, association, and setting through the alteration of surrounding buildings and modern infill construction on nearby parcels. None of the four resources appear to meet the criteria for listing on the NRHP or CRHR.

Archival research was conducted by JRP at the California State Library, Shields Library at U.C. Davis, the Sacramento County Assessor's Office, the Sacramento County Recorder's Office, the Sacramento Archives and Museum Collection Center, the Sacramento Room of the Sacramento Public Library, the Caltrans library in Sacramento, the California State Library, and the California State Railroad Museum.

Properties in the survey population were inspected in the field, photographed, and described in detail on DPR-523 forms. None of the buildings within the architectural APE have been previously surveyed, nor do any of them appear in the Office of Historic Preservation's (OHP's) Historic Resources Inventory as of May 2002.

4.5.3 Impacts

4.5.3.1 IMPACTS TO ARCHAEOLOGICAL RESOURCES

No archaeological resources were found to appear eligible for listing in the NRHP or the CRHR. Because much of the APE has been covered over with pavement or other obstructions, however, the CRI could not determine with absolute certainty that there are no unrecorded cultural remains within the APE. If such remains exist, areas where they are most likely to occur are as follows:

- Areas of San Joaquin silt-loam soils that could not be surveyed because of pavement or other obstructions, including CRB between Center Parkway and Bruceville Road, and the optional shuttle lot location at Calvine Road and Auberry Drive, north of the future Edward Harris Middle School and Monterey Trails High School;
- Natural stream crossings and stream-side terraces (areas of higher archaeological sensitivity) along Morrison, Union House, and Strawberry creeks; and
- The anomalies within the Bufferlands identified by Tremaine and Associates.

The LPAP2 would primarily be constructed above ground and often on fill. Subsurface construction would occur mainly in locations where bridge foundations and support columns would be required.

4.5.3.2 IMPACTS TO HISTORIC ARCHITECTURAL RESOURCES

Because there are no historic architectural resources in the APE that are eligible for listing in the NRHP or CRHR – or included in any local inventory of historic resources – the project would have no impact on historic architectural resources.

4.5.4 Mitigation Measures

These mitigation measures are consistent with the California SHPO's concurrence on a finding of no affect [being] predicated on the FTA conducting monitoring, by an archeologist who meets the Secretary of Interior's standards for archeology, and a member of the local Native American community (if they so choose).

H&C-1 During construction in areas identified in Section 4.5.3.1, monitoring will be conducted by a qualified professional archaeologist, and if a recognized member of the local Native American community requests to be present, by a member of the local Native American community. The monitor(s) will have the ability to temporarily stop any work in an area where archaeological materials or human remains are uncovered long enough to assess the finds and, in the case of human remains, to follow the stipulations set out in the State Health and Safety Code (Section 7050.5). The project's construction contracts will include provisions requiring this type of monitoring and coordination process.

H&C-2 If unanticipated archaeological resources are encountered during construction, they would be addressed in consultation with the Office of Historic Preservation in (OHP) or in accordance with an archaeological treatment plan to be developed in consultation with OHP.

4.6 ELECTROMAGNETIC FIELDS (EMF) AND ELECTROMAGNETIC INTERFERENCE (EMI)

4.6.1 Electromagnetic Fields (EMF)

Electromagnetic fields (EMF) are associated with electromagnetic radiation on the lower frequency end of the electromagnetic spectrum.[10] The electromagnetic spectrum includes the various waveforms of energy found in the environment, from electrical fields to radio waves to light to x-rays. Energy frequencies at the high end of the spectrum are termed ionizing because they break chemical bonds and thereby can damage living cells and DNA. Energy frequencies at the lower end are termed non-ionizing since they do not break chemical bonds and would not have the same biological effects as ionizing radiation. The EMF discussion of this section pertains to non-ionizing radiation.

EMF results from both man-made and naturally occurring sources of radiation energy. The most common manmade sources of EMF are electrical systems such as electronics, telecommunications, electric motors, and other electrically powered devices. The radiation from these sources is invisible, non-ionizing, and low frequency. Generally, in most living environments, the level of such radiation plus background natural sources of EMF is low and not considered hazardous. Under extreme conditions, however, EMF can become intense, and hazards include shock and burn. Such conditions are rare. The more pertinent concern over EMF exposure is the potential insidious biological and health effects to individuals as the number of manmade EMF-generating activities increases. As more sources of EMF are introduced, the extent and level of human exposure increases.

As the name implies, EMF has electrical and magnetic field components. With respect to electrical systems, electric fields result from the strength of the electric charge (voltage) while magnetic fields result from the motion of the charge. Direct current (DC) produces stronger EMFs than alternating current (AC). Electric field strength is measured in units of volts per meter (V/m) and is greater the higher the voltage. Electric field strength deteriorates rapidly with distance from the source. Magnetic field strength has several units of measure; the most commonly used are milligauss (mG) and the microTesla (µT). Ten milligauss equal one microTesla. Magnetic fields also deteriorate with distance but readily pass through most objects. Magnetic fields are typically the radiation of concern when evaluating EMFs. Consequently, EMF strength is measured in terms of milligauss.

Although modern society increasingly relies on electromechanical systems, strong EMF fields are not associated with the normal live-work environment. Examples of EMF intensities from human activities are presented in Table 4.6-1.

For comparison, in the natural environment apart from human activity, the earth's static magnetic field varies from 300 mG at the equator to over 600 mG at the magnetic poles.

[10] The frequency of electromagnetic radiation is the rate at which the electromagnetic field changes direction, expressed in terms of cycles per second, or Hertz (Hz). Frequencies of less than around 3000 Hz are considered extremely low frequency (ELF) and include alternating current electrical fields that oscillate at 60 Hz and direct current fields that are static.

Table 4.6-1: EMF Intensities from Common Human Activities	
Activity	**EMF Intensity**
Overhead power transmission line	1 to 300 mG (at edge of right of way)
Overhead power distribution lines	1 to 80 mG (under the line)
Household appliances	2 to 80 mG (at 12 inches)
Computer video display	2 to 4 mG (at 16 inches)
Rail vehicle (electrically powered)	400 mG (at 43 inches from the vehicle floor) to 1,500 mG (at floor level)
Source: Understanding EMF, Electric and Magnetic Fields, Pacific Gas & Electric Company, August 2002; Safety of High Speed Guided Ground Transportation Systems, EMF Exposure Environments Summary Reports, Federal Railroad Administration, August 1993.	

4.6.1.1 SETTING AND REGULATORY ENVIRONMENT

The area in the vicinity of the proposed transportation improvements for the project alternatives is developed or developing urban area. As such, it includes numerous sources of low-level EMF. The existing and No-Action Alternative EMF environment would be characterized by lower levels of EMF than would be found in dense urban environments with extensive commercial/industrial activity. Most exposures to individuals would be at the levels found in modern residential and office environments. For example, the average home in the U.S. has background alternating current (ac) magnetic field levels of approximately one mG when a person is not directly exposed to an electric appliance.

Health Issues. Although short-term human health effects from abnormal, sustained exposures to EMFs are well established, such as effects on the central nervous system and elevation of body temperature, the effects of long-term exposures to the typical levels of EMF found in the normal human environment are not clear. Several reports have proposed a link between EMF exposure and such health problems as cancer, including childhood leukemia. The California EMF Program recently issued "An Evaluation of the Possible Risks from Electric and Magnetic Fields (EMFs) from Power Lines, Internal Wiring, Electrical Occupations, and Appliances" (Final Report, June 2002) in which the researchers "were inclined to believe that EMFs can cause some degree of increased risk of childhood cancer, adult brain cancer, Lou Gehrig's Disease, and miscarriage." The researchers strongly believed "EMFs are not universal carcinogens." The conclusions of this study are very controversial. The report does not include recommendations on protecting against the potential health risks and emphasizes that the risks are very small; only a very small fraction of the possible cancers or health conditions could be attributed to EMFs. The preponderance of other authoritative scientific studies has found no evidence of long-term health risks from low-intensity EMF exposures. Health and regulatory agencies continue to study the matter.

Regulatory Setting. Neither the federal government nor the state of California has set standards for EMF exposures. The Federal Drug Administration, Federal Communications Commission, Department of Defense, and Environmental Projection Agency at various times have considered guidelines. The California Department of Education has established a policy of "prudent avoidance" for the location of schools in the vicinity of high voltage power lines. Several countries and other states have standards for electrical field exposures. The International Radiation Protection Association has proposed limiting ac electric field exposure to five kV/m and magnetic field exposure to 2000 mG.

The California Energy Commission (CEC) recommends that transmission lines be designed so electric fields at the edge of ROW do not exceed 1.6 kV/meter; no recommendation is provided for magnetic fields, however. The CEC's current position is that EMF exposure at utility ROW limits should not constitute a significant effect "if emissions have been mitigated to the extent achieved by engineering practice" *(Instructions to the California Energy Commission Staff for the Review of and Information Requirements for an Application for Certification*, California Energy Commission, 1992). Two states and several countries have emission standards for EMF exposures. New York has set limits of 1.6 k/V/meter for electric field strength and 150 mG for magnetic field strength at the edge of ROW for new transmission line. Florida has limits of 2 kV/meter and 150 mG. These standards are not based upon demonstrated effects of EMF on human health.

4.6.1.2 IMPACTS

The No-Action Alternative and TSM Alternative would not introduce major new EMF generators into the environment. The TSM transit improvements would be primarily expanded bus service. Although buses have electrical systems that generate EMF, the potential exposure to riders would differ little from the exposure an individual would experience when riding in a non-electric private automobile, for example.

The LPAP2 would introduce new electrical systems into the local environment, and these are potential sources of increased EMF exposure to both individuals riding the rail system and individuals working (or possibly residing) near electrical equipment. The main sources of EMF generation would include overhead train power distribution systems (catenary), which are 750 volt DC; power substations with connecting lines to the major utility lines; passenger facilities, with their various electrical systems for lighting, communications, utilities, fare machines, among other systems, and their proximity to power distribution networks; and electrically powered light rail vehicles. *EMF may interfere with sensitive electronic equipment. Typically, such devices are found in scientific laboratories, health facilities, recording studios and the like. No such resources have been identified in the corridor and therefore adverse impacts on sensitive electronic instruments are not anticipated.*

EMF intensities associated with electric trains vary considerably. The greatest potential fields, and therefore highest potential for exposure, are within the electric light rail vehicle itself. Stations would also be a location of EMF exposure to passengers and station workers. Train operator exposure would be greatest in the motorized vehicle. Other worker exposure would likely be greatest when working close to an activated catenary system and substations.

Strong fields that carry a greater possibility of health risks are not associated with these environments, however. The field strengths are low (as described previously) and below most recommended exposure levels. For light rail passengers and individuals passing through or by rail facilities, the duration of exposure to EMFs would be relatively brief in comparison to their daily exposure from office equipment, household appliances, cell phones, and other electronic equipment. Because EMF field strength diminishes rapidly with distance from the EMF generator and because most rail electrical systems would be isolated in RT owned right-of-way, EMF impacts to residences and workplaces adjacent the light rail alignment should be very low level and in most cases not measurable.

At present, the evidence is that any increased health risks from EMF exposures attributable to light rail improvements would be very small.

4.6.2 Electromagnetic Interference (EMI)

EMF generation has the potential to interfere with the performance of other electromagnetic systems. Electrical Magnetic interference (EMI) is defined as the interruption, obstruction, or other degradation in the effective performance of electronics and electrical equipment. Depending upon the critical nature of this equipment, the effects can have serious consequences for the health and safety of individuals. Perhaps of less concern but nonetheless important, the efficiency of affected systems may be reduced.

The main sources, or generators, of transient EMI disturbances would be switching currents produced by switching loads, relays, power controllers, and switch mode power supplies. High current electronic switches and controls are capable of producing transient signals that can be transmitted along the power supply network to other electronic systems. The No-Action and the TSM Alternatives would not introduce major new sources of EMI into the environment. The greatest potential for EMI impacts would be associated with the LPAP2.

4.6.3 Mitigation Measures

EMF-1 The potential for EMI effects can be minimized by ensuring that all electronic equipment is operated with a good electrical ground and that proper shielding is provided for electronic system cords, cables, and peripherals. Specialized components, such as filters, capacitors and inductors that can also reduce EMI susceptibility of certain systems will be installed, as appropriate. With these measures, EMI impacts of the LPAP2 would not present a problem for safe and reliable operation of the rail system and nearby electronic systems.

Because EMF intensities and exposures from proposed rail operations under the LPAP2 are expected to be below thresholds indicating potential health risks, no mitigation measures are recommended.

4.7 GEOLOGY, SOILS AND SEISMICITY

This section describes the geology of the project area and the susceptibility of site soils to seismically induced hazards. The project impact area is the maximum footprint of the proposed LPAP2, i.e., the area that will be directly affected by the project. A larger area is evaluated in the setting section to determine the overall geologic setting, soils, and seismic setting.

4.7.1 Setting

4.7.1.1 GEOLOGIC SETTING

The proposed LPAP2 Project is located in the Great Valley geomorphic province of California, bounded on the west by the Coast Ranges and on the east by the Sierra Nevada. Depth to bedrock in the project vicinity is on the order of 8,500 feet. The bedrock is overlain by roughly 6,000 feet of marine sediments of Tertiary age and 2,500 feet of more recent continental sediments. Sediments are typically deposited in near-horizontal beds with a gentle westerly dip.

Historic surface topography shows that the natural ground was very gently rolling with surface drainage to Morrison Creek, North Fork and South Fork Elder Creek and Union House Creek. These creeks flowed southwesterly to the former Beach Lake, now a dry closed-depression at or below sea level, located southwest of the project area.

As this part of Sacramento has been developed, the creeks have been confined to linear channels with levee banks constructed partly of artificial fill. Other existing areas of fill along the project alignment include railroad embankments, streets and highways, soil berms around detention basins, and the northeast corner of the Cosumnes River College (CRC) football stadium.

Geologic surface mapping shows that most of the alignment is underlain by Riverbank formation, described as partly consolidated glacial outwash alluvium of Pleistocene age. Overall, these deposits are expected to be effectively flat-lying, but there can be vertical and horizontal stratigraphic transitions between zones of clay, silt, sand and gravel. Such transitions may be abrupt or may occur gradually. The creeks are commonly incised into the Riverbank formation.

Test borings made for nearby projects suggest that, for most of the project, the natural soils profile consists of roughly three to five feet of stiff clay (topsoil) overlying interbedded clay, silty sand/sandy silt, and sand of stiff to hard or compact to dense consistency. The borings indicate that clean sands and gravel/cobble beds are present at some locations and that silt/sand soils commonly exhibit significant cementation. Clay soils near ground surface are expected to have medium to high expansion potential.

Geologically, recent basin deposits, expected to consist primarily of silt/clay alluvium, are mapped at the west edge of the project in and along the Morrison Creek and Union House Creek channels. None of the referenced test borings were made in areas mapped as underlain by basin deposits. Where basin deposits are present, they may constitute areas with a significant thickness of soft or loose soils.

Soil survey mapping shows typically clay or clay loam soils along the project alignment. Where soils are developed on older alluvial fans such as the Riverbank formation, they are indicated to be typically shallow, with a well developed clay horizon underlain by a cemented “hardpan” layer. Soil survey mapping suggests that shallow ground water may be present in soils developed over basin deposits and that, in soils developed on Riverbank formation, seasonal saturation of surface soils may result in “perched” groundwater above the underlying hardpan.

The LPAP2 alignment is located roughly 70 miles east of the Pacific Ocean, and there are no sizeable lakes in the vicinity of the project. Due to the site’s location, seiche and tsunami are not considered a hazard.

4.7.1.2 SEISMIC SETTING

As shown in Table 4.7-1, numerous active faults capable of generating earthquakes with moment magnitude in the range of 6.1 to 7.9 are located within 100 miles of the project. Over the last 200 years, these faults are known to have produced more than 800 earthquakes of magnitude 4.0 or greater centered within 100 miles of the project area. No active faults are mapped as passing within 20 miles of the proposed alignment. Estimated historical maximum peak ground acceleration at the project site is 0.12 g.

Table 4.7- 1: Active Faults Within 100 Miles of the LPAP2 Alignment

Fault	Approximate Distance (miles)	Estimated Maximum Earthquake Magnitude (Mw)
Foothills System	22	6.5
Great Valley	27	6.8
Concord-Green Valley	40	6.9
Hunting Creek-Berryessa	41	6.9
Greenville	43	6.9
West Napa	48	6.5
Calaveras	53	6.8
Rodgers Creek	55	7.0
Hayward	59	7.1
Bartlett Springs	66	7.1
Maacama	68	6.9
Collayoni	70	6.5
San Andreas	77	7.9
San Gregorio	77	7.3
Point Reyes	80	6.8
Mohawk-Honey Lake	81	7.3
Ortigalita	83	6.9
Monte Vista-Shannon	83	6.8
Genoa	90	6.9
Sargent	96	6.8
Zayante-Vergales	99	6.8

Source: Geologic Setting/Seismic Hazard Report, Taber Consultants, June 2002

Seismic hazard mapping by the U.S. Geological Survey (USGS) indicates that over a 50-year period there is a 10 percent chance of exceeding a peak rock acceleration of 0.13 g, a five percent chance of exceeding a peak rock acceleration of 0.17 g, and a two percent chance of exceeding a peak rock acceleration of 0.22 g. The corresponding "return periods" (meaning the likely interval until such an event would re-occur) are 475 years, 975 years and 2,475 years, respectively. The primary source faults have been identified as the San Andreas Fault and the Great Valley Fault system.

The LPAP2 alignment is located in Seismic Zone 3 per the 1997 Uniform Building Code (UBC). Assuming Soil Profile Type D, UBC would assign the site a peak ground acceleration of 0.36 g. In accordance with Caltrans "Seismic Design Criteria," the area within project footprint would be assigned a peak bedrock acceleration of 0.2 g and again assuming a Type D soils profile, a peak ground acceleration of 0.28 g.

4.7.1.3 REGULATORY SETTING

Governing code requirements such as 1997 UBC and Caltrans "Seismic Design Criteria" are expected to adequately account for ground shaking hazard in design of "ordinary" structures. If a structure is identified as "critical," it may be appropriate to consider structure response to higher levels of ground shaking. Ground shaking hazards will thus be minimized through facility design

The extent of other hazards – including seismically induced liquefaction/settlement – will be defined by geotechnical studies during final design. Design requirements to address soils that are susceptible to seismically induced liquefaction/settlement will be incorporated into the final design and construction requirements. These would likely include measures such as: special foundation design and/or ground improvement work such as grouting, vibro-compaction/replacement, soil-cement columns or excavation-and-replacement.

4.7.2 Impacts

Given there are no active faults mapped in the immediate vicinity, the risk of an actual fault rupture in the vicinity of the LPAP2 alignment appears very low. The proposed project alternative facilities would, however, be exposed to a risk of substantial ground shaking, which can impose loads on structures and earth embankments. Some soils (most likely those associated with basin deposits) may be susceptible to seismically induced liquefaction and settlement, which could affect design and service of the proposed project.

Construction-phase geology and soils impacts are discussed in Section 5.2.6.

4.7.3 Mitigation Measures

The results of the preliminary geologic hazards evaluation of the proposed project alternatives indicate that there are no substantial geologic hazard impacts that would not be fully addressed by design requirements, and therefore, no mitigation measures are required.

4.8 HAZARDOUS WASTES

4.8.1 Affected Environment

4.8.1.1 INTRODUCTION AND METHODOLOGY

An Initial Site Assessment (ISA) was conducted along the LPAP2 alignment. A database search was conducted for known, agency-listed hazardous waste release sites near the alignment. Historic maps and aerial photographs and site reconnaissance were also used to identify current and past activities associated with the use, generation, treatment, storage, and/or disposal of hazardous materials. In addition, public requests were made to test for lead along Cosumnes River Boulevard.

4.8.1.2 POTENTIAL SOURCES OF HAZARDOUS WASTE CONTAMINATION IN THE PROJECT CORRIDOR

Properties that appear on one or more hazardous waste databases have experienced documented releases of hazardous materials. Table 4.8-1 identifies the one contaminated site known to occur near the LPAP2 alignment, as depicted in Figures 2.4-3 through 2.4-19. There are no other sites that are within ¼ mile of the alignment that have reported a release to groundwater. In addition to the reported hazardous waste release site listed in Table 4.8-1, there are other potential sources of hazardous substances that could affect the LPAP2 Project. These include aerially deposited lead, lead-based paint, methyl tertiary butyl ether (MTBE), asbestos, and unreported or undiscovered releases.

Table 4.8-1: Hazardous Wastes Site Affected

Site (with address and/or location description)	Reference/Agency Listing	Medium Affected/ Contaminant	Status
SMUD PCB Substation Site #15, Meadowview Road at UPRR	CalSites	Not reported/ Not reported	Not reported

Notes:
CalSites – CA Environmental Protection Agency's database of hazardous substance release properties.
ERNS - Emergency Response Notification System, a U.S. Environmental Protection Agency database.
Source: Parsons, Initial Site Assessment, November 2002.

Aerially Deposited Lead and Lead-based Paint. Although lead is no longer used in gasoline formulations, lead emissions from automobiles are a recognized source of contamination in soils along roadways in urban areas. Elevated concentrations are well documented in urbanized areas of California, including the Sacramento region. Lead-based paint may have been used on older buildings near the LPAP2 alignment, and weathering and routine maintenance of paint on these buildings may have contaminated nearby soils with lead.

MTBE has been added to gasoline to enhance octane ratings and to comply with Clean Air Act mandates. This chemical compound has high solubility in water, has low retardation in groundwater aquifers, and is slow to biodegrade. There is, therefore, potential for high source area concentrations, long plumes in groundwater, and long residence times in the subsurface. It also has taste and odor characteristics that can impair water supplies at very low concentrations. Analysis for MTBE was not performed at sites with leaking USTs that were closed before the mid-1990s. Groundwater at these sites could be contaminated with MTBE even though regulatory closure of the site has been approved.

Suspect Asbestos-Containing Materials. Asbestos containing material (ACM) is commonly found in structures built prior to the 1980s. Federal and California regulations require that specific work practices be followed to abate the hazard associated with exposure to ACM during demolitions and renovations of all structures, installations, and buildings. Regulations require the owner of the building and/or the contractor to notify applicable State and local agencies – in this case, the Sacramento Area Air Quality Management District and/or EPA Regional Offices – before all demolitions.

Unreported Releases and Other Potential Sources. Unreported spills or leaks may have occurred within the project area. As yet undiscovered leaks from USTs or other subsurface structures may be present. Spills may have occurred on streets, and storm drains can serve as conduits for these surface spills to reach subsurface environmental media. These unreported conditions could affect local groundwater and soil conditions. Illegal dumping and burning, which was observed in several locations – including the UPRR right-of-way, can be potential sources of environmental contamination.

4.8.2 Impacts

This section addresses the potential for encountering hazardous wastes during construction of the project alternatives, as well as the long-term effects of hazardous wastes and materials during

operations. The handling of hazardous materials associated with construction is addressed in Section 5.2.8.

No impacts are anticipated from the No-Action Alternative; therefore the balance of this section discusses impacts of the TSM and LPAP2 alternatives.

4.8.2.1 POTENTIAL TO ENCOUNTER BURIED HAZARDOUS WASTE

For either the TSM or the LPAP2 alternative, it is possible that soils in the median and on the shoulders of busy streets and highways within the project area are contaminated by lead from automobile emissions or depositions of lead-based paint. In response to comments from the public regarding possible lead levels along CRB, soil samples were collected for a lead analysis on April 15, 2005 from six locations along CRB between Bruceville Road and Franklin Boulevard. Two samples were collected from each location, one from 0-6 inches below ground surface, and one from 12-18 inches below ground surface. One duplicate sample was collected. All samples were collected in accordance with a Soil Characterization Sampling and Analysis Plan (SAP). The soil samples were analyzed for lead by EPA Method 6010 in accordance with the SAP and the results were received by Parsons on April 29, 2005 (Attachment 2). Lead concentrations in the soil ranged from 5 to 14 milligrams per kilogram (mg/Kg or parts per million [ppm]). These values represent natural ambient concentrations with only minimal impact (if any) from the aerially deposited lead associated with historic vehicle emissions or other potential sources. The concentrations are less than 10% of the lowest soil screening criteria of 150 mg/Kg presented in the SAP. Soil that contains lead at the concentrations reported herein does not require special handling during construction as a result of the lead concentrations.

There is also a small potential for unreported spills or other releases to have occurred within the project area and to have contaminated subsurface environmental media.

For the TSM or the LPAP2 alternative, construction activities may be affected by releases of hazardous materials from hazardous waste sites. Construction activities such as clearing, grubbing, and excavation would require soil excavation and possibly dewatering, which may expose or encounter hazardous materials. Impacts that could result include: (1) exposure of workers to toxic materials in the environment, (2) further contamination of environmental media, and (3) schedule delays and budgetary impacts as a result of characterization, removal and/or disposal of hazardous materials encountered.

The pathways of exposure to workers during the construction phase include dermal contact with contaminated soil and/or groundwater and inhalation through exposure to vapors migrating through the soils and into the construction trenches/pits. Impacts to environmental media can occur through the influence of dewatering systems on local contaminated plumes and the excavation of soil providing a low-pressure zone for attracting migrating vapor phase contaminants.

Construction of the LPAP2 could also encounter groundwater carrying contaminants from release sites (such as leaking underground storage tanks) to areas within the LPAP2 footprint and affect underground structures associated with LRT construction – such as foundations, vaults or manholes. Dewatering during trenching or excavating may change or amplify local hydraulic gradients and draw groundwater contamination into the trench or excavation. Construction of the park-and-ride lot associated with the TSM Alternative is not expected to encounter groundwater.

4.8.2.2 HAZARDOUS MATERIALS EXPOSURE DURING PROJECT OPERATIONS

Both the TSM and LPAP2 alternatives are focused on transporting people and would not introduce the transport of hazardous materials.

The LPAP2 would introduce new tracks and passenger LRT service into a segment of the existing UPRR corridor, within which existing freight rail service transports a variety of goods and materials. UPRR freight trains carry a wide variety of hazardous materials, over fifty, in various quantities. The specific materials and their quantities being moved in this UPRR corridor are subject to wide variations during any given time period dependent on UPRR business demands. The Federal Department of Transportation prescribes the standards for the safe transportation of hazardous materials. Based on these standards, UPRR has developed its own specific instructions regarding hazardous materials. Issues associated with any hazardous materials transport on freight trains would not increase or decrease as a result of the LPAP2 and would remain the responsibility of the UPRR.

The LPAP2 impacts subsection of Section 4.16, Safety and Security, discusses the potential risk of derailments or collisions that can be anticipated with shared freight and light rail transit use of a common rail corridor. The predictable frequency of such accidents is already very small and would increase only nominally under shared corridor operations. A derailment or collision does not guarantee exposure to hazardous materials as freight rail cars are robust in their construction so as to minimize potential failure during derailments and collisions. No mitigation is warranted.

Purchase agreements for property acquired along the alignment will address the characterization, remediation, and liability for existing hazardous environmental conditions.

4.8.3 Mitigation Measures

RT will implement the following mitigation measures:

HW-1 Exposed soil in the median or on the shoulder of highways and primary traffic corridors that are more than 20 years old will be tested for lead prior to beginning construction.

HW-2 The *three* residential building*s* subject to demolition (see section 4.13.3) will be inspected (and tested as necessary) for asbestos containing materials and lead-based paints.

HW-3 Contractors will incorporate procedures into a Construction Management Plan describing how they will monitor for subsurface contamination. Monitoring will include, at minimum, visual observation for discolored, stained, or oily soil or for soils with unusual or foul odors by personnel with appropriate hazardous materials training, including 40 hours of Occupational Safety and Health Administration (OSHA)-approved Health and Safety training. In areas with documented groundwater contamination by petroleum products or other volatile, ionizable contaminants, surveillance will include monitoring with a gas analyzer equipped with a photoionization detector. If contamination is suspected, then soil samples should be collected and analyzed for contamination by a laboratory, certified by Cal-EPA's Environmental Laboratory Accreditation Program, using USEPA-approved analytical methods.

HW-4 A contingency plan for handling and disposing of contaminated soil and groundwater during construction will be prepared.

HW-5 Additional site-specific information will be collected regarding hazardous materials use and hazardous waste generation for those properties that would be acquired for right-of-way or support facilities. Regulatory agency files will be reviewed to confirm whether groundwater has been affected by any reported releases and/or whether the sites are within an area where excavation would encounter groundwater. Visual inspections will be conducted of

properties or portions of properties that were inaccessible during preparation of this environmental document.

HW-6 Phase Two site investigations will be performed, as appropriate, prior to construction in areas where groundwater contamination is documented within the project footprint; where groundwater or soil contamination is nearby (contaminants may migrate through the soil vadose zone into the construction area); or where current information regarding the extent of contamination is inconclusive. The purpose of the Phase Two investigation is to determine whether environmental contamination is present that could affect construction or future rail line maintenance. Sampling will include potential environmental contaminants, based on the results of the Phase I study, in soil and groundwater. Site operators/owners will be interviewed to develop a history of possible hazardous materials use at the site. The information collected will be used to develop safe and environmentally sound practices and procedures for the project's Construction Management Plan.

HW-7 All contaminated materials encountered will be evaluated in the context of applicable local, state, and federal regulations and/or guidelines governing hazardous waste.

HW-8 All materials deemed to be hazardous will be remediated and/or disposed of following applicable regulatory agency regulations and/or guidelines. All evaluations, remediation, treatment and/or disposal of hazardous waste should be supervised and documented by qualified hazardous waste personnel.

4.9 HYDROLOGY, FLOODPLAIN, AND WATER QUALITY

4.9.1 Setting

4.9.1.1 SURFACE HYDROLOGY

Information for the surface hydrology setting was obtained from the project Floodplain Analysis (Mead & Hunt, 2002) and the South Sacramento County Streams Investigation Final Environmental Impact Statement/Report (Army Corps of Engineers, 1998).

The proposed LPAP2 and TSM alternatives improvements are located within the 132-square-mile Morrison Creek watershed, also called the Morrison stream group. The stream group as a whole encompasses a wider area – extending into the lower foothills of the Sierra Nevada. The Morrison stream group is sloped and drains into Beach-Stone Lakes. The watershed is drained by Morrison, Florin, Elder, Union House and Laguna creeks, as well as smaller tributaries. All of these streams were intermittent under natural conditions; however, many now experience low summer flows from urban wastewater and agricultural runoff.

Streams in the Morrison group generally flow westward, and most join Morrison Creek in or near the City of Sacramento, on the west side of the basin. Beach-Stone Lakes is a low flat area surrounded by levees and frequently flooded. Floodwaters from the Mokelumne and Cosumnes rivers are major contributors to flooding in the Beach-Stone Lakes area. The proposed LPAP2 LRT alignment includes crossings of Morrison and Union House creeks. The portions of these creeks located in the project area have been straightened and channelized.

4.9.1.2 GROUNDWATER

Groundwater in the vicinity of the LPAP2 alignment is present in two saturated water-bearing zones. The first zone is referred to as the "shallow saturated zone" and is located about 20 to 50 feet below the ground surface. The second zone is referred to as the "first aquifer" and is located about 50 to 80 feet below the ground surface. Groundwater elevations in wells in the vicinity of the project show seasonal changes of about five feet. The groundwater system in the project area has very little exchange with the Sacramento River and is considered hydrologically independent. The aquifers are predominantly recharged by infiltration from streams in the watershed.

The first zone or the "shallow saturated zone" is the only aquifer that may be affected by surface flooding and any change in the floodplains due to this project will not have any impact on groundwater. As explained below, the water quality in the "shallow saturated zone" is of very poor quality and there is no recorded use of the first aquifer as a source of drinking water.

Existing data on groundwater comes from monitoring wells located in and around the Sacramento Regional County Sanitation District wastewater treatment plant. The purpose of the monitoring is to identify potential releases from the treatment plant's solids disposal facility and any associated effects on underlying groundwater.

Between 1990 and 1994, quarterly monitoring was performed for specific conductance, pH, and nitrate as elemental nitrogen, chloride, total dissolved solids, arsenic, and chromium. Results from monitoring indicate that (1) the concentrations of these constituents varied from one monitoring well to another, and (2) the concentrations in the upper and lower saturated zones varied dramatically (SRCSD, 1994). Cadmium, copper, nickel, and zinc were analyzed annually, and pesticides and biphenyls were tested every other year. These test results preclude the use of either aquifer as a source of drinking water.

4.9.1.3 FLOODPLAINS

Protection of floodplains and floodways is required by Executive Order 11988, *Floodplain Management*; US DOT Order 5650.2, *Floodplain Management and Protection*; and Federal-Aid Policy Guide 23 CFR 650A, *Location and Hydraulic Design of Encroachments on Floodplains*. The intent of these regulations is to avoid or minimize encroachments within the 100-year (base) floodplain. The major requirements of Executive Order 11988 are to avoid support of floodplain development; to prevent uneconomic, hazardous, or incompatible use of the floodplain; to restore and preserve natural and beneficial floodplain values; and to be consistent with the standards and criteria of the federal Flood Insurance Program. US DOT Order 5650.2 prescribes “policies and procedures for ensuring that proper consideration is given to the avoidance and mitigation of adverse floodplain impacts in agency actions, planning programs, and budget requests.” The order requires that attention be given and findings made in environmental review documents to examine any risk to or resulting from the proposed transportation facility; to examine the impacts on natural and beneficial floodplain values; and to examine the degree to which the action provides direct or indirect support for development in the floodplain. As stated in 23 CFR 650.113, “A proposed action which includes a significant encroachment shall not be approved unless the responsible agency makes a finding that the proposed significant encroachment is the only practical alternative.”

Flood Insurance Rating Maps (FIRM) prepared by the Federal Emergency Management Agency (FEMA) were reviewed to identify the locations of 100-year floodplains. Just less than three miles of the proposed LPAP2 LRT alignment are within areas currently designated as 100-year floodplain. Flooding in the majority of these areas will be addressed by flood control projects that are currently

being designed *and constructed* by the Army Corps of Engineers (ACOE) and the Sacramento Area Flood Control Agency (SAFCA). The existing 100-year floodplain in the project area is shown in Figure 4.9-1. The 100-year floodplain that will remain in this area after the flood control projects are completed is shown in Figure 4.9-2. The floodplain encroachments are described by "reach" of the project in the following paragraphs.

Meadowview Road to Morrison Creek

This reach includes 4,500 feet of the proposed LPAP2 LRT line, from Meadowview Road to Morrison Creek. Currently this reach is subject to flooding from the American River due to the possibility of overtopping or failure of the river's south levee. As a result, the reach is located within the FEMA A99 flood zone. The A99 flood zone is defined as an area that is to be protected from a 100-year flood by a federal flood protection system that is under construction. No water surface elevations are given for this floodplain zone.

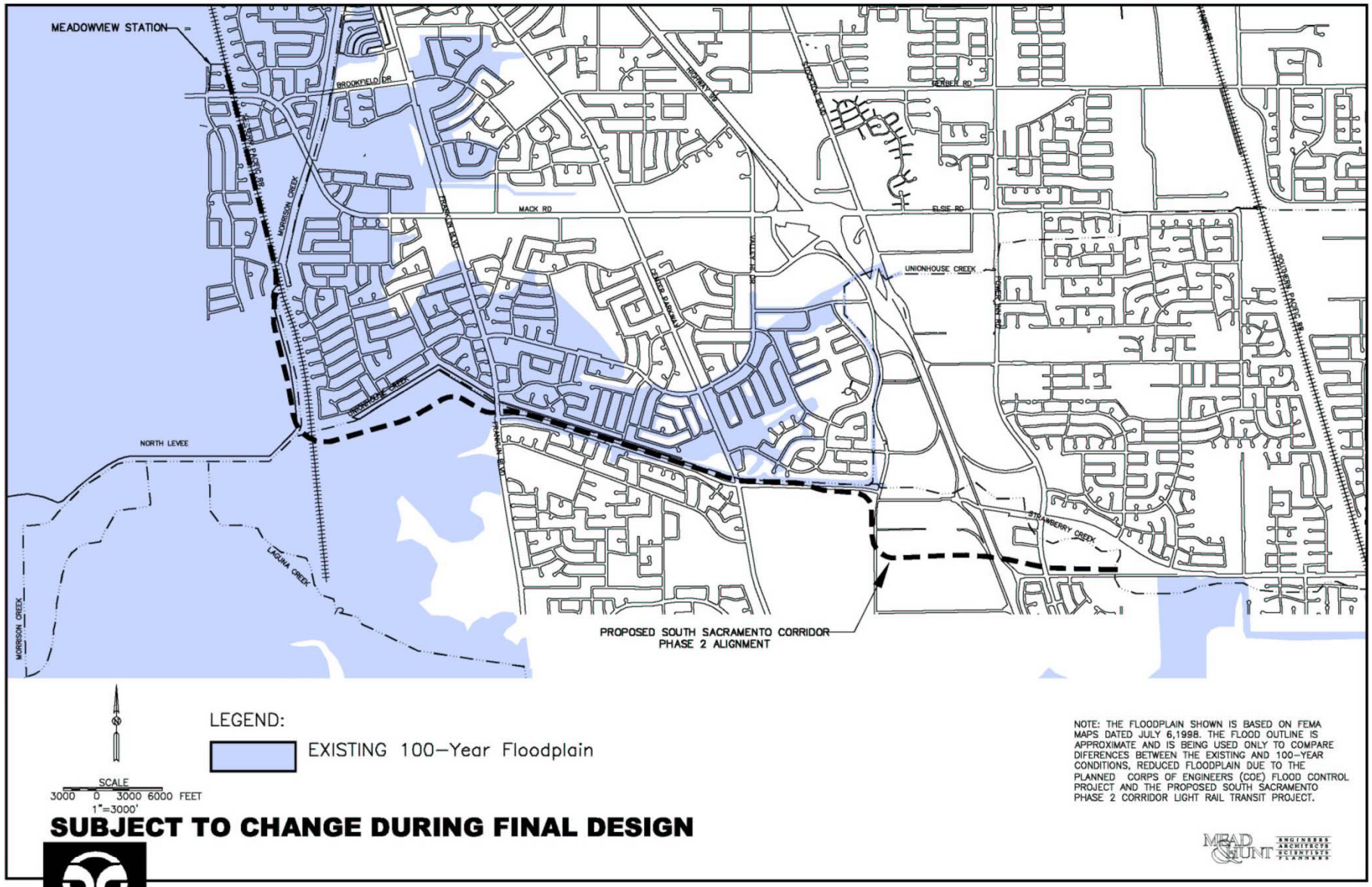
ACOE is currently constructing levee improvements that will eliminate the threat of flooding from the American River. It is anticipated that the ACOE project will be completed sometime in year 2007, three years before the planned completion of the LPAP2 Project.

There is an underlying floodplain that will remain even after the ACOE project removes the flood threat from the American River. The underlying floodplain is a result of the flooding threat from the Beach-Stone Lakes floodplain. The Beach-Stone Lakes area is located in southern Sacramento County downstream from the confluence of Morrison and Union House creeks. The area is subject to flooding when high flows from the Cosumnes and Mokelumne rivers spill into the area due to a lack of channel capacity in the North Delta region. These flows combine with flows from Morrison Creek to cause extensive ponding that threatens the levees protecting the Meadowview and Pocket areas of Sacramento. The floodplain elevation within the project area (Meadowview) with respect to the Beach-Stone Lakes flood threat is estimated to be 15.1 feet. The existing ground along the LPAP2 alignment of the rail line ranges from 10 to 16 feet.

ACOE and SAFCA are working together on a project that will eliminate the Beach-Stone Lakes flood threat from portions of the City and County of Sacramento. The South Sacramento County Streams (SSCS) project will raise levees, construct floodwalls, and build new levees in order to protect areas from flooding along Morrison, Union House, Florin, and Elder creeks as well as the Beach-Stone Lake floodplain. Phase 1 of the SSCS project will protect this reach of the rail line by constructing levee improvements along the west bank of Morrison Creek and on the North Beach Lake levee. Construction of the project has begun and it is anticipated that all areas of 100-year floodplain will be eliminated from the Meadowview to Morrison Creek reach before construction of the proposed light rail project is completed.

Morrison Creek to Union House Creek

In this reach the LPAP2 alignment includes 3,700 feet of the proposed LRT line, the Morrison Creek Station, and a flyover bridge structure crossing over the westerly levee of Morrison Creek, Morrison Creek and Union House Creek. This area is currently subject to flooding from Morrison Creek and is within FEMA flood zone AE with a flood elevation of 16.0. The cause of the flooding in this area is actually the Beach-Stone Lakes floodplain, which is predicted to pond to an elevation of 16.0 during a 100-year event. The SSCS project, Phase 1 described above will also protect this reach. SSCS Phase 1 project completion is scheduled for 2006 – 2007.



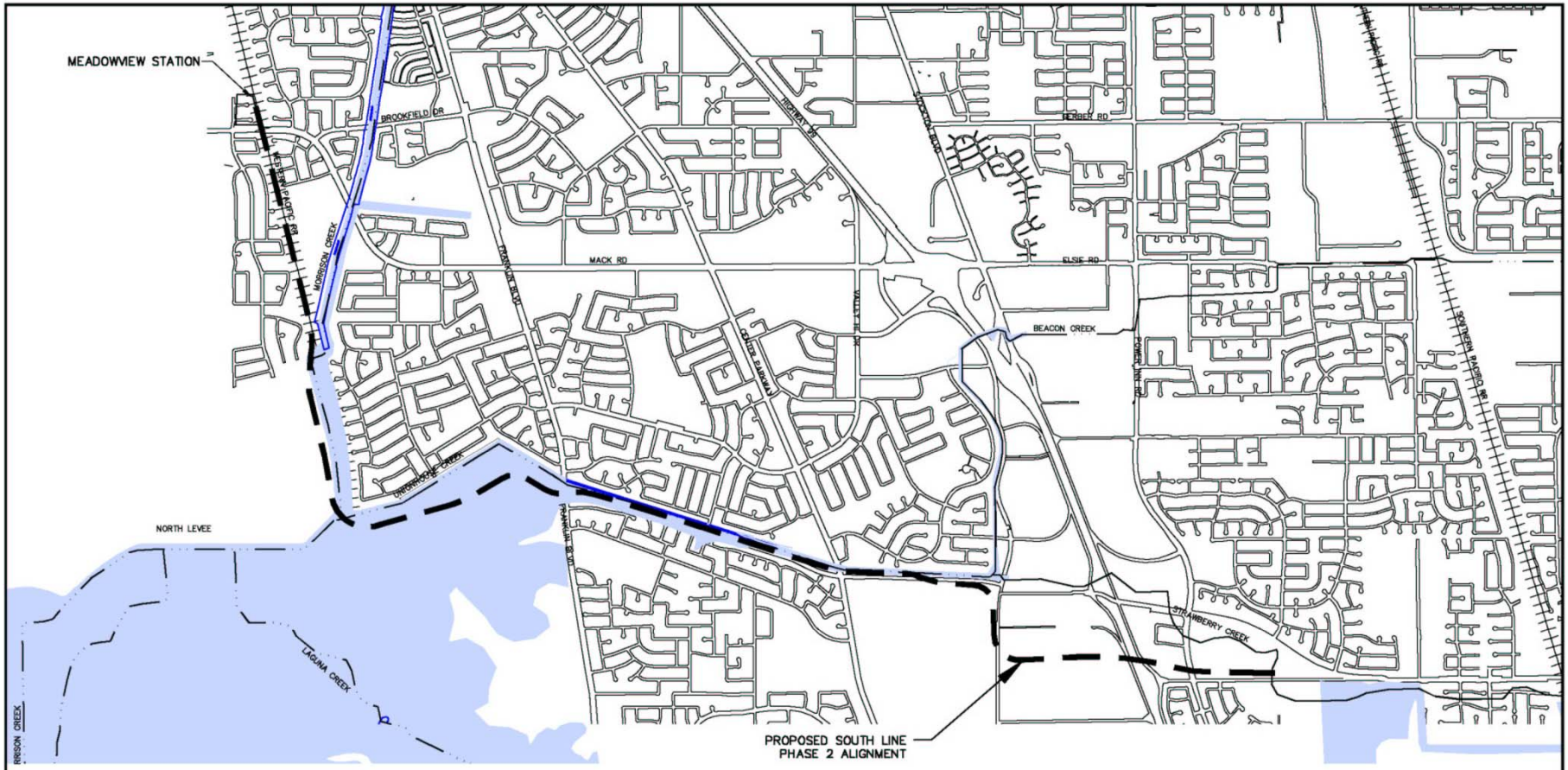
SUBJECT TO CHANGE DURING FINAL DESIGN

Regional Transit

South Sacramento Corridor
Phase 2 Project

EXISTING 100-YEAR FLOODPLAIN

FIGURE 4.9-1



LEGEND:

EXISTING 100–Year Floodplain

SCALE
3000 0 3000 6000 FEET
1"=3000'

NOTE: THE FLOODPLAIN SHOWN IS BASED ON FEMA MAPS DATED JULY 6,1998. THE FLOOD OUTLINE IS APPROXIMATE AND IS BEING USED ONLY TO COMPARE DIFERENCES BETWEEN THE EXISTING AND 100–YEAR CONDITIONS, REDUCED FLOODPLAIN DUE TO THE PLANNED CORPS OF ENGINEERS (COE) FLOOD CONTROL PROJECT AND THE PROPOSED SOUTH SACRAMENTO PHASE 2 CORRIDOR LIGHT RAIL TRANSIT PROJECT.

SUBJECT TO CHANGE DURING FINAL DESIGN

MEAD & HUNT ENGINEERS ARCHITECTS SCIENTISTS PLANNERS

Regional Transit

South Sacramento Corridor
Phase 2 Project

100-YEAR FLOODPLAIN AFTER IMPLEMENTATION OF FLOOD CONTROL PROJECTS (BY OTHERS)

FIGURE 4.9-2

Union House Creek To Franklin Boulevard

Between the Morrison Creek/Union House Creek flyover bridge and Franklin Boulevard, the proposed LPAP2 LRT alignment would travel south of Union House Creek through the bufferlands area of the Sacramento Regional Wastewater Treatment Plant. The LPAP2 would place the tracks on the south side of an existing flood control detention basin, which would result in approximately 4,100 feet of LRT track in the flood zone.

This reach is entirely within FEMA flood zone AE with a flood elevation of 16.0. The flooding source is Union House Creek, the south bank of which could be overtopped during a 100-year event. The actual cause of the overtopping would be ponded water in the Beach-Stone Lakes area that would back up into Union House Creek, reaching an elevation of 16.0. The low point of the creek's south levee in this reach is around elevation 15. Existing ground elevations along the proposed alignment vary between 6 and 14. There are no flood control projects currently proposed for near-term construction that would eliminate 100-year flooding from this reach. Presumably, this is due to the lack of development in this area that would require protection.

On the long-term horizon, there are projects in the planning stages that could ultimately provide flood protection to this area. The CALFED Bay-Delta Program is currently analyzing alternative flood control projects for the North Delta region. The alternatives being considered include measures to increase the capacity of the north and south forks of the Mokelumne River and/or to provide storage of peak floodwaters to reduce flows in the two forks. These improvements would help to reduce the floodwaters that back into the Beach-Stone Lakes floodplain and would lower the floodplain elevation in that area. This would reduce or eliminate the flooding along this reach of the light rail project. If funding is identified, these improvements are expected to be implemented during the next five-year time period.

Sacramento County is also considering a flood control project that would reduce the floodplain elevation in the Beach-Stone Lakes area. The Point Pleasant/Interstate 5 Flood Protection Project would construct new levees and raise existing levees to eliminate the backflow into the Beach-Stone Lakes area from the Cosumnes and Mokelumne rivers. Construction of the project would eliminate flooding in the area south of Union House Creek. Although the County has a strong interest in constructing this project, the project would cause increased water surface elevations in the North Delta. Therefore, the County is working with CALFED in an attempt to find a package of flood control improvements that would provide flood protection to both the North Delta and the Beach-Stone Lakes area.

Franklin Boulevard to Center Parkway

Between Franklin Boulevard and Center Parkway, the proposed LPAP2 alignment would run along the north side of CRB, south of, and in close proximity to, Union House Creek. FEMA has classified some of the southern overbank area of Union House Creek as floodplain. A portion of the overbank area is located within flood zone A; some is located in flood zone AO. Flood zone A extends from Franklin Boulevard to approximately 2,700 feet to the east. This flood zone is defined as a 100-year flood zone for which no flood elevations have been established. It is not clear why FEMA designated this area a 100-year floodplain without setting flood elevations in this area, but they could be no higher than those established for Union House Creek itself, for which elevations range between 16.0 and 18.5 feet, while existing ground elevations in this reach range from 13 to 19 feet. Between 2,700 feet to 3,600 feet east of Franklin Boulevard, FEMA has established the overbank area as a flood zone AO. This flood zone is used for areas of ponding between one and three feet. For this region,

a ponding depth of two feet has been established. The remainder of the reach to Center Parkway is not located within a FEMA Special Flood Hazard Area.

Phase 2 of the SSCS project (described above) includes a proposal to construct a floodwall along the north side, and widen the channel along its south side together with constructing a short floodwall, in this reach of Union House Creek. Construction of these improvements will remove the overbank area from the floodplain. Once this is accomplished (*2008-2009*), this reach of the proposed LPAP2 Project would not be subject to 100-year flood hazards.

4.9.1.4 WATER QUALITY

The City of Sacramento and County of Sacramento together with other local agencies have an established Sacramento Stormwater Management Program that will be followed and implemented as part of this project. The program is implemented through the Sacramento areawide MS4 permit and meets both federal and state regulations. Temporary and permanent Best Management Practices (BMPs) will be implemented to ensure water quality standards are met both during and after construction. The Contractor will be responsible for implementing a Stormwater Pollution Prevention Plan and an Erosion and Sediment Control Plan during construction.

4.9.2 Impacts

4.9.2.1 GROUNDWATER IMPACTS

Shallow groundwater is expected to be present at some locations along the LPAP2 alignment, either as a part of the "water table" or as a local and seasonal "perched" condition. The potential to encounter groundwater during construction of the project alternatives is addressed in Section 5.2.9. As all project facilities are at or above grade. No long-term groundwater impacts are anticipated.

4.9.2.2 FLOODPLAIN IMPACTS

Regulations governing the National Flood Insurance Program (23 CFR 650, Subpart 6A Section 650) were used as guidance for the evaluation of floodway impacts, which focuses on FEMA-defined floodways.[3] Section 650.111 calls for location hydraulic studies to be performed with detailed engineering design drawings and lists five location considerations to be examined for floodplain encroachments:

1. Risks associated with implementation of the action.
2. Impacts on the natural and beneficial floodplain values.
3. Support of incompatible floodplain development.
4. Measures to minimize impacts associated with the action.
5. Measures to restore and preserve the natural and beneficial floodplain values impacted by the action.

[3] Requirements of these regulations are consistent with Executive Order 11988, Floodplain Management, May 24, 1977, which seeks to avoid support of incompatible development in the floodplain; to restore and preserve natural and beneficial floodplain values; and to be consistent with the standards and criteria of the National Flood Insurance Program.

Impacts of the LPAP2 Project with respect to the five location considerations are discussed below. Neither the No-Build Alternative nor the TSM Alternative would affect floodplains, and therefore, discussions focus on the LPAP2.

1. **Risks associated with implementation of the action.** The flood risks associated with the LPAP2 alignment are very low. In the Meadowview Road to Morrison Creek reach, the track is to be constructed on a raised embankment above the 100-year floodplain and therefore there is no risk to the LPAP2 Project if the SSCS project is not completed as anticipated.

   In the Morrison Creek to Union House Creek reach (Morrison Creek Station segment), Phase 1B of the SSCS flood control improvements, which will provide protection to the station tracks and station located below the 100 year floodplain elevation, are under construction and are anticipated to be completed in November/December of 2007. Therefore protection from the floodplain is anticipated to be in place prior to start of construction of the LPAP2 Project. Therefore there is no risk to the LPAL2 project upon completion of the SSCS project.

   In the Union House Creek reach to Franklin Boulevard, Phase 1B of the SSCS flood control improvements is scheduled to start in *2008*. The LPAP2 track is to be constructed on a raised embankment above the 100-year floodplain, and therefore there is no risk to the LPAP2 project if completion of the SSCS project is not completed as anticipated. Culverts would be provided through the embankment to allow passage of local runoff as well as flood flows. The construction of LPAP2 track segments along the south berm of a large existing detention basin would require temporary removal of the berm, which would subsequently be reconstructed in a new position. The Franklin PNR lot would be constructed above the 100-year floodplain elevation. Mitigation would be provided to meet ACOE and SAFCA requirements as described in Section 4.9.3.1, Floodplain Mitigation.

   In the Franklin Boulevard to Center Parkway reach, Phase 2 of the SSCS project is proposed to be completed prior to beginning of LPAP2 construction in 2008. The track is to be constructed on a raised embankment above the 100-year floodplain, and therefore there is no risk to the LPAP2 project if completion of the SSCS project is not completed. Because the SSCS Project (Phase 2) would widen the Union House Creek and in some places construct a short floodwall, RT will continue to coordinate with ACOE and SAFCA during final design to determine appropriate design and placement of sound walls to accommodate the floodwall and widening of the creek.

   The 100 year floodplain does not extend east of Franklin Boulevard except within the existing Union House Creek channel and therefore does not pose a risk to the LPAP2 improvements which are to be constructed above it.

2. **Impacts on natural and beneficial floodplain values.** The 100 year floodplain in the vicinity of the proposed LPAP2 project is the result of combined flows from Morrison Creek and Union House Creek. Those two drainage areas are more than 90 percent urbanized. Drainage area from Morrison Creek is 67.5 square miles and from Union House Creek is 11.6 square miles. The new impervious surfaces associated with this project are attributable to the stations. The Morrison Creek station has approximately 2.0 acres, Franklin approximately 10.0 acres; Center Parkway approximately 1.1, and CRC approximately 23.9 acres, for a total of 35.9 acres. As a percentage of the total area in the creek's drainage areas (about 45,500 acres), the new impervious station areas of 35.9 total acres amounts to 0.079 percent and the impacts on the floodplain are considered inconsequential.

   In the Union House Creek reach to Franklin Boulevard and a portion of the Union House Creek reach between Franklin and Center Parkway, the LPAP2 would introduce a long-term encroachment in the floodplain. A fill embankment would be constructed in the area, to elevate

the LPAP2 LRT facilities above the floodplain elevation. To prevent the fill embankment from blocking natural flood flows and reducing beneficial flood storage, RT would construct culverts through the embankments and provide mitigation, as described in Section 4.9.3.1, Floodplain Mitigation.

3. **Support of probable floodplain development.** The project is proposed in a rapidly developing section of the greater Sacramento metropolitan area. In recognition of existing development and development pressure on open land, ACOE and SAFCA have developed flood control projects, described above, to eliminate 100-year flood hazards from much of this area. The exception is the Union House Creek to Franklin Boulevard reach. Although the Franklin Station and PNR lot are proposed in this reach, they are not expected to support incompatible floodplain development. The station would be on the edge of a dedicated open space area known as the Bufferlands, which constitutes the only substantial area of undeveloped land within the station's sphere of influence that is also in the 100-year floodplain (after completion of the programmed flood control project described above). The station is proposed to serve nearby established residential areas.

4. **Measures to minimize floodplain impacts associated with the action.** In the Union House Creek reach to Franklin Boulevard, culverts through the embankment would be provided to allow passage of local runoff as well as flood flows. Mitigation would also be provided as required by ACOE and SAFCA. RT will continue to consult with ACOE and SAFCA during preliminary engineering and final design regarding the need to address short-term floodplain impacts, should the LPAP2 Project be completed before the SSCS Phase 2 Project.

5. **Measures to restore and preserve the natural and beneficial floodplain values impacted by the action.** Mitigation would be provided by either (1) excavating floodplain storage equal to the amount removed, or (2) paying a mitigation fee to SAFCA, to be used for flood control projects. RT has consulted extensively with ACOE and SAFCA during this environmental review process regarding the need to address short-term floodplain impacts, should the LPAP2 Project be completed before the SSCS Phase 2 Project. See Section 4.9.3.1, Floodplain Mitigation. This consultation will continue during the preliminary engineering and final design phases of the project.

4.9.2.3 WATER QUALITY IMPACTS

The amount of runoff in urban areas is directly related to the amount of impervious surfaces that carry surface water and prevent absorption. Impacts to surface or groundwater quality could occur if a project expanded pavement surfaces and increased the amount of runoff containing hazardous wastes or other pollutants. The Federal Highway Administration (FHWA) has measured constituents of highway runoff, and has found that solids, such as debris and soil particles, are the largest constituents to highway runoff. Other constituents of concern include oil, grease, total organic carbon, chloride, iron, nickel, and trace amounts of other heavy metals such as lead. Similar constituents and concerns would result from runoff associated with local paved parking lots and access roadways.

No-Build Alternative. Under the No-Build Alternative, none of the proposed TSM or LPAP2 improvements would be made and no new water quality impacts would result.

TSM Alternative. The TSM Alternative would include one new park-and-ride lot. Runoff from this lot would be directed to the storm water systems and eventually to receiving waters. Expanded bus service is not expected to affect water quality of receiving waters, as the increased number of transit vehicles on local streets and highways would be offset by the reduction in vehicle miles traveled resulting from this alternative.

LPAP2. As part of the LPAP2, a combination of ditches, pipes, and water storage systems would be constructed along the LPAP2 alignment and in station areas to replace affected drainage facilities, and maintain sufficient stormwater drainage capacity. The development of new LPAP2 LRT tracks will require the widening of the UPRR track bed along the northern portion of the LPAP2 alignment, and the construction of new LRT track in newly acquired right-of-way. The track bed would not be paved, and projected future absorption of rainfall would remain similar to existing levels along the LPAP2 alignment.

The only sizeable areas of impervious surface that would be introduced by the project are park-and-ride lots and station platform and plaza areas at four proposed stations. These areas total a maximum of 35.9 acres with the surface lot options at CRC. Runoff from these areas would be directed to the storm water systems, and eventually to receiving waters. First-flush concentrations of fuel oil and other vehicle fluids could adversely affect water quality if permitted to enter the local storm drain system.

Drainage plans, including inlets, manholes and storm drains would be designed to City of Sacramento stormwater drainage system standards, and the project would maintain existing drainage patterns for surface runoff into the City systems. During a storm event the first water to run off from the paved surfaces is typically higher in concentrations of contaminants. Concentrations are lower following this "first flush." Increased pollutants from runoff would be within the absorption and assimilation capacity of surrounding land. On a regional basis, considering the urban area, the existing highway and local street network, and other paved surfaces such as structures and parking lots, runoff from the LPAP2 would be negligible.

4.9.3 Mitigation Measures

4.9.3.1 FLOODPLAIN MITIGATION MEASURES

WQ-1 RT will continue to consult with ACOE, *the Central Valley Flood Protection Board* and SAFCA regarding the progress of construction of the SSCS Phase 1B project to ensure that *a* floodplain protection *plan for* the Morrison Creek to Union House Creek reach (Morrison Creek Station) is in place as planned prior *to entry into New Starts Final Design*.

WQ-2 In the unlikely event the SSCS project is delayed and floodplain protection *plan* is not in place, mitigation measures will be incorporated into the LPAP2 design to minimize impacts due to potential flooding. These may include raising the tracks, platforms and station improvements, and raising and relocating the proposed traction power substation planned at the Morrison Creek Station, to reduce the risk and impacts of flooding to acceptable levels.

WQ-3 Mitigation in the Union House Creek reach to Franklin Boulevard and for a portion of the reach between Franklin Boulevard and Center Parkway Boulevard will be achieved by either (1) excavation of compensating floodplain storage equal to the amount removed, or (2) payment of a mitigation fee to SAFCA. Modifications of the detention basin south berm in the vicinity of proposed Franklin Station will be conducted to avoid a net loss in flood storage capacity, or if net loss is unavoidable, compensatory flood storage shall be created in

coordination with SAFCA and ACOE. RT has initiated coordination with ACOE and SAFCA regarding impacts and potential mitigation in this area. The final mitigation plan will be developed in consultation with ACOE and SAFCA.

4.9.3.2 WATER QUALITY MITIGATION MEASURES

WQ-4 Water quality impacts associated with pollutants collecting on parking lots will be mitigated by regular cleaning of pavements and collection of solid waste from the facilities. Catch basins and storm drains will be cleaned regularly. Where feasible, detention basins and bioswales may be used to achieve the desired water quality standards. At the Morrison Creek Station, a detention basin and/or bioswales will be used to improve water quality prior to release into the local City system. At the Franklin Station, it is proposed to increase the size of the existing City detention basin for stormwater runoff which will also serve to improve the water quality prior to release into Union House Creek. At the CRC Station, additional storage capacity is to be provided by construction of a new on-site detention basin or a large underground pipe. Both systems would result in storm water passing through a detention basin which would improve water quality. Use of oil-water separator drainage facilities will be considered at all parking facilities.

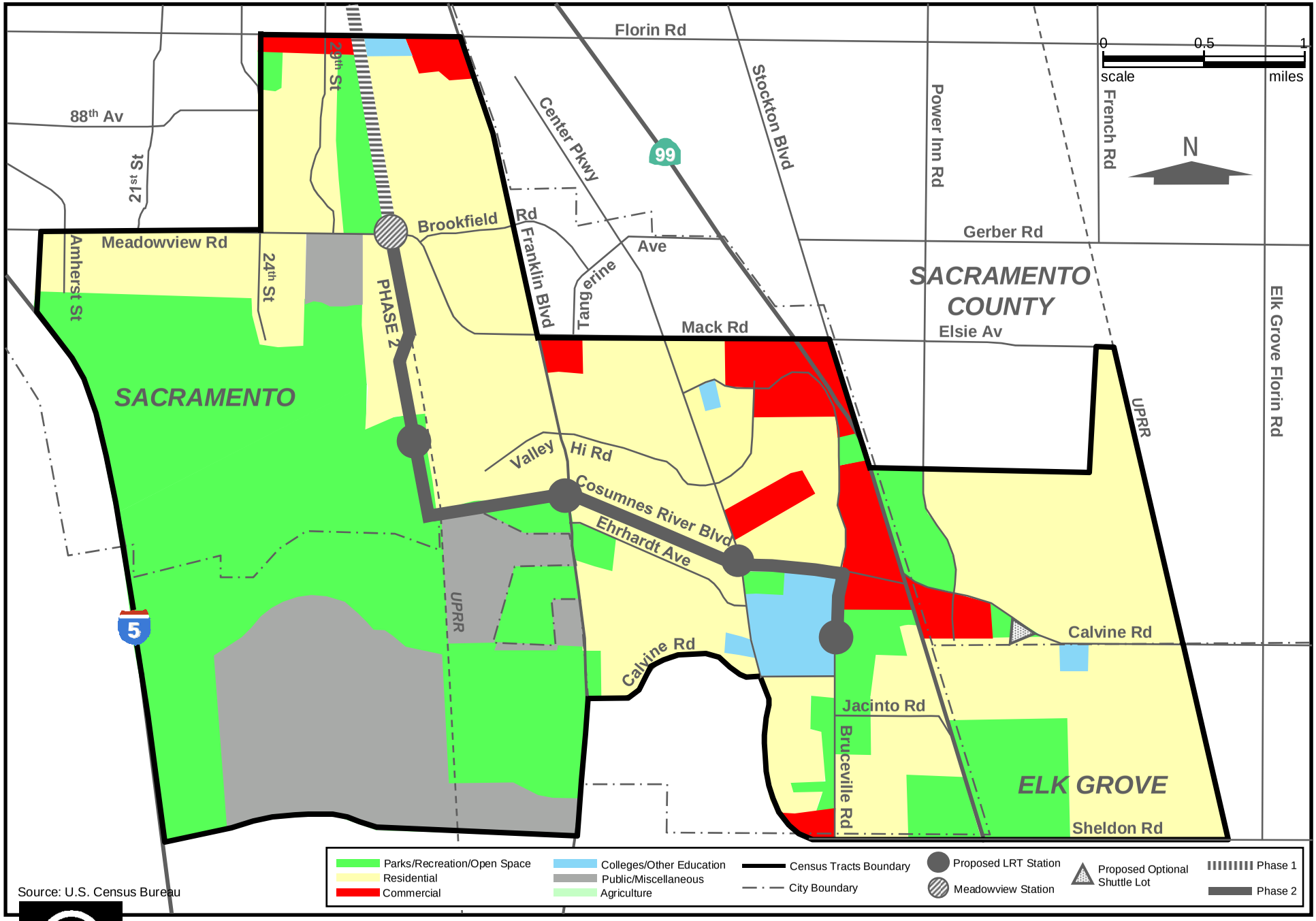
4.10 LAND USE AND PLANNING

This section identifies existing regional land use and transportation plans and policies that apply to lands in surrounding the LPAP2 alignment, describes changes in land use that would occur as a result of the project alternatives, and evaluates the consistency of the project alternatives with local and regional planning policies. In addition to local plans, RT has a strong commitment to implementing its Transit for Livable Communities (TLC) program, which consists of working with local jurisdictions to encourage transit oriented development (TOD) around transit stations such as those included in the LPAP2 Project.

The LPAP2 Project is located in southern Sacramento County and includes portions of the City of Sacramento. The LPAP2 alignment would begin at the Meadowview Station (the terminus of the Phase 1 project) and continue south along the western border of the UPRR right-of-way. At the Morrison Creek Bridge, the LPAP2 alignment would leave the UPRR corridor and veer to the west side of Morrison Creek heading south through the Stone-Boswell Property. The LRT would then turn east, crossing over Morrison Creek, the UPRR tracks and Union House Creek, and continue eastward over the SRCSD bufferlands and across Franklin Boulevard to run along the north side of CRB. Between Center Parkway and Bruceville Road, the LPAP2 alignment would cross to the south side of CRB to Bruceville Road where it would turn south and continue along the west side of Bruceville Road to the project terminus just north of the college entrance.

An optional shuttle lot would be located south of Calvine Road and east of Auberry Drive. The Edward Harris Middle School and Monterey Trails High School are situated to the southeast of the proposed optional shuttle lot location, and a water quality basin and Strawberry Creek are located to the northeast.

Existing land uses in the vicinity of the LPAP2 alignment include residential, commercial, industrial, recreational, agricultural and open space as described from north to south and west to east below. Existing land uses are shown in Figure 4.10-1.



Regional Transit

South Sacramento Corridor Phase 2 Project

EXISTING LAND USE MAP
Figure 4.10-1

4.10.1 Existing Land Uses

In the northern portion of the LPAP2 alignment, between the Meadowview LRT Station and the Morrison Creek Bridge, the primary land use is the UPRR right-of-way. Single-family residential uses extend along both sides of the rail alignment. At the Morrison Creek Bridge, the LPAP2 alignment would leave the UPRR corridor and continue west of Morrison Creek, heading south through undeveloped property that is zoned residential – the Stone-Boswell property.

The LRT alignment would then turn east crossing over Morrison Creek, the UPRR tracks and Union House Creek, continuing eastward over SRCSD treatment plant bufferlands and a city-operated flood control detention basin, and would continue to the site of the proposed Franklin Boulevard Station and PNR lot that would be located just north of the future CRB extension under the LPAP2. Union House Creek and a single-family residential area are situated on the north side of the LPAP2 alignment beyond the bufferlands at this location. A Sacramento Municipal Utility District (SMUD) substation is located just west of Franklin Boulevard.

Leaving the Franklin Boulevard Station/PNR lot area, the LPAP2 alignment would continue eastward along the north side of CRB. Single-family residences are the primary land use on both sides of the LPAP2 alignment between Franklin Boulevard and Center Parkway. The Center Parkway LRT Station platform would be located north of the future widened CRB and west of Center Parkway.

Between Center Parkway and Bruceville Road, the LPAP2 alignment would cross to the south side of CRB to Bruceville Road. The CRC playing fields and the City detention basin are located south of the LPAP2 alignment just east of Center Parkway. Single- and multi-family residential units predominate to the north. At Bruceville Road, the LRT alignment would continue southward past the CRC stadium to the location of the proposed LRT station platform north of the CRC entrance from Bruceville Road. If the TSM Alternative were constructed, a PNR lot would be located here as well.

The College Square Development is located east of Bruceville Road and south of CRB. The proposed Shasta Park, community center, library and fire station, currently in the development stages, would be located south of the alignment at the northeast corner of Bruceville Road and Shasta Avenue. An optional shuttle lot would be located south of Calvine Road and east of Auberry Drive.

4.10.2 Local Development Plans and Policies

Planning goals and policies for the area near the LPAP2 alignment are guided by the *County of Sacramento General Plan, City of Sacramento General Plan, City of Elk Grove General Plan, South Sacramento Community Plan, Airport Meadowview Community Plan* and the *SRCSD Bufferlands Master Plan (currently Draft Final).*

City of Sacramento General Plan. Adopted in January 1988, the 1986 – *2006 City of Sacramento General Plan* is geared toward physical development of land uses, a circulation network, and supporting facilities and services. The overall goal of the plan is to implement policy for a rapidly maturing urban area that is experiencing acute growth pressure. Emphasis is on conserving the quality of existing development and on planning development for vacant lands. The *General Plan* endorses land use policy decisions supportive of a well-designed light rail system that would meet future needs and complement the regional transit system. Policies identified in the *General Plan* promote the reservation of the designated right-of-way for the extension of the light rail route into South Sacramento.

City of Sacramento General Plan 2025. The City of Sacramento Planning Department is currently undertaking an update of the City's *General Plan*.

To support development which promotes public transportation and revitalizes urban areas and existing communities, the Sacramento City Council adopted the *Smart Growth Implementation Strategy* into the *General Plan* to address issues of growing traffic congestion, deteriorating air quality and greater losses of open space. In keeping with the *Smart Growth Implementation Strategy*, the City Council has denied large floor plate, auto oriented uses adjacent to LRT stations.

To target areas in the *General Plan* for higher density and Transit Oriented Development (TOD) around existing and proposed light rail stations, the City of Sacramento adopted an *Infill Strategy* in May 2002. The *Infill Strategy* sets policies and promotes infill development in the City. The *Infill Strategy* is currently resulting in new developments on previously vacant or underutilized land near future LRT station for the LPAP2 alignment.

City of Elk Grove General Plan. The *City of Elk Grove General Plan* was adopted in November 2003. This plan's circulation policies support extension of light rail service to connect employment areas and areas of higher residential densities in Elk Grove. Elk Grove's "vision" for Traffic/Circulation includes an increase in the use of alternative forms of transportation: walking, cycling, and public transit, including light rail.

South Sacramento Community Plan. The *South Sacramento Community Plan,* adopted in August 1986, serves as a guide for public and private development of the South Sacramento area. The plan area boundaries are Fruitridge Road on the north, Sheldon Road (and the southernmost City limits) on the south, the UPRR tracks on the west, and Elk Grove-Florin Road (and the City limits) on the east.

The predominant existing land use in this area is single-family residential. Commercial uses are concentrated in community shopping centers and along commercial strips such as Florin Road, Franklin Boulevard, Mack Road, and Stockton Boulevard. A few acres of office use are located primarily in the vicinity of Florin Road, Power Inn Road, and around Methodist Hospital in the Valley Hi Area. Industry located east of Power Inn Road in the Florin-Perkins industrial area consists mostly of light manufacturing, warehousing, auto dismantling, junkyards and distributing. Land use goals and objectives are aimed at creating an urban environment with a greater diversity of residential densities, fewer acres of general commercial uses, and an expansion of specialized commercial uses such as highway commercial or office.

Light rail transit is supported by the *South Sacramento Community Plan* as reflected by its stated goals to provide safe, rapid transportation to and from the community and to encourage a fuel efficient method of transportation. The plan was amended in 1998 to include the adopted South Sacramento Corridor Light Rail Extension (including Phase 2).

Airport Meadowview Community Plan. Adopted in April 1984, the *Airport Meadowview Community Plan* serves as a guide for both public and private development in the Airport/Meadowview area. The plan reflects changes in City policy regarding the selection of the south portion of the Airport-Meadowview community to promote high technology industrial business. Geographic boundaries of the Airport-Meadowview Community Plan area include 35th Avenue and the Sacramento Executive Airport limits to the north, the Sacramento City limits to the south, the UPRR right-of-way to the east, and the SPRR right-of-way and the Sacramento River to the west. The Land Use Element of the plan focuses on undeveloped, vacant land. At the time of the *Airport Meadowview Community Plan's* adoption, one-third of the community land was vacant, with almost three-fourths of that vacant land being south of Meadowview Road. The Executive Airport, owned by

the City of Sacramento and operated by the Sacramento County Department of Airports, encompasses approximately 740 acres within this community.

The goals of the *Airport Meadowview Community Plan* support light rail to provide for increased transit service and accessibility in the Meadowview community. In 1998, the plan was amended to reflect the adopted LPAP2 LRT extension.

Airport-Meadowview/South Sacramento Community Plan Update. The City of Sacramento is currently developing a comprehensive community plan update for the areas currently covered by the *Airport-Meadowview* and the western part of the *South Sacramento Community Plans*. Issues being addressed include land use changes to promote transit-oriented development (TOD) around light rail stations with the South Sacramento Corridor light rail extensions, review of existing and proposed land uses to implement smart growth policies, economic development and employment generation strategies, housing conditions and rehabilitation, land use and transportation issues for undeveloped areas in the south part of the City, and engaging all segments of the diverse community in the area and providing for environmental justice policies.

On April 12, 2004, the RT Board of Directors approved the addition of the light rail transit station at Morrison Creek. Prior to RT's proposal to include the station, the City was in the process of reviewing land uses in the planning area. It was assumed to be primarily low to medium density and single-family housing. Given the new proposed station, the City will plan for and solicit high density and urban high density projects, as well as a new high school. The City concurs with RT's supportive land use planning and TOD recommendations, and will include the Morrison Creek Station and adjust the land use plan accordingly. The City is committed to intensify the land uses to include higher density mixed uses, and urban high density of over 30 units per acre at the Morrison Creek Station. The City anticipates a recommendation to the City Council to amend the Plan to include the Morrison Creek Station.

City of Sacramento Light Rail Station Ordinance. Following approval of the Transit for Livable Communities (TLC) project in October 2002, the Sacramento City Council directed staff to prepare an ordinance that would encourage TOD. The *Light Rail Station Ordinance* is designed to maximize the opportunities for TOD by encouraging greater infill and TOD adjacent to current and future light rail stations. The ordinance regulates certain non-transit supportive uses within a 0.25-mile radius of existing and general plan designated light rail stations and is intended to provide a review of key uses on a case-by-case basis to ensure that development around light rail stations is pedestrian friendly and supportive of LRT ridership. The *Light Rail Station Ordinance* was approved during the summer of 2004. TOD discussion for the LPAP2 is provided in Section 4.10.4.1.

County of Sacramento General Plan. The primary goal of the Land Use Element of the *County of Sacramento General Plan* is to develop an orderly pattern of land use that (1) concentrates urban development and enhances community character and identity through the creation and maintenance of neighborhoods, (2) is functionally linked with transit, and (3) protects the County's natural, environmental and agricultural resources.

Plan policies promote the interrelationship between land use and transportation by supporting alternatives to automobile travel; accommodating projected population and employment growth in areas where appropriate infrastructure exists or will be made available; and locating higher residential and nonresidential densities within walking distance of transit stops and along key transit corridors. To implement these policies, the plan provides guidelines for high intensity, mixed-use neighborhoods: Transit Oriented Developments (TODs), between 20 and 160 acres in size, to be located within an approximate one-quarter mile walking distance of a transit stop. The TODs are designed to stimulate a pedestrian environment and encourage the use of public transportation.

Sacramento Regional County Sanitation District (SRCSD) Bufferlands Master Plan. The *SRCSD Bufferlands Master Plan* is a component of the *2020 Master Plan for the Sacramento Regional Wastewater Treatment Plant (SRWTP)* prepared to address the needs of the facility for the next 20 years. The bufferlands master plan study area consists of approximately 2,650 acres of bufferlands surrounding the SRWTP between Franklin Boulevard and the Sacramento River south of Meadowview Road. The area was acquired by SRCSD in the 1970s to establish a buffer between the newly constructed treatment plant facility and the neighboring community and to provide an area that would accommodate future expansion of the SRWTP. The study area is bisected by the north-south right-of-way of the UPRR.

The *Bufferlands Master Plan* establishes a long-term, cost-effective management direction for the bufferlands that will maintain the existing buffer zone, provide for future expansion and changes in operation of the SRWTP, and protect and enhance the area's environmental resources. The master plan provides guidelines and policies for alternative land uses, for visitor use and access, and for vegetation and wildlife management and presents a consistent management framework through the year 2020 that will remain applicable and flexible as land use in the surrounding SRWTP area evolve, and regulatory agency personnel and bufferland uses change over time.

In 1983, the first land use management plan for the bufferlands was adopted by SRCSD to establish a framework to guide evaluation of land use proposals received from various public agencies and private entities. Three treatment plant–related constraints were identified as applicable to bufferlands land use decisions:

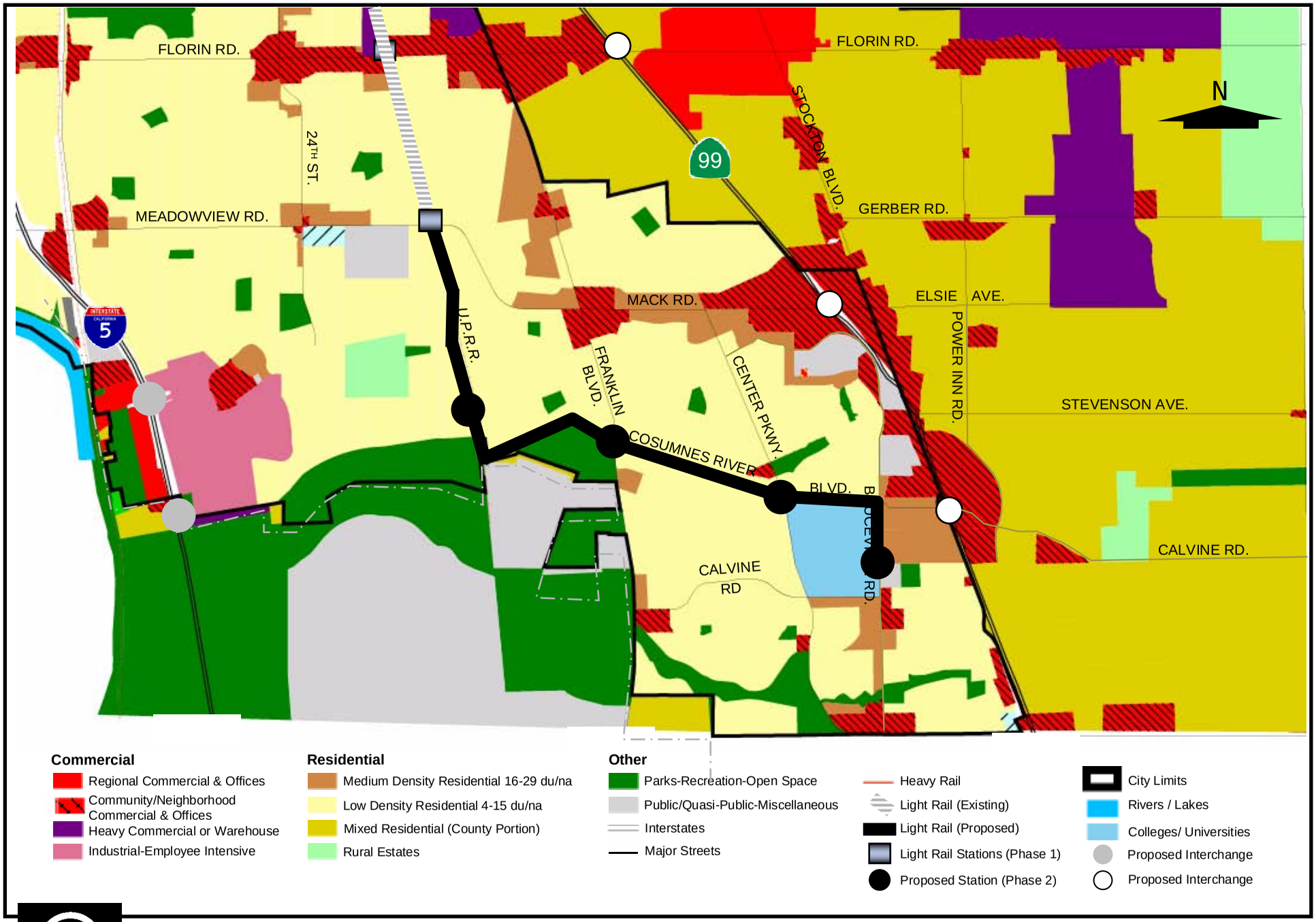
- A primary hazardous gas buffer zone where recreational use was generally prohibited.
- An odor impact zone where high population densities were prohibited; and
- A solids dust impact zone where high population densities and all recreational uses were prohibited.

Although technological improvements in plant infrastructure have changed considerably since 1983, these constraints provide a basic rationale for the initial establishment and continued operation of the bufferlands. Several other land use studies have been prepared for the bufferlands since adoption of the 1983 plan. These include the *Urban Forest Master Plan* (1989), the *Upper Beach Lake Wildlife Area Specific Plan (1991),* and the *Blue Oak and Wetlands Preserve Specific Plan* (1991).

4.10.3 Future Land Uses in the Near the LPAP2 Alignment/Related Projects

Future planned land use in the vicinity of the LPAP2 alignment is shown in Figure 4.10-2. The following projects (shown in Figure 4.10-3) are planned or proposed near the LPAP2 alignment.

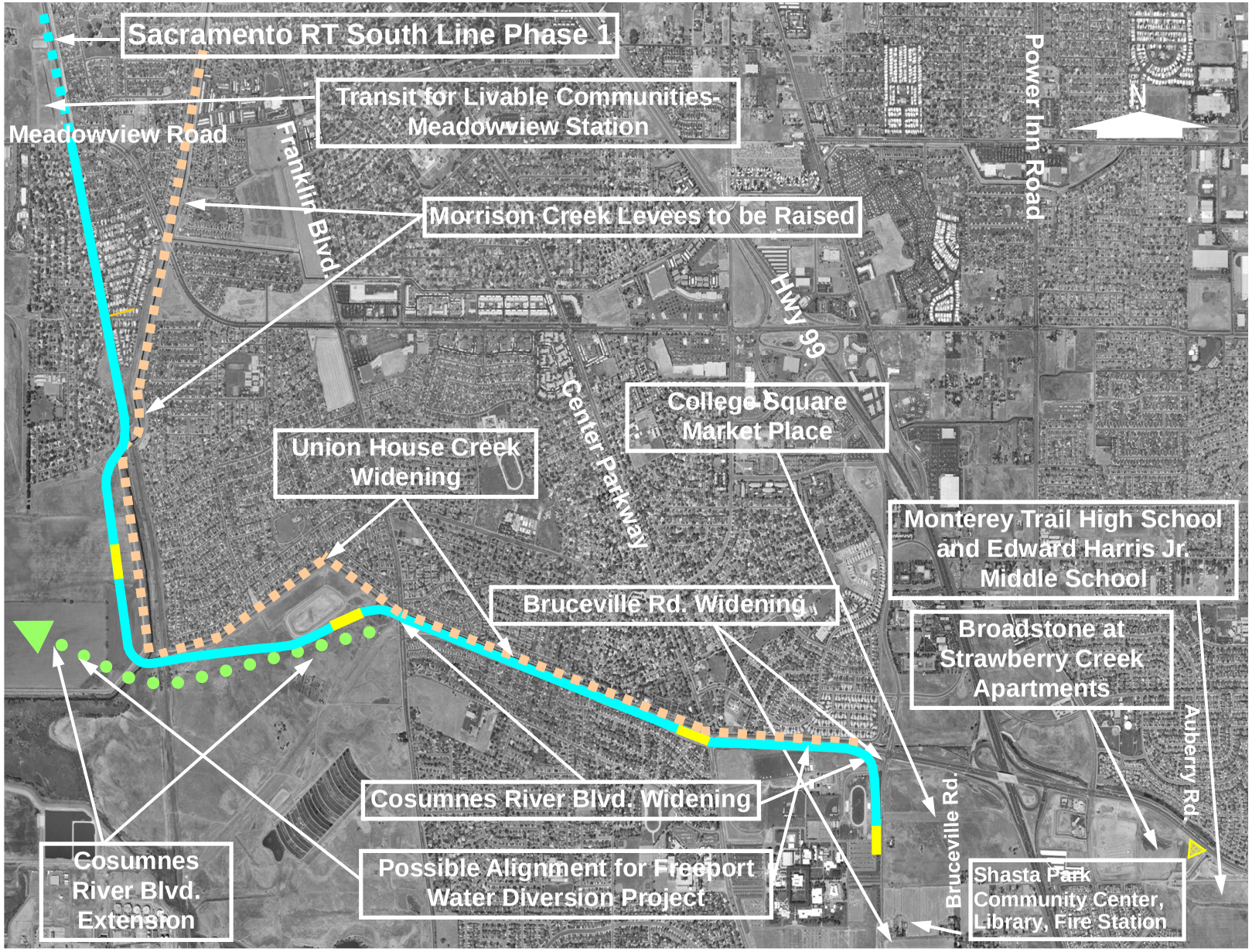
RT has carried out close coordination of its planning and conceptual design of the transit alternatives evaluated in this document with planning and conceptual design of other land use and development projects along the LPAP2 alignment. See Section 8.4, Chronology of Coordination, for a listing of the coordination meetings that have been conducted to date. RT will continue to coordinate during the preliminary engineering, final design, and construction phases of the preferred alternative with local project planners in the City of Sacramento and with developers via meetings, correspondence, and RT's established design review process



Regional Transit

South Sacramento Corridor Phase 2 Project

FUTURE LAND USE MAP
Figure 4.10-2



Regional Transit

South Sacramento Corridor
Phase 2 Project

MAJOR CONSTRUCTION PROJECTS IN LRT CORRIDOR AREA
Figure 4.10-3

Neither the TSM nor LPAP2 Alternative is dependent on any of these related projects to be implemented, although the Morrison Creek LRT Station will not be opened until the CRB Extension to the west is completed. Each related project has its own independent utility, i.e., could be built with or without implementation of either transit alternative. In several cases, however, design of the related project will need to be coordinated with the design of the proposed LPAP2. Such coordination is currently underway between RT and the various planning and implementing agencies identified below.

South Sacramento Corridor Phase 1 LRT Project (Sacramento Regional Transit). The South Sacramento Corridor Phase 1 light rail extension extends from downtown Sacramento to Meadowview Road and began operation in September 2003. The LPAP2 Project would extend the Phase 1 light rail extension.

South Sacramento County Streams Project (Sacramento Area Flood Control Agency/ U.S. Army Corps of Engineers). The SAFCA and USCOE propose to increase flood protection to the south Sacramento County area by (1) modifying existing levees or channels and constructing new levees at the Sacramento Waste Water Treatment Plant and along portions of Morrison, Elder, Union House, and Florin creeks; and (2) retrofitting bridges on these same creeks. An EIS/EIR has been completed for this work. Improvements to the levees along Morrison Creek have been funded and portions have been constructed. The floodwalls along CRB are currently in design review. Improvements to Union House Creek will include widening the creek by approximately 18 feet between Franklin Boulevard and Center Parkway. It is anticipated that these flood control improvements will be in place prior to initiation of construction for the LPAP2 Project. RT will continue to work with SAFCA and the USCOE to assure coordination of the appropriate design for transit facilities and implementation of these levee and floodwall improvements.

Cosumnes River Boulevard Extension (City of Sacramento). This proposed new roadway would extend CRB from its current westerly terminus at Franklin Boulevard. An Environmental Impact Report has been circulated and certified for this project. CRB would be extended from Franklin Boulevard west to an interchange with I-5 with the option to construct CRB west of I-5 toward the Sacramento River to Freeport Boulevard (SR 160).

The proposed LPAP2 LRT alignment would be located to the north and generally parallel to the roadway extension. Vehicular access to the Franklin Boulevard LRT Station and PNR lot would be provided by the CRB extension or by a separate access road should the CRB extension not be developed. The Morrison Creek LRT Station would not be opened until the CRB Extension is opened for traffic.

Cosumnes River Boulevard Widening (City of Sacramento). The City of Sacramento proposes to widen CRB from two lanes to four to six lanes between Bruceville Road and Franklin Boulevard. The *Cosumnes River Boulevard – Franklin Boulevard to Bruceville Road Environmental Impact Report,* City of Sacramento Planning and Development Department, December 1991 was prepared for this widening project and states that:

> "As evaluated in the EIR and adopted by the City, Route 148 Arterial within the project area would have ultimately been constructed to six lanes. The City of Sacramento is reevaluating this ultimate configuration based on the potential for other uses within the existing corridor. For example, a water transmission main may at some future date be proposed to be installed within the right-of-way of CRB, as well as, a light rail route and expansion of the Union House Creek. The amount of right-of-way necessary to accommodate a light rail corridor, landscaping, a pedestrian path, bicycle lanes, a water transmission main, the expansion of Union House Creek and six lanes of traffic is currently insufficient. Based upon these factors,

the City will determine the relative merits of ultimately constructing CRB in the project area as either a four or six lane roadway."

Bruceville Road Widening (City of Sacramento). The City of Sacramento is currently widening Bruceville Road between CRB and Sheldon Road. RT will continue to coordinate with the City of Sacramento Public Works Department regarding the design of the light rail system.

Freeport Regional Water (Diversion) Project (Freeport Regional Water Authority - County of Sacramento, East Bay Municipal Utility District). The Freeport Regional Water (Diversion) Project would divert water from the Sacramento River for use by Northern California areas. One of the project alternatives would locate the diversion pipe along CRB. Construction *has begun* with completion scheduled for 2009.

College Square (Private Developer). A development project named College Square is proposed for the southeast quadrant at the CRB/Bruceville Road intersection. The first phase of this project is *constructed*. Fifty-three acres of planned unit development are proposed, including a mix of residential, office and retail uses. The proposed mixed-use development would meet the needs of the local community by providing residential uses including independent and assisted living for seniors, low-cost housing and conventional multi-family units, as well as neighborhood retail and office functions in close proximity to the CRC and the SR 99 interchange.

RT will continue to coordinate with the City of Sacramento and the developer, regarding the design of the possible LRT PNR lot as well as the design for the developer's proposed West Stockton Roadway and intersection with Bruceville Road and the developer's proposed extension of Cotton Lane.

Transit for Livable Communities. RT's Transit for Livable Communities (TLC) project is a land use planning process that began in late 2000 to obtain community involvement in the development of land use plans surrounding 21 current and future light rail stations including the Marconi (at Academy Way), 47th Street, Florin Road, Meadowview Road and proposed CRC LRT Stations in the South Sacramento Corridor. The plans and recommendations emphasize pedestrian-oriented design, efficient use of land, and a mixture of residential, retail and office land uses, all designed to support and help create unique and sustainable communities at each station while increasing transit ridership.

The land use plans cover an approximately one-quarter mile radius around each of the 21 stations on the South, Folsom, and Northeast lines. Strategies for joint development are promulgated that apply to property that RT owns at seven of these stations. The implementation measures are relevant to transit-oriented development throughout the Sacramento region. RT will prepare TLC Plans for the Morrison Creek and CRC Station areas and is already in the process of coordination with the private developers adjoining these station areas (see section 4.10.4.1 below).

***Shasta Park at Bruceville Road and Shasta Avenue**. The Sacramento City Park and Recreation Department will complete the environmental review for this two phased project in October, 2007. Phase 1 (10.5 acres) will begin construction in the spring of 2008 and is scheduled for completion in 2009. Phase 2 (5 to 6 acres) is scheduled to start construction in approximately 2009 with completion within a year. The library (3 acres) is to be constructed at the same time as Phase 1 of the park and will be completed by June 2009. The community center has no anticipated construction schedule and will be constructed when funding is available which is anticipated over the next ten years. The City is assuming the extension of Cotton Lane will be built by the adjacent development and will provide access to the park. If the developer does not construct it then the City will construct a driveway to the park in the location of what would have been Cotton Lane.*

4.10.4 Impacts

No-Action Alternative. The No-Action Alternative would support a long-term dispersed pattern of development in the South Sacramento Corridor. This would not be consistent with local and regional land use planning objectives that promote transit as the key to more orderly and sustainable growth.

TSM Alternative. The TSM Alternative would involve increased express and local bus services and construction of one bus PNR lot facility to be located at CRC. These actions would be consistent with local and regional plan goals that promote transit use. All of the construction proposed under the TSM Alternative would require a total of 16.7 acres of right-of-way acquisition. Approximately *4.0 acres* of non-residential property would be acquired. Land use conversion from other community uses to transit facilities is *neither substantial nor* adverse.

As with the No-Action Alternative, long-term land use impacts of the TSM Alternative would likely support more dispersed patterns of development. Improved bus service with the TSM Alternative would better promote transit as the focus of orderly and sustainable growth than the No-Action Alternative, but not to the level offered by the LPAP2, which focuses ridership collection at station sites.

LPAP2. The LPAP2 would be consistent with the land use and development objectives of local development plans and policy: to promote a transit system that influences growth into efficient and coherent patterns to improve the region's economy, land use, air, and quality of life. The South Sacramento Corridor Phase 2 Project is included in the *California State Transportation Improvement Program*, SACOG's *Metropolitan Transportation Plan*, *Sacramento County General Plan*, *City of Sacramento General Plan*, *Airport-Meadowview Community Plan,* and *South Sacramento Community Plan*, all of which promote preservation of rights-of-way for future LRT use and land use policy decisions that support the extension of the light rail system. Supportive land use planning would encourage compact development around station locations, particularly the Morrison Creek and CRC Stations, and promote maximum compatibility and coordination with the light rail system and area land uses.

Approximately 5*4.4* acres would be required for construction of the LPAP2 LRT alignment, stations, PNR lots, replacement college parking, and optional shuttle lot. Approximately 14.6 acres of Cosumnes River College land *and* 19.1 acres of SRCSD bufferlands would be converted to public right-of-way. An additional 8.9 acres would come from the UPRR. These types of land acquisitions are considered to be land use impacts of the proposed project and are further characterized in Section 4.13.3, Property Acquisition and Displacement. Given the anticipated benefits of the LPAP2 in promoting transit use and organizing development consistent with local planning, these land use conversions are not considered substantially adverse.

4.10.4.1 LAND USE IMPACTS AT PROPOSED LPAP2 LRT STATION LOCATIONS

Morrison Creek Station and PNR Lot. Construction of the proposed Morrison Creek Station and PNR lot would be consistent with the update of the *City of Sacramento's General Plan* and the comprehensive update of the *Airport-Meadowview* and *South Sacramento* community plans that propose to include the proposed Morrison Creek Station and support transit-oriented development in the vicinity of the light rail station. The proposed station and PNR lot would be compatible with the planned Cosumnes River and Detroit boulevard extensions located south and west, respectively of the LRT facilities. RT has held meetings with the proposed developers (Dunmore Homes) of the property (Stone-Boswell property) to the west of Morrison Creek Station and with the City of Sacramento to review and pursue transit oriented development options for this station location.

Franklin Boulevard Station and PNR Lot. The proposed Franklin Boulevard Station and PNR lot would convert undeveloped SRCSD bufferlands to public right-of-way. RT has coordinated with the City of Sacramento and the SRCSD for authorization to use the designated bufferlands area for construction of the proposed LRT station and PNR lot. These facilities would not constrain operation or expansion of the SRWTP nor would they encroach on treatment plant-related constraint zones, as identified by land use management plans for the bufferlands. RT would continue to coordinate with SRCSD to ensure that the proposed transit facilities are developed in a manner consistent with the land use management policies identified in the *Bufferlands Master Plan*.

The proposed station and/or PNR lot would be compatible with the planned CRB extension that would be located south of the LRT facilities. The LRT station and PNR lot would provide area residents with improved access to downtown Sacramento and activity centers along the LRT system, while the extended CRB would provide access to the LRT station. In addition, the provision of pedestrian access from the existing Deer Creek subdivision would improve access for over 1,200 residences.

Center Parkway Station. The proposed Center Parkway Station would be constructed north of the future widened CRB and would be compatible with the existing transportation use of the roadway corridor. Residents in the vicinity of the proposed station would be provided improved access to downtown Sacramento and other activity centers along the LRT system. No PNR lot is planned for this station. Therefore, no transit-related development or land use conversion pressures are expected on the surrounding neighborhood. Construction of the Center Parkway Station would require 0.01 acres of residential property. The pedestrian walkway option over CRB would require the conversion of residential property to public use.

Cosumnes River College Station and PNR Lot. The proposed CRC Station and PNR lot would be compatible with the existing land uses associated with the college and would provide students and employees improved access to the campus. This proposed LRT station would also provide a transit link with Sacramento City College, located along the South Sacramento Phase 1 Corridor. Construction of the station and PNR lot would also support planned residential, office and retail growth associated with the College Square development, and RT previously participated with the City of Sacramento to promote the College Square development to be transit oriented. Changes were made to the development proposal in response to this coordination, e.g., a gas station was removed and assisted living housing was incorporated. The planned Shasta Park, community center, library and fire station to be located at Bruceville Road and Shasta Avenue would also be provided improved access with the station and PNR lot at CRC.

Optional Shuttle Lot at Calvine/Auberry. Construction of the proposed optional shuttle lot at Calvine/Auberry would convert undeveloped property that is currently owned by RT to a parking facility for transit services.

4.10.5 Design Requirements and RT Practices

RT has conducted extensive consultation and coordination with the City and County of Sacramento and the City of Elk Grove during the current phase of the South Sacramento Corridor (see Chapter 8: Consultation and Coordination). RT will continue to coordinate with these agencies during preliminary engineering and final design to ensure that project facilities would be consistent with land use planning processes and zoning ordinance controls.

RT will work with SRCSD to ensure that the LPAP2 Project is compatible with SRCSD's Land Use Management Plan or to ask for authorization to use fringe bufferlands for specific light rail transportation facilities (RT Board Resolution 95-05-2356 May 8, 1995). The LPAP2 Project will not

be authorized by SRCSD unless it is developed in a manner consistent with the land use management policies identified in the Bufferlands Master Plan.

4.10.6 Mitigation Measures

Mitigation measures that would be implemented for land use impacts as a result of the one possible residential relocation as described in Section 4.13. Project effects on agricultural land and proposed mitigation measures proposed are described in Section 4.2.

4.11 MINERAL AND ENERGY RESOURCES

4.11.1 Minerals

No precious or scarce minerals would be mined or consumed in significant quantities to support the construction and operation of the alternatives under consideration.

4.11.2 Energy

Energy is required for construction and operation of transportation systems. Because construction is limited in duration, the energy impacts are temporary. The temporary energy impacts of the project alternatives are described in Section 5.2.11.2.

Energy for operations is an ongoing, or long-term, requirement of transportation systems. While typically less on an annual basis than the energy required to construct facilities, operations energy is usually greater over the life of a project since it does not diminish until the project ends or is replaced. Given the concerns over long-term energy demand and supply, operations energy impacts are possibly of greater importance than construction impacts.

Operations energy is primarily the fuel used by transit vehicles transporting people or goods—propulsion energy. Fuel is defined broadly to include all forms used to power vehicles, including electricity, new energy forms such as fuel cells and hybrids, and traditional petroleum-based fuels.

Operations energy also includes that consumed in the ongoing maintenance of transportation systems. Energy is required to power non-revenue vehicles and other equipment used in maintaining revenue vehicles and transportation facilities. The administrative functions that are required to oversee transportation operations consume energy as well. Energy for transit system administration and maintenance is normally a small proportion of the total energy requirement.

The assessment of potential energy impacts of the proposed project alternatives discusses, first, the market for the major forms of energy that would be consumed in transportation systems operation and, second, the change in energy demand associated with each project alternative. The change in energy demand is estimated by comparing the LPAP2 and TSM alternatives to the No-Action Alternative.

4.11.2.1 SETTING

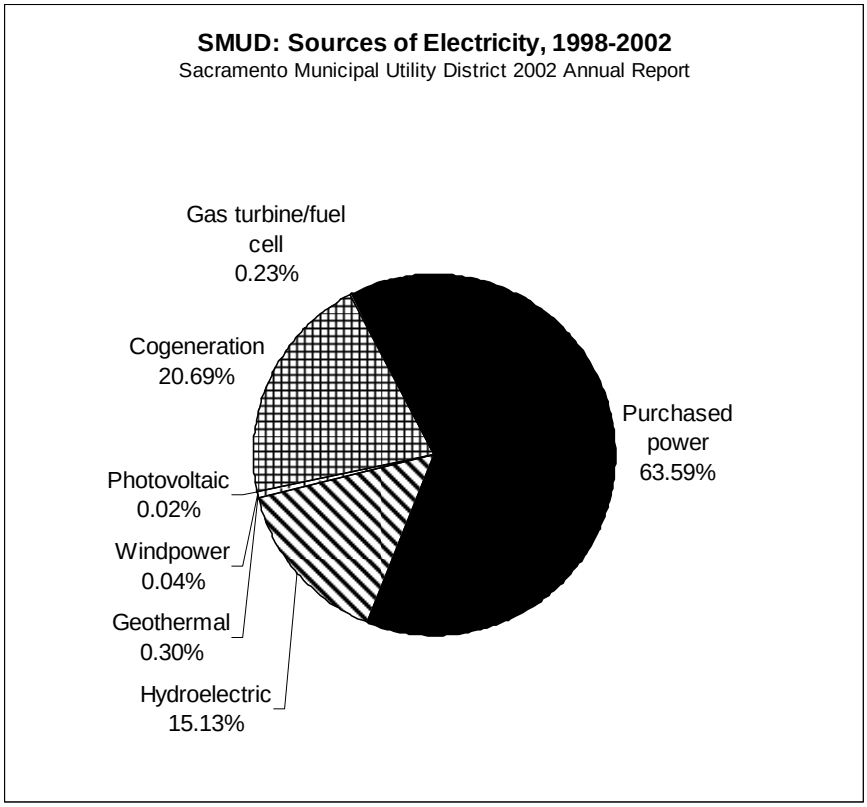
The two major forms of energy consumed in the operation of RT transit service are electricity and natural gas, the latter including compressed natural gas (CNG). Light rail vehicles use electric power

for propulsion, and most RT transit buses are powered by CNG. Administrative, maintenance and other facilities use both electricity and natural gas for power and heat, respectively.

The Sacramento Municipal Utility District (SMUD) is the main supplier of electricity and Pacific Gas & Electric Company (PG&E) is the main distributor of natural gas in metropolitan Sacramento. RT currently purchases electricity from SMUD and natural gas through PG&E.

Electricity. SMUD is a municipally owned and operated utility. Of the electricity it supplies to commercial and residential customers through its regional transmission network, about 40 percent is generated by SMUD owned or controlled facilities. The other 60 percent is purchased, as shown in Figure 4.11-1.[4]

Figure 4.11-1: SMUD Sources of Electricity 1998-2002



Cogeneration and hydro plants are the largest sources of self-generated power. Other renewable sources of electricity account for a small but increasing share of SMUD-supplied power. Purchased power can come from a variety of sources, including hydroelectric, natural gas or oil, coal or renewables. This is power generated by other utilities in the western United States and sold to utilities like SMUD on the wholesale market. SMUD uses both short and long-term contracts to secure this additional power.

[4] The energy crisis of 2001, in combination with a water shortage for hydropower during the same general time period, has distorted the historic distribution of self-generated versus purchased power, according to SMUD. In years prior to 2001, closer to 50 percent of power was self-generated.

Net system peak demand (the highest hourly kilowatt demand, typically in summer) has averaged 2,700 megawatts over the last several years. Although SMUD had adequate power supplies to meet peak and normal demand, during the 2000-2001 California energy crisis the utility was required to participate in one-hour rolling outages in early 2001 to help stabilize the state's energy markets. No outages have been required since that time.

Electricity demand in metropolitan Sacramento continues to grow along with population and employment growth. Between 1998 and 2002 SMUD experienced an approximate seven percent growth in demand. To ensure future power supplies are reliable and will meet growing demand, SMUD has taken several steps.

- Two "peaker" generation plants, powered by natural gas and providing up to 71 megawatts total were brought on line in 2001 to meet spikes in electricity demand.
- A new 500-megawatt natural gas fired plant opened in 2006, doubling the existing capacity of natural gas fired plants owned by SMUD.
- SMUD is in the process of renewing its license for the operation of the Upper American River Project, a system of 11 reservoirs and eight powerhouses that generates about 20 percent of the electricity SMUD supplies to its customers. The existing 50-year license expires in 2007.
- Renewable power and energy conservation are being pursued aggressively. SMUD proposes to expand hydropower to provide 29 percent of future electric power supply. Solar power is to double (increasing by 10 to 15 megawatts) by 2006 and possibly quadruple or more by 2011. Wind power is scheduled to expand by 45 megawatts by 2006, and energy conservation measures are projected to reduce peak demand by a comparable amount over the same period.
- In the near term, SMUD will enter into contracts that will expand purchased power by approximately 20 to 25 megawatts. Long-term energy contracts help stabilize prices as well as ensure electricity supplies for future years. In order to increase its flexibility to purchase electric power, SMUD has started assuming more control in the management and reporting of power purchased on the open market. Until mid 2002, SMUD's purchase transactions were through the California Independent System Operator (ISO), a statewide power exchange. In June 2002, the District left the control area, overseen and coordinated by the ISO, and established an independent control area within the Western Electric Coordinating Council. As a control area, the District manages its electric supply, demand and reserves independently without having to operate through the ISO, except for the use of transmission facilities under the ISO's control.

In the current, partially deregulated California power market, RT as a commercial user has the option of purchasing electricity from suppliers other than SMUD. RT can select from a number of power generators who would deliver power to RT through the SMUD power transmission and distribution system. A competitive electric power market for the state was the intent of Assembly Bill 1890, passed in 1996, which established a state Power Exchange and the Independent System Operator to facilitate selling and buying of power. The power crisis of 2000 and 2001 threw the nascent system into disarray. Further deregulation of the power industry was halted. Despite the fact that the discussion on deregulation was resumed, it is not clear at this time whether deregulation will be allowed to proceed further or, if it proceeds, what altered form it will take.

Despite the recent problems with the larger California energy market, electric power supply in the Sacramento region has been relatively stable and SMUD has a solid record of performance. RT can continue to procure electricity from SMUD for the foreseeable future.

Natural Gas/CNG. Natural gas distributed by PG&E is purchased from various suppliers; PG&E is not itself a major gas producer. The main natural gas inter- and intrastate pipelines are controlled by relatively few pipeline companies, and this has led to allegations that some of these companies exploited this control to restrict supply during California's recent energy crisis, thereby driving up prices. By regulation, access to natural gas pipelines is afforded all qualifying suppliers.

About 67 percent of PG&E's natural gas supplies come from Canada and 10 percent from California (PG&E Corp, *Annual Report*, various years). The state of California has become less a source of natural gas supply as available resources are depleted. Throughout North America and elsewhere, however, natural gas reserves are considered plentiful. According to the Department of Energy, Energy Information Administration, U.S. proven reserves of wet natural gas were 195 trillion cubic feet in 2002, or not quite 10 times the 2002 level of production (U.S. Crude Oil, Natural Gas, and Natural Gas Liquids Reserves 2002 Annual Report, USDOE, Energy Information Administration). In addition to U.S. reserves there are substantial North American gas reserves in Canada.

Other. Other forms of energy consumed in the regional transportation system include gasoline and diesel fuel. Despite short-term volatility in gasoline and diesel fuel prices, the petroleum fuels market is competitive, with a number of potential suppliers and distributors. Supply is not considered a critical issue although the U.S. has become increasingly dependent upon foreign sources. Political events can temporarily disrupt oil supplies. In the last 30 years, a time of considerable international turmoil, the U.S. has experienced two "oil crises" leading to short term shortages and substantial price hikes. Distribution of fuel is by a number of methods, from pipelines to railroads to trucks. The distribution network is extensive and not a supply constraint. In the long term, oil reserves will be depleted and alternative fuels will become necessary. Certain alternative fuels for automobile propulsion are being tested and some are already available for public use.

4.11.2.2 LONG-TERM ENERGY IMPACTS

Changes in Transit Service and Vehicle Miles of Travel. Improvements to transit services under the LPAP2 and TSM alternatives would increase energy consumption by transit modes compared to the No-Action Alternative. The TSM Alternative proposes increases in standard bus service that translate into 4.6-percent more bus vehicle miles of travel (VMT) annually in *2030*. Light rail service levels in the TSM Alternative would remain unchanged relative to the No-Action Alternative.

The LPAP2 proposes increases in light rail service that translate into 9.4-percent greater annual rail VMT in *2030* than under either the No-Action or TSM Alternative. Standard bus service would be reduced by less than one percent in terms of bus VMT compared to the No-Action Alternative and from 4.7-percent compared to the TSM Alternative.

Changes in Energy Consumption. The effect on vehicle operations energy consumption of these changes in transit service was estimated by applying fuel economy rates to the VMT generated by each alternative. Because fuel types differ by transit mode, energy use was converted into a standard, or common, energy unit. The selected common energy unit was British thermal units, or BTUs. A BTU is an English standard unit of energy equivalent to the amount of thermal energy needed to increase the temperature of one pound of pure liquid water by one degree Fahrenheit at the temperature at which water has its greatest density (39 degrees Fahrenheit). Once converted to common energy units, alternatives can be compared and differences in energy use calculated.

Table 4.11-1 shows the unit energy use for the various transit modes operated by RT. Although a mix of fuels may be available in *2030*, the likely predominant fuel type is listed along with its energy

content in BTUs. RT buses are assumed to be powered mainly by CNG, which is measured in terms of therms of CNG. For every mile operated, a standard transit bus uses approximately 0.19 therms. One therm of CNG contains approximately 100,000 BTUs of direct energy. Direct energy is the energy content of one therm at its final point of use, i.e., the energy released when combusted by the bus engine. One therm of CNG contains approximately 110,000 BTUs of total energy, which includes the energy required to process and transport a therm of CNG to its final point of use. On a per vehicle mile basis, a standard bus uses approximately 19,000 BTUs of direct energy and 21,000 BTUs of total energy.

Table 4.11-1: Direct and Total Energy Use by Transit and Auto Modes (2030)

Mode	Energy Unit[1]	Direct Energy BTUs per Energy Unit[2]	Total Energy BTUs per Energy Unit[3]	Ratio Total to Direct	Modal Energy Use per Veh. Mi.[4]		Direct BTUs per Veh.Mi.	Total BTUs per Veh.Mi.
Std Bus	Therm CNG	100,000	110,000	1.10	0.19	therm	19,231	21,154
Shuttle Bus	Therm CNG	100,000	110,000	1.10	0.10	therm	9,615	10,577
Articulated Bus	Therm CNG	100,000	110,000	1.10	0.29	therm	28,703	31,573
All Buses	Therm CNG	100,000	110,000	1.10	0.19	therm	19,183	21,101
LRT	Kilowatt-hour (kwh)	3,416	8,000	2.34	7.50	kwh	25,620	60,000
Auto/Truck	Gallon gas-equiv.	110,400	132,480	1.20	0.04	gal	3,864	4,637

Notes:
1. Primary form of energy used. For bus and auto, various energy sources may be in use in 2025. These could include electric, hybrid gas-electric, fuel cell, and gasoline. These have been expressed in terms of one energy type and its energy content.
2. The net energy content of energy unit at its point of use.
3. The total energy content of energy unit, including energy used to refine/generate and transport to point of use of 3.5 miles per therm; and auto/truck economy of 30 mpg.

Source: Parsons; Energy and Transportation Systems, Caltrans (1983), PG&E.

Similarly, a light rail vehicle uses approximately 7.5 kilowatt hours (kWh) of electricity when traveling one mile. This is equivalent to approximately 26,000 BTUs of direct energy and 60,000 BTUs of total energy. The total energy content of a kWh is proportionally more than for a therm of CNG because of the additional energy required to generate and transport electricity. Most new power plants in California and the western U.S. in general are natural gas fired. Their efficiency in converting fossil fuel energy to electrical energy is improving and now exceeds 50 percent but upwards of 15 percent of electrical energy is lost in transmission and there are additional losses in converting electric power to the appropriate voltages at the final point of use. A light rail vehicle is larger and has greater capacity than a standard bus; thus, light rail energy use is less than bus energy use on a per passenger-mile basis.

Table 4.11-1 also shows estimated energy use for automobiles and trucks in terms of gallons of gasoline equivalents and BTUs per vehicle mile. Auto/truck energy use is included in the energy assessment because increased transit service generates a shift in travel from auto to transit modes. Reduced auto travel associated with transit improvements is an energy benefit that is taken into account in calculating the net energy requirements of each project alternative. Vehicle miles of travel for each project alternative and transportation mode were obtained from the travel demand forecasts. Annual projected VMT is shown in Table 4.11-2 for the No-Action, TSM, and LPAP2 alternatives.

Table 4.11-2: Annual Energy Consumption for Vehicle Operations by Alternative (2030)

	No Action Alternative			TSM Alternative			LPAP2		
	Annual Veh.	Energy Use, BTUs in Millions		Annual Veh.	Energy Use, BTUs in Millions		Annual Veh.	Energy Use, BTUs in Millions	
Mode	Miles	Direct	Total	Miles	Direct	Total	Miles	Direct	Total
Std Bus	12,908,100	248,233	273,056	13,188,600	253,627	278,990	12,793,860	246,036	270,639
Shuttle Bus	1,837,020	17,664	19,430	1,837,020	17,664	19,430	1,837,020	17,664	19,430
Articulated Bus	456,960	13,116	14,428	456,960	13,116	14,428	456,960	13,116	14,428
All Bus	15,202,080	279,013	306,914	15,482,580	284,407	312,848	15,087,840	276,816	304,497
LRV	6,135,300	157,186	368,118	6,135,300	157,186	368,118	6,711,600	171,951	402,696
Subtotal	21,337,380	436,199	675,032	21,617,880	441,593	680,966	21,799,440	448,767	707,193
Auto/Truck	24,176,200,005	90,713,119	108,855,742	24,172,543,845	90,680,970	108,817,164	24,163,984,348	90,662,423	108,794,908
Total	24,197,537,385	91,149,318	109,530,774	24,194,161,725	91,122,563	109,498,130	24,185,783,788	91,111,190	109,502,101
Difference from TSM	3,375,660	26,755	32,644	0	0	0	-8,377,937	-11,373	3,971
Percent Change	0.01%	0.03%	0.03%	0.00%	0.00%	0.00%	-0.03%	-0.01%	0.00%

Source: Parsons August 2004, derived from travel forecasts by DKS Associates, July 2008. Auto/truck VMT is forecast on a weekday basis and annualized using an annualization factor of 320.

Total annual VMT in *2030* decreases as the level of transit improvements increases, being highest for the No-Action Alternative and lowest for the LPAP2.[8]

Using the unit energy relationships summarized in Table 4.11-1, annual VMT is translated into energy use. Compared to the TSM, the LPAP2 Project is expected to use *11.373* million BTUs less of direct energy, representing a *0.01* percent decrease. Similar to the pattern for total VMT, net energy consumption for vehicle operations is lowest for the LPAP2 and is highest for the No-Action Alternative.

Relative to the TSM Alternative, the LPAP2 generates savings in both direct and total energy consumed. Because auto/truck travel is the dominant transportation mode in the Sacramento region and the level of transit improvements achieved with this project is relatively small in proportion, the changes in total VMT and thus changes in energy consumption associated with the project alternatives are relatively small from a system perspective. VMT, direct energy and total energy are estimated to decrease by less than one percent under the LPAP2, relative to the TSM Alternative. Overall, it can be concluded that the proposed transit improvements would have a slightly positive, although negligible effect on transportation system energy consumption for vehicle operations.

Facilities and Other Energy. Besides estimating vehicle operations energy requirements, the impact assessment estimated energy use for facilities operations and system maintenance. This was done for transit modes only. The relatively small changes in auto travel associated with the TSM and Light Rail Alternatives was assumed to have a negligible effect on energy use in roadway operations and maintenance. Energy for transit facilities operations and system maintenance can be significant, however, and depends upon the level of improvements provided. The LPAP2 that includes additional LRT stations and PNR lots would generate the greatest energy demand. Bus improvements under the No-Action Alternative and the TSM Alternative would also consume energy for ongoing maintenance, but improvements would be much less extensive and thereby less energy intensive.

Facilities and other energy use for light rail options was estimated to be 12 percent of total transit system energy use; for bus alternatives, including the No-Action and TSM Alternative, facilities and other energy use was estimated to be 10 percent of total transit system energy use. The additional energy required to operate and maintain the new transit facilities would reduce the direct energy benefits of the Light Rail phasing options somewhat. The net energy requirements of the LPAP2 compared to the TSM Alternative are listed below. As shown, the LPAP2 would generate direct and total energy savings when compared to the TSM Alternative.

Because the LPAP2 does not increase long-term energy requirements substantially compared to the TSM Alternative, the energy impacts are not considered significant. The LPAP2 can be considered beneficial from an energy consumption standpoint because they would help reduce direct energy consumption in the metropolitan area.

4.11.2.3 DESIGN REQUIREMENTS AND RT PRACTICES

For either the TSM or the LPAP2 alternative, facilities and equipment will be designed and specified to ensure energy efficiency, thereby helping to reduce the long-term energy requirements and the operating costs of proposed transit system improvements.

[8] This is because, although transit VMT increases as light rail improvements are introduced, the increase is more than offset by a decrease in auto/truck VMT as travelers shift modes and drive less.

4.11.2.4 MITIGATION MEASURES

The proposed project improvements would not substantially affect mineral or energy resources. Therefore, no mitigation of impacts would be necessary.

4.12 NOISE AND VIBRATION

4.12.1 Methodology and Criteria

This section describes the methodology used to characterize the existing noise and vibration conditions along the LPAP2 alignment and predict noise and vibration impacts of the project alternatives.

4.12.1.1 NOISE METHODOLOGY AND CRITERIA

Noise is typically defined as unwanted or undesirable sound. The loudness of sound is associated with its sound pressure level, most commonly measured in decibels (dB). Through a process known as "A-weighting," the measurement of loudness is adjusted to provide a single numerical descriptor that correlates with human subjective response. Sound levels measured using this weighting system are called "A-weighted" sound levels and are expressed in decibel notation as "dBA." The A-weighted sound level is widely accepted by acousticians as a proper unit for describing environmental noise.

Noise Metrics

Because environmental noise fluctuates from moment to moment, it is common practice to condense the wide fluctuations recorded over time into a single number, called the "equivalent" sound level (Leq). Leq can be thought of as the steady sound level that represents the same sound energy as the varying sound levels over a specified time period (typically 1 hour or 24 hours).

Noise in residential areas is characterized by measuring changes in day-night sound level (Ldn). Ldn is the A-weighted Leq for a 24-hour period with an added 10-decibel penalty imposed on noise that occurs during the nighttime hours (between 10 P.M. and 7 A.M.). Many surveys have shown that Ldn *correlates* well with human annoyance; therefore, this descriptor is widely used for environmental noise impact assessment. Figure 4.12-1 provides examples of typical noise environments and criteria in terms of Ldn.

Noise Impact Criteria

City Noise Ordinance

The City of Sacramento noise ordinance establishes limits for *noise* generators such as outdoor concerts, construction noise, and nuisances. Although the ordinance provides exclusion for airports and aircraft, surface transportation noise is not addressed except to limit noise emissions of individual automobiles. Thus, the ordinance does not apply to LRT operational noise. Also, existing noise levels along the proposed LPAP2 LRT alignment are generally already higher than the threshold levels established in the City noise ordinance. FTA, moreover, requires the noise impact analysis presented here and establishes criteria for mitigation of noise impacts. These FTA procedures and criteria are required to be followed for all New Starts and other federally funded rail projects. Applying FTA procedures and identifying required mitigation measures according to FTA criteria will adequately address LRT operational noise impacts. Requirements of the Sacramento noise ordinance are

addressed for the construction phase of the project in Section 5.2.13, Construction Noise and Vibration.

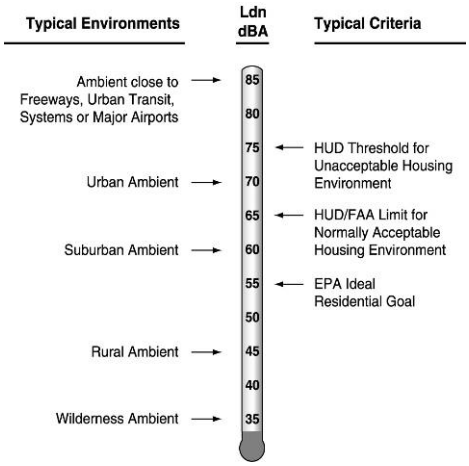


Figure 4.12-*1*: Examples of Typical Outdoor Noise Exposure

FTA Noise Criteria

Noise impact for this project is based on the criteria defined in the U. S. Federal Transit Administration (FTA) *Transit Noise and Vibration Impact Assessment* (FTA-*VA-90-1003-06, May 2006), also referred to as the "guidance manual."* The FTA noise impact criteria are founded on well-documented research on community reaction to noise and are based on change in noise exposure using a sliding scale. Although more transit noise is allowed in neighborhoods with high levels of existing noise, smaller increases in total noise exposure are allowed with increasing levels of existing noise.

The FTA Noise Impact Criteria group noise-sensitive land uses into three categories:

Category 1: *"Tracts of land* where quiet is an essential element in their *intended* purpose. *This category includes lands set aside for serenity and quiet, and such land uses as outdoor amphitheaters and concert pavilions, as well as National Historic Landmarks with significant outdoor use. Also included are recording studios and concert halls." (FTA, 2006)*

Category 2: "Residences and buildings where people normally sleep. This includes residences, hospitals, and hotels where nighttime sensitivity is assumed to be of utmost importance.*" (FTA 2006)*

Category 3: "Institutional land uses with primarily daytime and evening use. This category includes schools, libraries, *theaters, and* churches *where it is important to avoid interference with such activities as speech, meditation and concentration on reading material. Places for meditation or study associated with cemeteries, monuments, museums, campgrounds and recreational facilities can also be considered to be in this category. Certain historical sites and parks are also included." (FTA 2006) Note that this category does not include parks used for active recreation such as playing fields.*

Ldn is used to characterize noise exposure for residential areas (Category 2). For other noise-sensitive land uses, such as outdoor amphitheaters and school buildings (Categories 1 and 3), the maximum 1-hour Leq during the facility's operating period is used.

There are two levels of impact included in the FTA criteria, as summarized below:

- Severe *Impact*: *"Impacts* in *this range have* the *greatest adverse* impact *on the community; thus* there is *a presumption by FTA that mitigation will be incorporated in the* project *unless there are truly extenuating circumstances which prevent it." (FTA 2006)*
- *Moderate Impact*: *Predicted noise levels in* the *"... moderate* impact *range will also require consideration and adoption of mitigation measures when it is considered reasonable. The range of Moderate Impact delineates an area where project planners are alerted to the potential for adverse impacts* and *complaints from the community and must then carefully consider project specifics as well as details concerning the affected properties in determining* the need for mitigation*." (FTA 2006) Factors that may be considered when deciding whether to mitigate moderate impacts* can include the predicted increase over existing noise levels, the type and number of noise-sensitive land uses affected, existing outdoor-indoor sound insulation, and the cost effectiveness of mitigating noise to more acceptable levels.

The FTA noise impact criteria are summarized in Table 4.12-1. The first column shows the existing noise exposure, and the remaining columns show the noise exposure from a transit project that would cause either *moderate* impact or severe impact if added to that existing exposure level. In other words, the table values present the amount of noise that the transit project could make at various ambient noise levels to be just above the threshold for creating *a moderate* impact or severe impact. The future noise exposure would be the combination of the existing noise exposure and the additional noise exposure caused by the transit project.

Table 4.12-2 expresses the FTA criteria in terms of the amount of change in noise levels that can occur in the overall noise environment before noise thresholds are exceeded (i.e., the change in cumulative noise levels).

It is RT policy to consider noise impact to occur when the predicted noise levels are within 1 decibel of the FTA threshold for Moderate Impact ((Resolution No. 97-03-2805, Section 2). To conform to this policy, the predicted noise levels in Section 4.12.4 include a 1 decibel increase.

4.12.1.2 VIBRATION METHODOLOGY AND CRITERIA

Ground-borne vibration can be described in terms of displacement, velocity or acceleration. Velocity is the preferred measure for evaluating ground-borne vibration from transit projects. This is because human sensitivity to vibration approximately corresponds to the amplitude of vibration velocity within the low-frequency range of most concern for environmental vibration (roughly 5-100 Hz).

Vibration Metrics

The most common measure used to quantify vibration amplitude is the peak particle velocity (PPV), defined as the maximum instantaneous peak of the vibratory motion. PPV is typically used in monitoring blasting and other types of construction-generated vibration, *because* it is related to the stresses experienced by building components. PPV is less suitable for evaluating human response, which is better correlated to the average vibration amplitude. Thus, ground-borne vibration from transit trains is usually characterized in terms of the root mean square (rms) vibration velocity level,

in decibels (VdB), with a reference quantity of one micro-inch per second*, and an average time of 1 second*. VdB is used in place of dB to avoid confusing vibration decibels with sound decibels.

Table 4.12-*1*: FTA Noise Impact Criteria

Existing Noise Exposure Leq or Ldn	Project Noise Exposure Impact Thresholds, Ldn or Leq (dBA)			
	Category 1 or 2 Sites		Category 3 Sites	
	***Moderate* Impact**	**Severe Impact**	***Moderate* Impact**	**Severe Impact**
<43	Amb.+10	Amb.+15	Amb.+15	Amb.+20
43	52	58	57	63
44	52	58	57	63
45	52	58	57	63
46	53	59	58	64
47	53	59	58	64
48	53	59	58	64
49	54	59	59	64
50	54	59	59	64
51	54	60	59	65
52	55	60	60	65
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55	56	61	61	66
56	56	62	61	67
57	57	62	62	67
58	57	62	62	67
59	58	63	63	68
60	58	63	63	68
61	59	64	64	69
62	59	64	64	69
63	60	65	65	70
64	61	65	66	70
65	61	66	66	71
66	62	67	67	72
67	63	67	68	72
68	63	68	68	73
69	64	69	69	74
70	65	69	70	74
71	65	70	71	75
72	66	71	71	76
73	66	71	71	76
74	66	72	71	77
75	66	73	71	78
76	66	74	71	79
77	66	74	71	79
>77	66	75	71	80

Note: Ldn is used for land uses where nighttime sensitivity is a factor; maximum 1-hour Leq is used for land use involving only daytime activities.

Source: Federal Transit Administration, *May 2006.*

Table 4.12-2: Cumulative Noise Level Increase Allowed by FTA Criteria

Existing Noise Exposure Leq or Ldn	Impact Threshold for Increase in Cumulative Noise Exposure (dBA)			
	Category 1 or 2 Sites		Category 3 Sites	
	Moderate Impact	Severe Impact	*Moderate* Impact	Severe Impact
45	8	14	12	19
46	7	13	12	18
47	7	12	11	17
48	6	12	10	16
49	6	11	10	16
50	5	10	9	15
51	5	10	8	14
52	4	9	8	14
53	4	8	7	13
54	3	8	7	12
55	3	7	6	12
56	3	7	6	11
57	3	6	6	10
58	2	6	5	10
59	2	5	5	9
60	2	5	5	9
61	1.9	5	4	9
62	1.7	4	4	8
63	1.6	4	4	8
64	1.5	4	4	8
65	1.4	4	3	7
66	1.3	4	3	7
67	1.2	3	3	7
68	1.1	3	3	6
69	1.1	3	3	6
70	1.0	3	3	6
71	1.0	3	3	6
72	0.8	3	2	6
73	0.6	2	1.8	5
74	0.5	2	1.5	5
75	0.4	2	1.2	5

Note: Ldn is used for land uses where nighttime sensitivity is a factor;
maximum 1-hour Leq is used for land use involving only daytime activities.

Source: Federal Transit Administration, *May 2006*

Figure 4.12-2 illustrates typical ground-borne vibration levels for common sources as well as criteria for human and structural response to ground-borne vibration. As shown, the range of interest is from approximately 50 to 100 VdB, from imperceptible background vibration to the threshold of damage. Although the approximate threshold of human perception to vibration is 65 VdB, annoyance is *rare* unless the vibration exceeds 70 VdB.

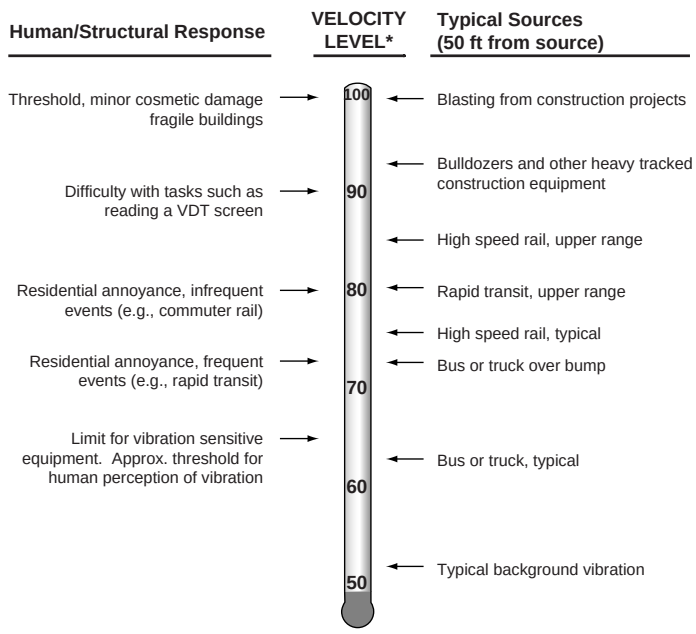


Figure 4.12-*2*: Typical Ground-Borne Vibration Levels and Criteria

Vibration Impact Criteria

New criteria *were introduced in the 2006 version of the FTA guidance manual for use in detailed vibration impact assessments. The general assessment criteria were also changed; the changes have no effect on the impact assessment for this project. As discussed below, the general assessment criteria were used to identify potential vibration impacts and the detailed assessment criteria were then used to determine where vibration mitigation would be required.*

The FTA criteria for general vibration assessments are based on land use and train frequency, as shown in Table 4.12-3. There are some buildings *with sensitive interior uses*, such as concert halls, recording studios and theaters, which can be very sensitive to vibration but do not fit into any of the three categories listed in Table 4.12-3. Due to the sensitivity of these buildings, they usually warrant special attention during the environmental evaluation of a transit project. *There are no "special buildings" with sensitive interior uses in the LPAP2 corridor for which the criteria in Table 4.12-3 are applicable.*

Table 4.12-3: Ground-Borne Vibration and Noise Impact Criteria *for General Assessment*

Land Use Category	Ground-Borne Vibration Impact Levels (VdB re 1 micro inch/sec)			Ground-Borne Noise Impact Levels (dB re 20 micro Pascals)		
	Frequent Events[1]	*Occasional Events[2]*	*Infrequent Events[3]*	*Frequent Events[1]*	*Occasional Events[2]*	*Infrequent Events[3]*
***Category 1**: Buildings where vibration would interfere with interior operations.*	*65 VdB[4]*	*65 VdB[4]*	*65 VdB[4]*	*N/A[5]*	*N/A[5]*	*N/A[5]*
***Category 2**: Residences and buildings where people normally sleep.*	*72 VdB*	*75 VdB*	*80 VdB*	*35 dBA*	*38 VdB*	*43 dBA*
***Category 3**: Institutional land uses with primarily daytime use.*	*75 VdB*	*78 VdB*	*83 VdB*	*40 dBA*	*43 VdB*	*48 dBA*

Notes:

1. "Frequent Events" is defined as more than 70 vibration events per day. Most rapid transit projects fall into this category.
2. *"Occasional* Events" is defined as *between 30 and* 70 vibration events *of the same source* per day. *Most commuter truck lines have this many operations.*
3. *"Infrequent Events" is defined as fewer than 30 vibration events per day. This category includes most commuter rail branch lines.*
4. This criterion limit is based on levels that are acceptable for most moderately sensitive equipment such as optical microscopes. Vibration-sensitive manufacturing or research would require detailed evaluation to define the acceptable vibration levels. Ensuring lower vibration levels in a building often requires special design of the HVAC systems and stiffened floors.
5. Vibration-sensitive equipment is not sensitive to ground-borne noise.

Source: Federal Transit Administration, *May 2006.*

It should also be noted that Table 4.12-3 include separate FTA criteria for ground-borne noise, the "rumble" that can be radiated from the motion of room surfaces in buildings due to ground-borne vibration. Although expressed in dBA, which emphasizes the more audible middle and high frequencies, the criteria are set significantly lower than for airborne noise to account for the annoying low-frequency character of ground-borne noise. Because airborne noise often masks ground-borne noise for above-ground (i.e., at-grade or elevated) rail systems, ground-borne noise criteria are primarily applied to subway operations where airborne noise is not a factor. For the above-grade transit system planned along the LPAP2 alignment, ground-borne noise criteria would apply only to buildings that have sensitive interior uses, such as concert halls or recording studios, which are well insulated from exterior noise. No buildings with sensitive interior uses have been identified within 200 ft of the proposed location for the LRT tracks.

For a detailed analysis, the 2006 version of the FTA guidance manual includes a separate set of vibration impact criteria that are based on the 1/3 octave band spectrum of the predicted vibration. The criteria for residential land uses are shown in Figure 4.12-3. The interpretation is that there is impact if any part of the predicted vibration spectrum exceeds the "Residential (Night)" curve in Figure 4.12-3. That is, as long as the entire 1/3 octave band spectrum is below the curve, vibration mitigation is not required.

Figure 4.12-3 also illustrates application of the impact criteria for a detailed vibration analysis. The example vibration spectrum is from a recent measurement at a residence on Fernandez Street along Phase 1 of the South Line. The overall level for this vibration is 76 VdB, 4 decibels above the impact threshold for a general vibration assessment. However, the maximum spectrum level is 71 VdB, which is 1 decibel below the Residential (Night) curve. Based on the detailed assessment criteria, vibration mitigation is not warranted at this location. This example is typical. General experience is

that the maximum spectrum level is almost always 3 to 5 decibels lower than the overall level. As such, potential vibration impacts identified using the general assessment procedures are often eliminated as impacts when a detailed vibration assessment is performed.

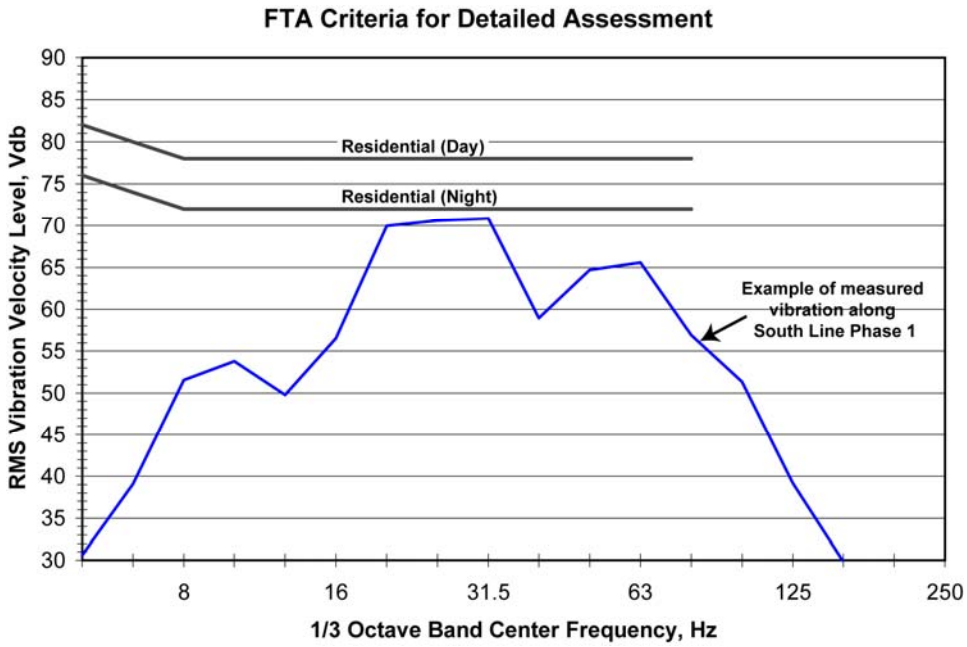


Figure 4.12-3: FTA Vibration Criteria for Detailed Assessment

The approach taken for this study was to use the general assessment threshold of 72 VdB for the overall vibration level to identify potential vibration impacts. The detailed assessment curve was then used to identify locations where vibration mitigation would be needed and to define what type of vibration mitigation would be effective. Because vibration propagation measurements were performed for this study, the vibration assessment includes predictions of the spectrum of the ground-vibration, which is a requirement for applying the FTA detailed assessment criteria curves.

4.12.2 Sensitive Receptors

Sensitive land uses along the LPAP2 alignment were identified based on conceptual alignment drawings, aerial photographs, and visual surveys. Areas adjacent to the project alignment include neighborhoods of primarily single-family residences, the Brooke Meadow mobile home park, and the Valley Hi Covenant Church.

4.12.3 Measurement of Existing Noise and Vibration

4.12.3.1 EXISTING NOISE

Land uses along the LPAP2 alignment are currently exposed to noise from traffic (SR 99, CRB, and other local streets), freight trains, and air traffic from general aviation aircraft accessing the

Sacramento Executive Airport. Existing ambient noise levels were characterized through measurements at selected sites along the proposed alignment during the period from April 22 through April 27, 2002.[9] The measurements included both long-term (typically 24-hour) and short-term (1-hour) monitoring of the A-weighted sound level at representative noise-sensitive locations. All measurement sites were located in noise-sensitive areas and were selected to represent a range of existing noise conditions along the LPAP2 alignment.

At each site, the measurement microphone was positioned to characterize the exposure of the site to the dominant noise sources in the area. For example, microphones were located at the approximate setback lines of the receptors from adjacent roads or rail lines and were positioned to avoid acoustic shielding by landscaping, fences or other obstructions. Figure 4.12-*4* shows the general location of the 12 long-term monitoring sites (LT-1 through LT-12) and two short-term monitoring sites (ST-1 and ST-2*). All sites* are described below.

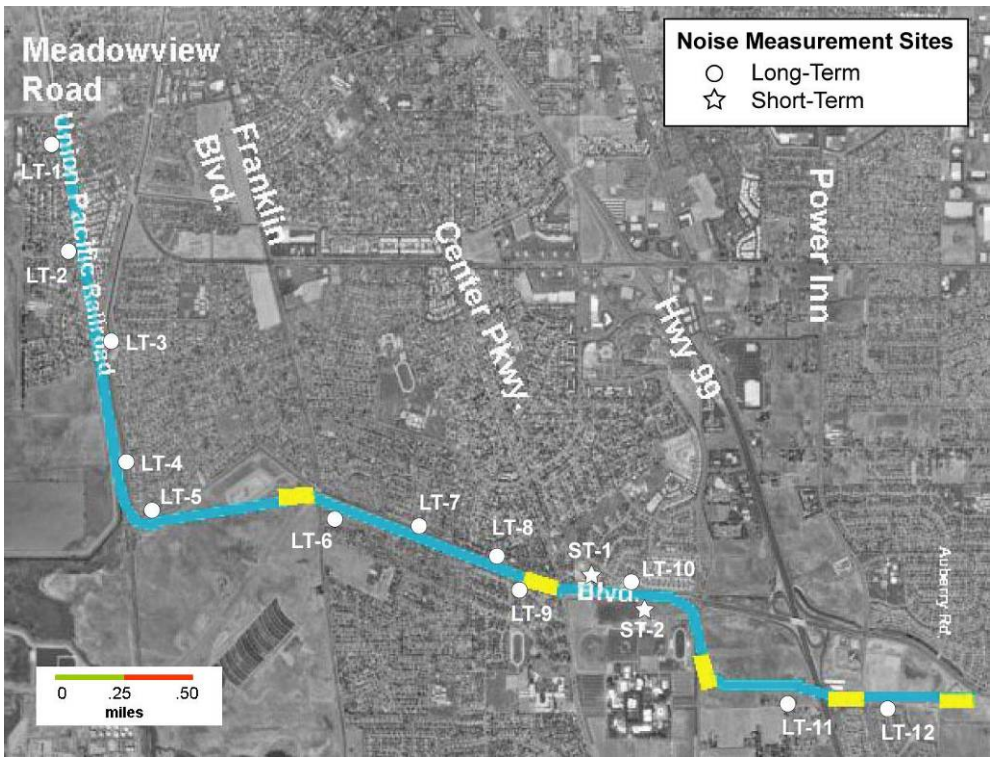


Figure 4.12-*4*: Noise Measurement Sites: LPAP2 LRT Alignment

Freight trains are *the dominant noise source from Meadowview Road south to the UPRR crossing where the LRT alignment curves to the east. The highest recorded noise levels were caused by the use of freight train horns near the Meadowview Road grade crossing. Except for the freight trains, the residential communities east of the UPRR tracks are relatively quiet with noise coming from distant arterial roads and freeways, normal community activities such as landscaping equipment, local*

[9] *Although the measurements were performed six yeas ago, they are still valid because there have been at most minor changes in the major noise sources. Current traffic volumes and the volume of freight trains are approximately the same as in 2002. Note that it takes a doubling of traffic volumes to cause a 3 decibel increase in the noise levels.*

traffic, and occasional aircraft overflights. There are several older sound walls at the east boundary of the UPRR right-of-way ranging in *height from about 8 to 10 ft. Materials for these walls include lightweight sheet metal, concrete panels, and masonry block. The walls appear to be in relatively poor condition and cannot be depended on to provide acoustic shielding of LRT noise unless they are refurbished or rebuilt*.

Sound levels are relatively low from the proposed UPRR flyover to Franklin Boulevard. Once the alignment crosses Franklin Boulevard, noise levels are dominated by traffic on CRB. The highest noise levels are south of CRB where the closest residences are 25 to 50 ft from its southern edge. There are walls along the south side of CRB that range in height from about 9 ft near Franklin Boulevard to 4 ft near Center Parkway.

Following is a summary of the results at each measurement site:

Site LT-1 is located west of the proposed alignment at 7659 *Laurie* Way. The microphone was located in the backyard of the single-family residence. Freight trains and horn blowing at the Meadowview grade crossing were the dominant sources of noise at this site. Traffic and airplanes also contributed to the noise environment. The measured Ldn at this site was 63 dBA.

Site LT-2 is located east of the proposed alignment at 3637 Reel Circle. The microphone was located in the backyard of the single-family residence. Dominant sources of noise at this site included freight trains and airplanes. The measured Ldn at this site was 64 dBA.

Site LT-3 is located *approximately 550 ft* east of the proposed alignment at 7886 Deer Lake Drive. The microphone was located in the yard of the single-family residence. Airplanes, freight trains and local traffic contributed to the noise environment. The measured Ldn at this site was 56 dBA.

Site LT-4 is located east of the proposed alignment at 24 Vidmar Circle. *There is an 8 to 9 ft high concrete wall that parallels the UPRR tracks in this area.* The microphone was placed in the backyard of a single-family residence at the end of Vidmar Circle abutting the train tracks. Freight trains and airplanes contributed to the noise environment. The measured Ldn at this site was 62 dBA.

Site LT-5 is located north of the proposed alignment at 4110 McNamara Way. The microphone was located in the backyard of the single-family residence. Noise sources at this site included airplanes and local traffic. The measured Ldn at this site was 53 dBA.

Site LT-6 is located south of the proposed alignment at 4867 North Laguna. The microphone was located in the backyard of the single-family residence. *There is an 8 to 9 ft high masonry block wall along* the *south side of* CRB at this *location. Traffic on CRB dominated the noise environment. The measured Ldn at this* site was 60 dBA.

Site LT-7 is located north of the proposed alignment at 5250 Yvonne Way. The microphone was located in the backyard of the single-family residence. Traffic on CRB dominated the noise environment. The measured Ldn at this site was 62 dBA. *Most residences in this area are two stories. The low levee along the south side of Union House Creek provides partial acoustic shielding from CRB traffic noise.*

Site LT-8 is located north of the proposed alignment at 5820 Hollyhurst Street. The microphone was located in the backyard of the single-family residence. Traffic on CRB dominated the noise environment. The measured Ldn at this site was 61 dBA. *As for LT-7, the low levee along the south side of Union House Creek provides partial acoustic shielding from CRB traffic noise.*

Site LT-9 is located south of the proposed alignment at 8217 La Almendra Way. The microphone was placed in the backyard of a single-family residence abutting CRB. Traffic on CRB dominated the noise environment at this site. The measured Ldn was 65 dBA.

Site LT-10 is located north of the proposed alignment at 8295 Arroyo Vista Drive. The microphone was located in the backyard of a single-family residence abutting Union House Creek and CRB. Traffic on the boulevard and airplanes contributed to the noise environment at this site. The measured Ldn was 57 dBA.

Site LT-11 is located south of the proposed alignment at 7705 Cotton Lane, the last residence on the street. The microphone was located in the yard. Local traffic and airplanes contributed to the noise environment. The measured Ldn was 55 dBA.

Site LT-12 is located south of the proposed alignment at 8409 Ardelle Way. The microphone was located in the yard of a single-family residence. Airplanes and traffic on Old Calvine Road and Route 99 contributed to the noise environment. The measured Ldn at this site was 56 dBA.

Site ST-1 was located north of the proposed alignment at the Valley Hi Covenant Church. Traffic on CRB dominated the noise environment at this site. The measured one-hour Leq was 53 dBA.

Site ST-2 was located north of the proposed alignment at Cosumnes River College. The two sites nearest to the alignment, which would potentially be affected by the light rail operations, are the soccer fields and the stadium. Traffic on CRB dominated the noise environment at this site. The one-hour Leq was 58 dBA.

The results of the existing ambient noise measurements are summarized in Table 4.12-4.

Table 4.12-*4*: Summary of Existing Ambient Noise Measurement Results

Site No.	Measurement Location Description	Measurement *Start*		Meas. Time (hrs)	Noise Exposure (dBA)	
		Date	Time		Ldn	Leq
LT-1	S.F. Residential @ 7659 Laurie Way	4/24/02	19:00	24	63	--
LT-2	S.F. Residential @ 3637 Reel Circle	4/22/02	14:00	24	64	--
LT-3	S.F. Residential @ 7886 Deer Lake Drive	4/22/02	15:00	24	56	--
LT-4	S.F. Residential @ 24 Vidmar Circle	4/23/02	15:00	24	62	--
LT-5	S.F. Residential @ 4110 McNamara Way	4/22/02	15:00	24	53	--
LT-6	S.F. Residential @ 4867 North Laguna	4/22/02	16:00	24	60	--
LT-7	S.F. Residential @ 5250 Yvonne Way	4/23/02	17:00	24	62	--
LT-8	S.F. Residential @ 5820 Hollyhurst Street	4/23/02	17:00	24	61	--
LT-9	S.F. Residential @ 8217 La Almendra Way	4/23/02	17:00	24	65	--
LT-10	S.F. Residential @ 8295 Arroyo Vista Drive	4/24/02	17:00	24	57	--
LT-11	S.F. Residential @ 7705 Cotton Lane	4/24/02	18:00	24	55	--
LT-12	S.F. Residential @ 8409 Ardelle Way	4/24/02	17:00	24	56	--
ST-1	Valley Hi Covenant Church	4/27/02	15:00	1	--	53
ST-2	Cosumnes River College	4/25/02	07:00	1	--	58*

* The peak-hour Leq for this site was taken from the loudest peak-hour measured at site LT-10, which was the nearest long-term noise measurement site.

Source: Harris Miller Miller & Hanson Inc., 2002

4.12.3.2 EXISTING VIBRATION

The only significant sources of existing ground-borne vibration along the LPAP2 alignment are the Union Pacific freight trains operating along the existing tracks on the UPRR corridor. Figure 4.12-5 shows the existing vibration levels from the freight trains as a function of the distance from the track. The measured freight train vibration levels are around 75 VdB at 100 ft and dropped only to about 72 VdB at 200 ft. Although the vibration measurements were performed in 2002, there has been no substantive change in the freight train equipment used on the UPRR corridor and the current vibration levels should be substantially the same as in 2002.

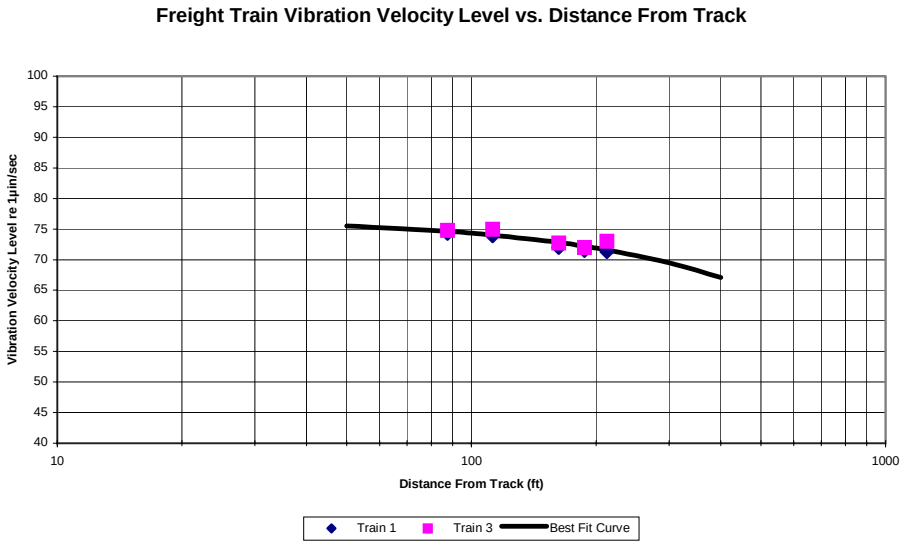


Figure 4.12-5: Maximum Existing Union Pacific Freight Train Vibration at 15 mph

In addition to measuring the vibration levels from the existing freight trains, the vibration measurements for this project focused on characterizing the vibration propagation characteristics of the soil at representative locations.

During the period from April 22 through April 27, 2002, and again on December 9, 2004, a ground-borne vibration propagation test was conducted at each of *four* vibration-testing sites by impacting the ground and measuring the input force and corresponding ground vibration response at various distances. The resulting force-response transfer function can be combined with the known input force characteristics of the Sacramento LRT vehicle to predict future vibration levels at locations along the LPAP2 alignment. The vibration testing sites (V-1 though V-*4*) were selected to represent a range of soil conditions in areas along the alignment that include a number of vibration-sensitive receptors. These sites are shown in Figure 4.12-*6* and described below.

Site V-1 is located east of the proposed alignment in the Brooke Meadow mobile home park. Several neighborhoods are located in the vicinity of this measurement site*, and it* is representative of the vibration-sensitive receptors in the northern portion of the proposed alignment. In addition to the propagation test conducted at this site, ground-borne vibration measurements were made during the passage of two Union Pacific freight trains. The existing vibration levels from freight trains are similar to the future vibration levels from LRT vehicles. The freight trains were traveling at approximately 10-15 mph through the project area. At higher speeds, the freight trains would have higher vibration levels as compared to the LRT.

Site V-2 is located north of the proposed alignment at an empty field on the corner of CRB and Franklin Boulevard. The measurements were performed just north of the intersection of CRB and Franklin Boulevard. This site is representative of vibration-sensitive receptors in the vicinity of Franklin Boulevard.

Site V-3 is located north of the proposed alignment at the Valley Hi Covenant Church. This site is representative of vibration-sensitive receptors *along* the *CRB section* of *the alignment near Center Parkway*.

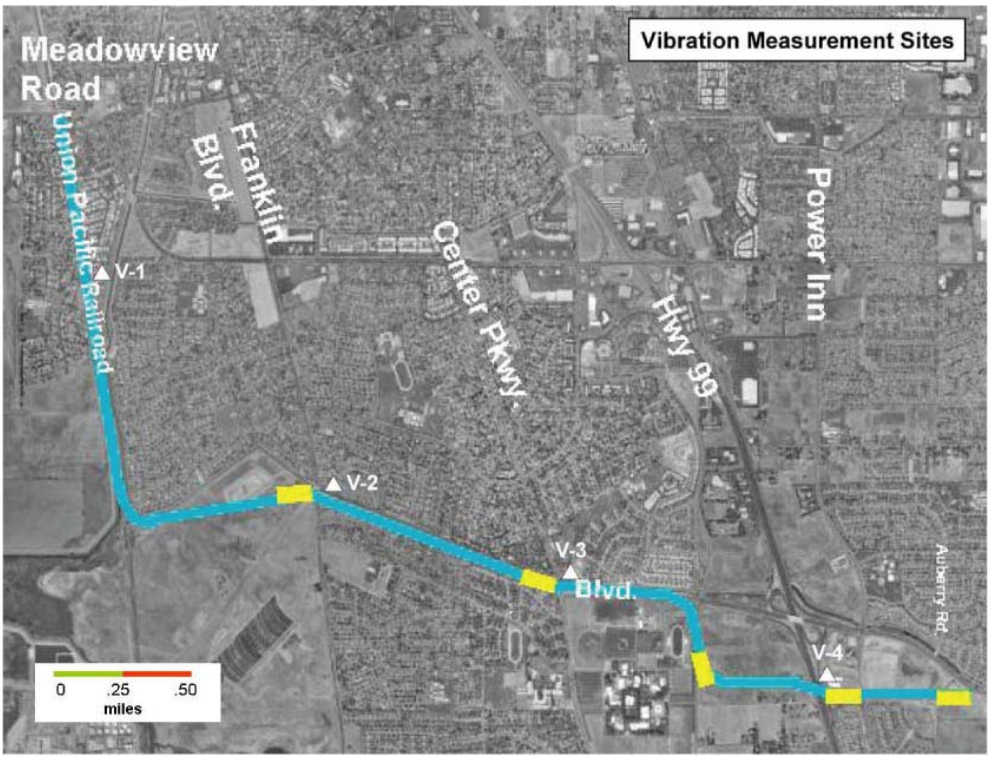


Figure 4.12-*6*: Ground-Borne Vibration Measurement Locations

Site V-4 is located south of the proposed alignment at a park and ride lot near Old Calvine Road and Route 99. This site is representative of vibration-sensitive sites in the southeastern portion of the proposed alignment.

Results of the vibration propagation tests at distances of 50 and 100 ft are shown in Figure 4.12-7. Shown in Figure 4.1.2-7 are the line source transfer mobility curves measured at the four vibration test sites. As discussed in Section 4.12.5, the transfer mobility curves are combined with curves representing the vibration forces generated by the light rail vehicles to predict future levels of ground vibration. The transfer mobility results in Figure 4.12-7 are well grouped at 50 ft and more widely spread at 100 ft. The results for Sites V-1 and V-2 are similar at both distances indicating that these sites are representative of the section of the corridor from Meadowview to east of the Franklin Boulevard crossing. Site V-3, which was located east of Center Parkway, has higher levels at both high and low frequencies at both 50 ft and 100 ft. The measured transfer mobility at Site V-4 has more high frequency than Sites V-1 and V-2, although the mid-frequency range that controls the

overall vibration level is similar for all four sites at 50 ft. Another difference with Site V-4 is that compared to the other three sites the attenuation going from 50 to 100 ft is less.

The approach used to develop vibration predictions for the corridor was to apply the average transfer mobility spectrum that is shown in Figure 4.12-7 to the entire corridor. This approach will tend to over-predict vibration levels for the majority of the corridor and could tend to under predict vibration levels near Center Parkway. Other assumptions made in the predictions tend to lead to over-predicting the vibration levels, so predictions for the Center Parkway area should still be on the conservative side.

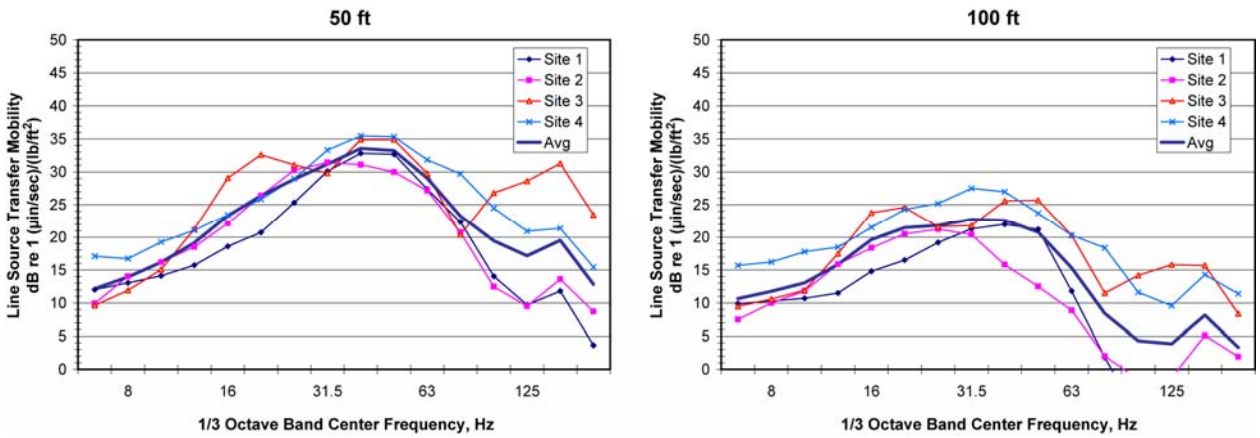


Figure 4.12-7*: Vibration Propagation Test Results*

4.12.4 Noise Impacts

The No-Action and TSM alternatives are not expected to result in noise impacts approaching or exceeding FTA thresholds, because these alternatives consist mainly of additional buses operating on major arterial streets. The additional noise levels generated for the TSM by the additional buses on major arterials and highways would be well below the impact thresholds for noise. For a 3 dBA increase in noise level, the traffic would have to be doubled. With only a small increase in the number of vehicles (even 8-10 per hour), on heavily traveled roads the increase would be a fraction of a decibel and well below the FTA impact criteria. Therefore, this section focuses on the LPAP2.

LRT Operations

LPAP2 noise levels were projected based on noise measurements of the Sacramento LRT vehicles, the transit operating plan provided in Chapter 2, and the prediction model specified in the FTA guidance manual. The operating times, headways, speeds, train consists, and other aspects of LRT operations are based on the operating plan described in Chapter 2. To comply with the RT policy that impact occurs when predicted noise levels are within 1 decibel of the FTA threshold for Moderate Impact, the predicted noise levels include a 1 decibel increase. Noise from audible warnings at grade crossings is covered independently in the later section, "Noise Impacts from Audible Warnings at Grade Crossings."

The primary noise-sensitive receptors in the project area are residential land uses, FTA Category 2. The locations of the predicted noise impact for Category 2 receptors are presented in Table 4.12-5.

For each cluster of receptors, the table includes the existing noise levels, the projected noise level from project operations, the impact criteria for the closest receptors, the number of dwelling units where moderate and severe impact are predicted, and the amount that the predicted levels exceed the impact threshold. The general locations of the predicted noise impacts are shown in Figures 4.12-8 and 4.12-9.

Table 4.12-5: Projected Noise Impacts at Residences due to LRT Operations

Location	Civil Station	Side of Tracks	Exist Noise[1]	Project Noise[1]			No. of Impacts		Amt Exceeded	
				Pred[2,3]	Impact Thresh		Mod[4]	Severe	Mod	Severe
					Mod	Severe				
Meadowview Road Crossing – At-Grade Option – Base Case										
Jola Circle	347-351	OB	63	68	60	65	6	6	8	2
Laurie Way	351-354	OB	63	68	60	65	3	3	8	2
Andros Way	347-351	IB	63	64	60	65	4	--	4	--
Leros Ct	351-354	IB	63	66	60	65	4	4	7	1.2
Subtotal – Meadowview Road Crossing – At-Grade Option							***17***	***13***		
Meadowview Road Crossing – Flyover Option										
Jola Circle	347-351	OB	63	68	60	65	6	6	9	3
Laurie Way	351-354	OB	63	68	60	65	3	3	9	3
Andros Way	347-351	IB	63	64	60	65	4	--	5	--
Leros Ct	351-354	IB	63	67	60	65	4	4	7	1.8
Subtotal – Meadowview Road Crossing – Flyover Option							***17***	***13***		
Meadowview Road Crossing – Depressed Option										
Jola Circle	347-351	OB	63	62	60	65	6	--	3	--
Laurie Way	351-354	OB	63	62	60	65	3	--	3	--
Leros Ct	351-354	IB	63	61	60	65	4	--	1.3	--
Subtotal – Meadowview Road Crossing – Depressed Option							***13***	***0***		
Franklin Boulevard Crossing – At-Grade Option – Base Case										
N Laguna Drive (2nd floor)	468-472	OB	65	66	61	66	6	6	6	0.2
Camino Royal Dr	468-469	IB	62	61	59	64	4	--	1.7	--
Villa Royal Way	469-478	IB	62	65	59	64	13	13	6	0.9
Subtotal – Franklin Blvd. Crossing – At-Grade Option							**23**	**19**		
Franklin Boulevard Crossing – Flyover Option										
N Laguna Drive	468-472	OB	65	70	61	66	16	16	9	4
Camino Royal Dr	468-469	IB	62	65	59	64	4	4	6	0.3
Villa Royal Way	469-478	IB	62	69	59	64	13	13	10	5
Subtotal – Franklin Blvd. Crossing – Flyover Option							***33***	***33***		
Cosumnes River Crossing – Flyover – Base Case										
Snowy Birch Way	537-550	IB	62	66	59	64	20	20	7	1.9
Subtotal – Cosumnes River Crossing – Flyover							***20***	***20***		
Cosumnes River Crossing – At-Grade Option										
Subtotal – Cosumnes River Crossing – At-Grade Option							***0***	***0***		

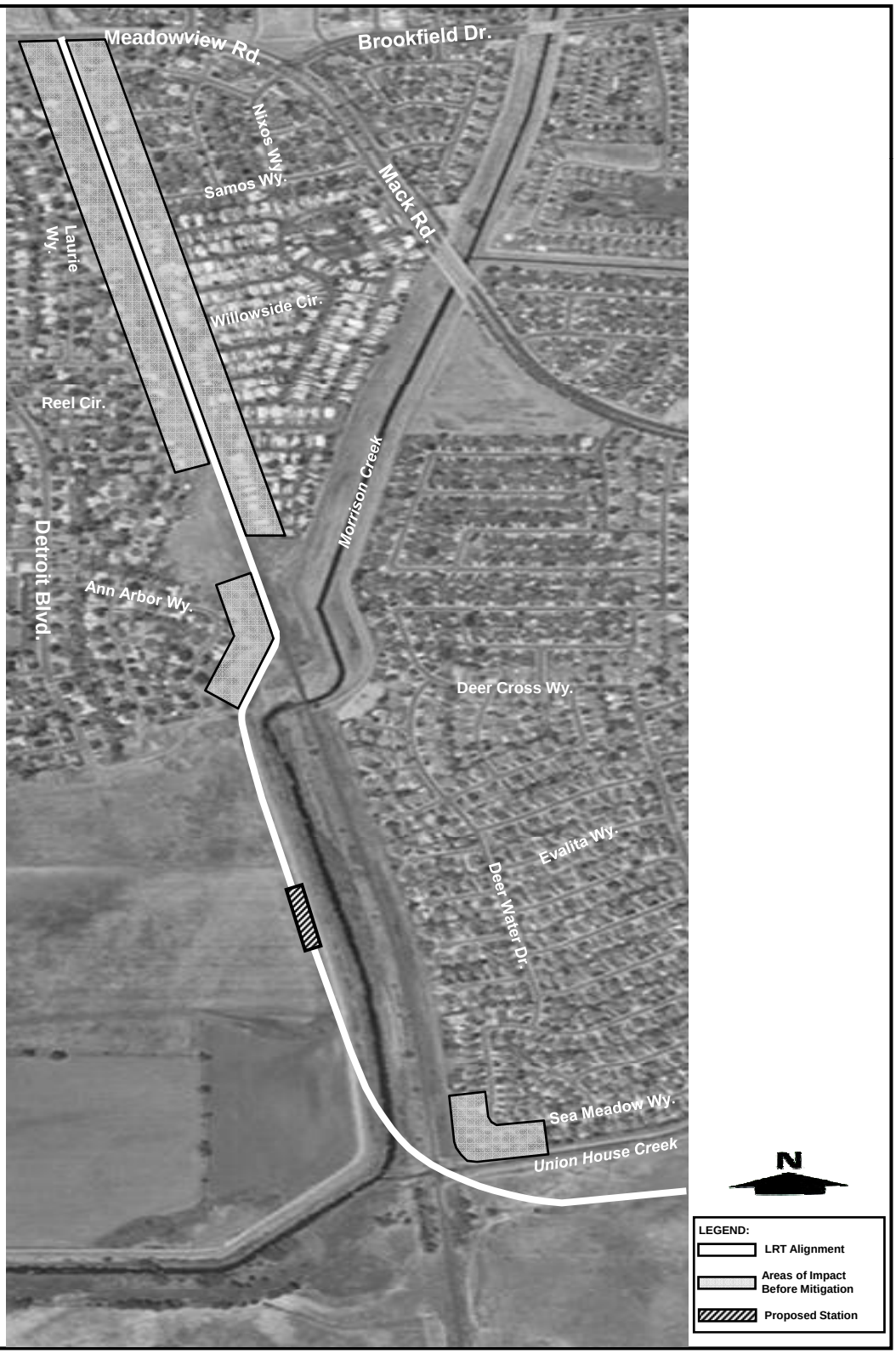
Table 4.12-5: Projected Noise Impacts at Residences due to LRT Operations

Location	Civil Station	Side of Tracks	Exist Noise[1]	Project Noise[1]			No. of Impacts		Amt Exceeded	
				Pred[2,3]	Impact Thresh		Mod[4]	Severe	Mod	Severe
					Mod	Severe				
Portions of LPAP2 LRT Alignment not Affected by Design Options										
Leros Ct	351-354	IB	63	66	60	65	4	4	7	1.2
Lesbos Ct	354-356	IB	63	66	60	65	4	4	7	1.2
Laurie Way	351-361	OB	63	68	60	65	14	14	8	2
Samos Way	356-359	IB	63	66	60	65	4	4	7	1.2
Marshwood Circle	359-363	IB	63	67	60	65	7	7	8	2
Laurie Way	361-366	OB	63	71	60	65	7	7	11	6
Willowside Circle	363-366	IB	63	67	60	65	6	6	7	1.6
Reel Circle	366-371	OB	63	69	60	65	7	7	9	4
Elk Wood Circle	366-371	IB	63	67	60	65	6	6	8	2
Woodgrove Ln	371-374	IB	63	67	60	65	3	3	7	2
Falls Circle	371-381	OB	63	67	60	65	13	13	8	2
Meadow Drive	374-380	IB	63	67	60	65	10	10	7	2
Ann Arbor	383-391	OB	63	67	60	65	9	9	8	2
McNamara Way	420-431	IB	59	59	57	63	22	--	2	--
Villa Royal Way	469-478	IB	62	65	59	64	26	26	6	0.9
Cornina Ct	478-480	IB	62	65	59	64	6	6	6	0.5
Bolinas	482-486	OB	63	66	60	65	2	2	7	1.4
Brenham	486-489	OB	63	66	60	65	2	2	7	1.4
Yvonne Way	480-495	IB	62	65	59	64	48	48	6	0.5
N Laguna Drive (2nd Floor)	468-482	OB	60	67	58	63	13	13	9	3
Clove Ct	489-492	OB	63	66	60	65	2	2	7	1.4
Essen Way	492-495	OB	63	66	60	65	2	2	7	1.4
La Almendra Way	495-497	OB	63	66	60	65	2	2	7	1.2
Hollyhurst Way	495-506	IB	62	65	59	64	21	21	6	0.9
La Almendra Way	497-511	OB	65	66	61	66	23	23	5	0.1
Apartments	506-512	IB	62	65	59	64	18	18	6	0.6
Lochinvar Way	511-518	OB	65	66	61	66	13	--	5	--
Birkdale Ct	518-520	OB	65	62	61	66	2	--	1.6	--
Midsummer Way	520-521	OB	65	62	61	66	3	--	1.6	--
Union House Way	522-525	IB	62	60	59	64	6	--	1.1	--
Narrowgauge Way	525-530	IB	62	64	59	64	3	--	5	--
Subtotal – LRT Alignment not Affected by Design Options							**308**	**259**		

Notes:

1. *Noise levels are Day-Night Average Level (Ldn) measured in dBA. Noise levels are rounded to the nearest decibel except for the "Amount Exceeded" when the amount exceeded is less than 2 decibels.*
2. *Predicted levels include a 1 dBA increase to conform to RT policy for Noise Assessments for Proposed Light Rail Projects (Resolution No. 97-03-2805, Section 2).*
3. *The reported noise levels represent the highest noise levels for each location.*
4. *The severe impacts are included in the number of moderate impacts.*

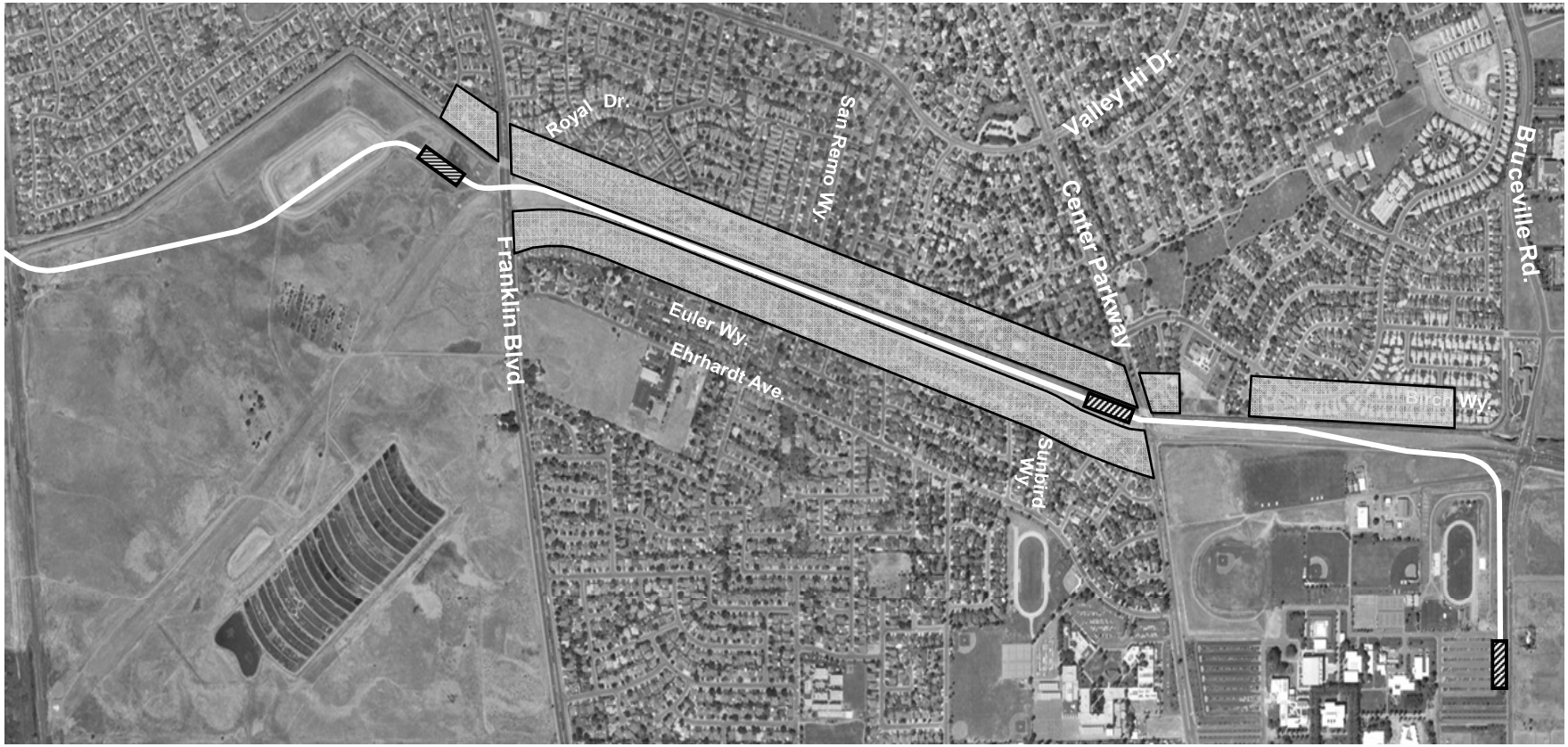
Source: ATS Consulting, August 2007



Regional Transit

South Sacramento Corridor
Phase 2 Project

NOISE IMPACTS BEFORE MITIGATION
Figure 4.12-8



N

LEGEND:
- LRT Alignment
- Areas of Impact Before Mitigation
- Proposed Station

Regional Transit

South Sacramento Corridor
Phase 2 Project

NOISE IMPACTS BEFORE MITIGATION
Figure 4.12-9

There also are several FTA Category 3 land uses in the corridor. As discussed above, FTA defines Category 3 to include schools, churches, libraries, and park facilities if they are associated with meditation or study. FTA specifically excludes parks used for active recreation such as playing fields. Table 4.12-6 lists the noise predictions for Category 3 land uses. The only Category 3 land use identified within the study area is the Valley Hi Covenant Church, which is located east of Center Parkway and north of CRB. For information purposes, Table 4.12-6 also includes predictions for CRC recreation facilities, although they are not considered noise sensitive by FTA. No noise impacts are predicted for Category 3 land uses.

Table 4.12-6: Projected Noise Impacts at Non-Residential Receptors due to LPAP2 LRT Operations (FTA Noise Category 3)

Location	Civil Station	Side of Tracks	Exist Noise[1]	Project Noise[1]			No. of Impacts		Amt Exceeded	
				Pred[2]	Impact Thresh		Mod	Severe	Mod	Severe
					Mod	Severe				
Cosumnes River Boulevard Crossing – Flyover										
CRC Soccer Fields[4]	533	OB	58	67	--	--	--	--	--	--
Subtotal – Cosumnes River Crossing – Flyover Option							**0**	**0**		
Portions of LPAP2 LRT Alignment not Affected by Design Options										
Valley Hi Covenant Church	525	IB	53	54	59	66	0	0	0	0
CRC Stadium[4]	556	OB	58	65	--	--	--	--	--	--
Subtotal – LRT Alignment not Affected by Design Options							**0**	**0**		

Notes:

1. Noise levels are maximum 1-hour Leq measured in dBA during the time that the facility would be in use.
2. Predicted levels include a 1 dBA increase to conform to RT policy for Noise Assessments for Proposed Light Rail Projects (Resolution No. 97-03-2805, Section 2).
3. CRC is Cosumnes River College.
4. The CRC soccer fields and stadium are not considered noise sensitive receptors under FTA definitions.

Source: ATS Consulting, August 2007

Meadowview Road Crossing Options: As shown in Table 4.12-5, noise impacts in the vicinity of Meadowview Road are the same for the at-grade and flyover options and substantially lower for the depressed option. A total of 17 impacts are predicted with the flyover and at-grade options, 13 of which would be severe impacts. For the depressed option 13 impacts are predicted, all of which are moderate impacts.

Franklin Boulevard Crossing Options: The at-grade crossing for Franklin Boulevard is predicted to have 23 impacts, 19 of which are severe impacts. The impacts increase with the flyover to a total of 33, all of which are severe impacts. The greater degree of impact for the flyover would be caused by a combination of higher noise levels from reflections off the concrete deck of the flyover and the elevation of the tracks, which would eliminate the acoustic benefits of the existing sound wall along the south side of CRB.

Cosumnes River Boulevard Crossing Options: The two options evaluated for the CRB crossing were a flyover from the north side of CRB to the west side of Bruceville Road and a mid-block at-grade crossing that would cross CRB on a diagonal. No noise impacts were identified for the at-grade crossing for two reasons: the tracks turn away from the residences at the crossing, and the train

speed would be relatively low for the crossing. A total of 33 impacts are predicted for the flyover option, and all are severe impacts. The impacts would be the result of maintaining the train speed to a point closer to Bruceville Road, the elevation of the tracks on the flyover, and the acoustic reflections off the concrete trackbed of the flyover.

Portions of LPAP2 LRT Alignment Not Affected by Design Options: *A total of 308 noise impacts are predicted for the remainder of the proposed LPAP2 LRT corridor, 259 of which are severe impacts. The impact count is based on an estimate of dwelling units. For multifamily buildings, the number of affected dwelling units was estimated based on the size of the building and the orientation of the building to the LRT alignment. Approximately 40% of the predicted impacts would be along the segment from Meadowview Road to Franklin Boulevard and 60% along Cosumnes River Boulevard. There are no impacts predicted for Category 3 (institutional) land uses. There is a potential for wheel squeal as the LRT vehicles traverse the three curves along the alignment: (1) on the bridge over the UPRR, (2) east of the Franklin Station, and (3) on the CRB flyover.*

Noise Impacts from Audible Warnings at Grade Crossings

The California Public Utilities Commission (CPUC) requires that audible warnings be sounded as light rail trains approach all gate protected crossings. The specific requirements are:

1. *Every LRV must be equipped with a bell or horn that generates a sound level of 75 dBA at a distance of 100 feet from the vehicle (CPUC General Order 143B).*
2. *Every LRV operating on separate right-of-way over motor vehicle grade crossings must be equipped with a horn or whistle that generates a sound level of at least 85 dBA at a distance of 100 feet from the LRV (CPUC General Order 143B). Most automobile horns generate a sound level of 80 to 85 dBA at a distance of 100 ft, so the loud horn is slightly louder than most automobile horns.*
3. *The light rail vehicle operator must sound an audible warning when approaching at grade crossings protected by automatic crossing signals. The standard practice at RT is to sound the low volume horn (75 dBA at 100 ft) unless there is a potential emergency.*
4. *Bells must be included in all automatic crossing gate assemblies. The bells are operated in conjunction with the flashing light signals and bells must conform to the guidelines of the American Railway Engineering and Maintenance of Way Association's (AREMA) "Communications and Signals Manual of Recommended Practices" (CPUC General Order 75D). The current AREMA C&S Manual states that crossing bells should generate a sound level of at least 75 dBA (Lmax) at a distance of 10 ft from the bell.*
5. *The automatic warnings at grade crossings, including the bells, must be activated at least 20 seconds before the light rail train reaches the grade crossing and must continue until the trailing car of the train is completely through the crossing (CPUC General Order 75D).*

RT's operating procedure on Phase 1 of the South Line is that train operators sound the 75 dBA warning device prior to all gate-protected crossings starting approximately 300 ft prior to the crossing. At speeds greater than 35 mph, the noise from the warning device adds less than 1 decibel to the noise exposure caused by light rail train operations. Therefore, the train horn has not been included in the analysis of audible warning noise at grade crossings.

Recent experience with several new light rail lines in California demonstrates that bells at rail/roadway crossings can be a major source of annoyance for people living in the immediate vicinity of grade crossings. Experience also has shown that it is possible to minimize the potential for

annoyance through straightforward means such as reducing the bell volume to the lower end of the range allowed by the CPUC and placing shrouds on the bells that direct the sound away from residences.

The potential at-grade crossings on the LPAP2 are Meadowview Road, Franklin Boulevard, Center Parkway, CRB, and a private crossing near the Morrison Creek crossing. Only public crossings are considered in this analysis because it is likely that the private crossing will be infrequently used and will not require sounding audible warnings for every train. The assumptions used for predicting the noise from bells ringing are:

- *The bells as delivered from the supplier will generate a sound level of 85 dBA at a distance of 10 ft from the bell.*
- *The bells will ring for a total of 40 seconds for every inbound and outbound train.*
- *There will be two bells at each crossing located at the top of the masts for the crossing gates.*
- *Each bells acts like a point sound source with sound levels attenuating at a rate of 20*log(distance).*

The predicted sound levels at the closest noise sensitive receptors to each of the grade crossings are shown in Table 4.12-7. *All of the noise sensitive receptors listed in Table* 4.12-7 *are residential land uses. Included in Table* 4.12-7 *are the existing noise levels, the FTA impact threshold for moderate noise impact, and the predicted Ldn from bell noise with no mitigation and with three levels of noise mitigation. There are two residences where the predicted levels of bell noise without any mitigation exceed the FTA moderate impact threshold, one in the southwest quadrant of the Meadowview crossing and one in the northeast quadrant of the Center Parkway crossing. Noise impact is also predicted at these residences from LRV operations. There are no locations where bell noise would exceed the FTA severe impact threshold.*

Three different levels of noise mitigation are shown in Table 4.12-7*:*

Level 1: *This mitigation measure consists of adjusting the bells so that the sound level is near the bottom end of the CPUC acceptable range. This simple measure is sufficient to reduce the predicted levels of bell noise at the closest residences to at least 6 decibels below the FTA moderate impact threshold. This is also a sufficient reduction that bell noise will add an insignificant amount to the total noise exposure, which means that the train noise can be evaluated independently of the noise from audible warnings at grade crossings.*

Level 2: *Reduce the bell volume plus install shrouds on the bells to direct the noise toward the grade crossing and away from the residences. The use of shrouds has been approved by the CPUC for grade crossings on the Los Angeles Metro Gold Line and for the VTA Vasona Line and it is reasonable to expect that approval can be obtained from the CPUC for use of shrouds on the LPAP2.*

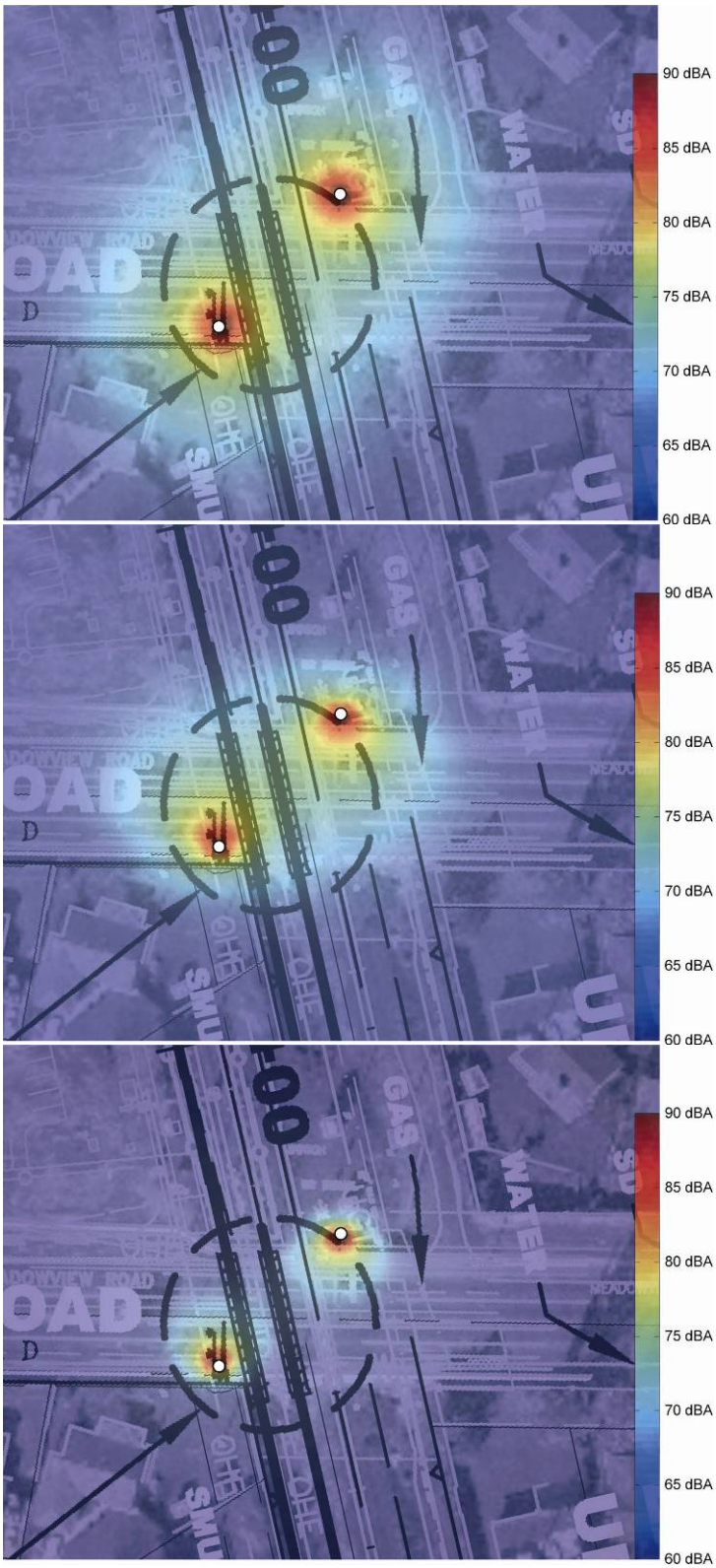
Level 3: *The measures in Level 2 plus apply to the CPUC for a gate-down-bell-stop variance. When a variance is granted by the CPUC, the bell ringing can be terminated once the gates are in the horizontal position. This reduces the duration of the bell ringing from around 40 seconds to less than 15 seconds. A gate-down-bell-stop variance may be difficult to achieve because it would be necessary to demonstrate to the CPUC that equivalent safety measures are in place so that ringing the bells is not necessary for public safety.*

Table 4.12-7: Predicted Noise from Grade Crossing Bells

Crossing	Quadrant	Distances, ft		Exist Ldn, dBA	Impact Thresh., Ldn, dBA	Bell Noise Ldn, dBA			
		Bell 1	Bell 2			No Mitigation	Level 1	Level 2	Level 3
Meadowview	SW Quad	60	160	63	60	**64**	54	49	43
	SE Quad	200	210	63	60	56	46	45	39
Franklin	SE Quad	160	260	60	58	56	46	44	39
	NE Quad	360	390	63	60	51	41	39	34
Center Parkway	SW Quad	230	230	62	59	55	45	43	38
	NW Quad	340	470	62	59	50	40	38	33
	NE Quad	150	80	62	59	**62**	52	50	44
CRB Mid-Block Crossing	North	270	260	62	59	54	44	42	37

Definitions:

Exist Ldn: Existing Ldn based on the noise survey results.
Impact Threshold: Applicable FTA threshold for moderate noise impact.
No Mit.: Predicted level of bell noise using bells as delivered from supplier with no mitigation.
Level 1: Mitigation consisting of reducing bell volume to near minimum allowed by the CPUC.
Level 2: Mitigation consisting of Level 1 plus installing half-round sheet metal shrouds on the bells to direct the noise toward the grade crossing and away from residences.
Level 3: Mitigation consisting of Level 2 plus applying for a gate-down-bell-stop-variance from the CPUC.



A. No noise mitigation for crossing bells.

B. Shrouds placed on bells to direct noise away from residences and toward crossing.

C. Shrouds placed on bells and bell volume reduced to 75 dBA at 50 ft.

Figure 4.12-10: Crossing Bell Noise at Meadowview Road Grade Crossing

The sound fields for the at-grade crossings of Franklin Boulevard, Center Parkway, and the CRB mid-block crossing are shown in Figure 4.12-11, 4.12-12, and 4.12-13, respectively. The primary observations from these figures are: (1) noise from the grade crossing bells would have only a minor effect on community noise levels, and (2) relatively simple noise mitigation measures would substantially reduce the levels of bell noise at the closest residences.

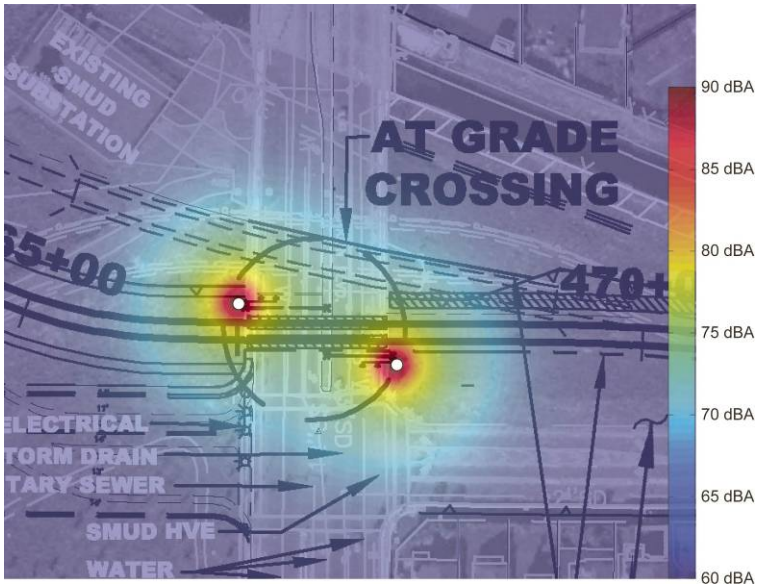
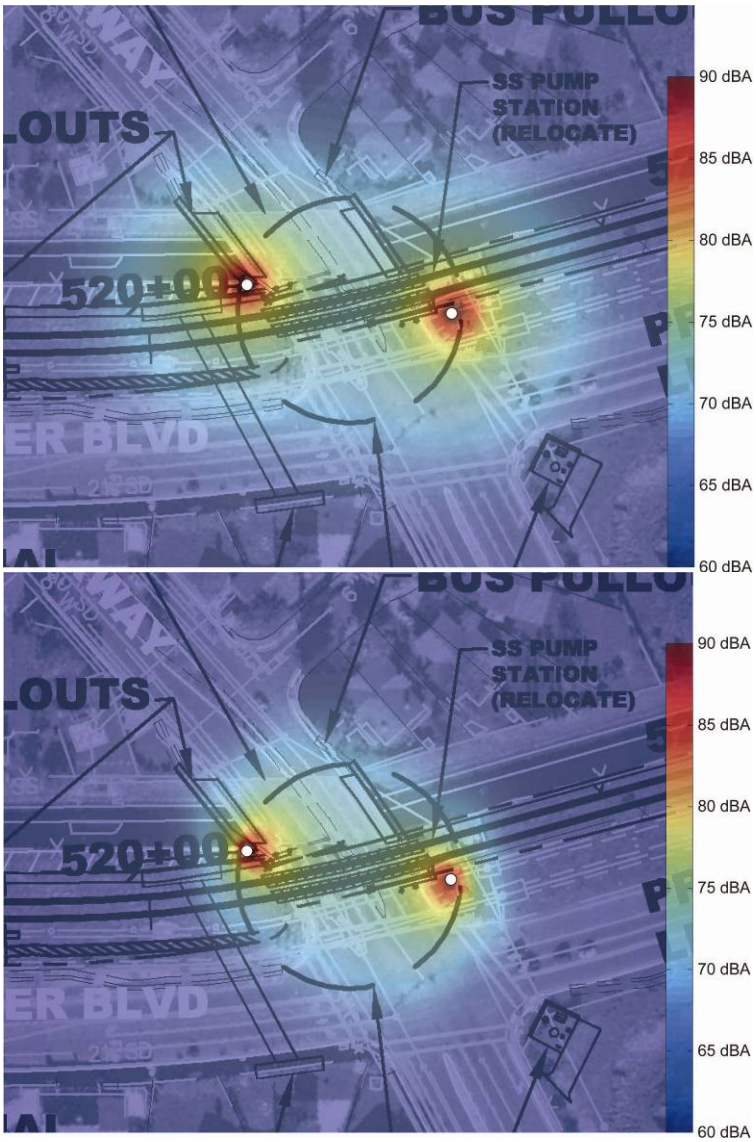


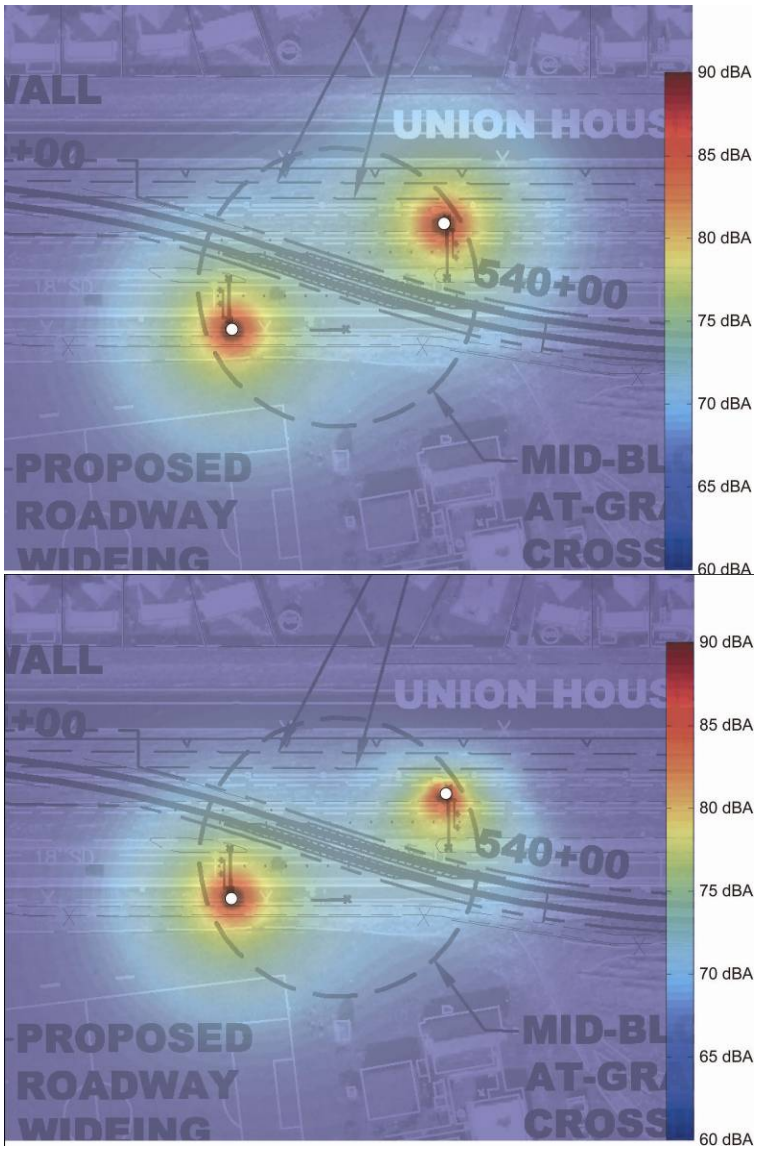
Figure 4.12-11: Crossing Bell Noise at Franklin Boulevard Grade Crossing
(No noise mitigation needed)



A. No noise mitigation for crossing bells.

B. Shrouds placed on bells to direct noise away from residences and toward crossing.

Figure 4.12-12: Crossing Bell Noise at Center Parkway Grade Crossing



A. No noise mitigation for crossing bells.

B. Shrouds placed on north bell to direct noise away from residences and toward crossing.

Figure 4.12-13: Crossing Bell Noise at CRB Mid-Block Grade Crossing Option (LPAP2 includes Flyover rather than mid-block crossing)

4.12.5 Ground Vibration Impact Assessment

The No-Action and TSM alternatives are not expected to result in any vibration impacts. Traffic, even heavy trucks and buses, rarely creates perceptible ground-borne vibration. The pneumatic tires and suspension systems of normal automobiles, trucks, and buses are sufficient to eliminate most significant ground-borne vibration forces. For this reason also, vibration impacts would not be expected to worsen with the inclusion of traffic from the CRB Extension and Widening projects.

The potential vibration impact from LRT operation was assessed on an absolute basis using FTA criteria. The following factors were used in determining vibration impacts along the LPAP2 alignment:

- Vibration source levels were based on measurements previously conducted on vehicles operating on the existing light rail system *at speeds of 30 to 35 mph. The vibration forces were adjusted to the projected speeds assuming a 20log(speed) relationship. The vibration source levels are characterized by the force density function shown in Figure 4.12-14.*
- Vibration propagation tests were conducted at four sites along the alignment near sensitive receptors. These tests measured the response of the ground to an input force *and are combined with the force density function shown in Figure 4.12-14 to predict outdoor vibration levels. Selected results of the vibration propagation tests are shown above in Figure 4.12-7.*
- Vehicle operating speeds *were* based on speed profiles identified in Chapter 2.
- *The predicted overall vibration velocity levels were compared to the FTA general assessment impact threshold to identify locations where there is potential for impact.*
- *At locations where the general assessment indicates potential for impact, the predicted vibration spectrum was compared to the FTA detailed assessment threshold curve to determine whether mitigation should be considered.*

Because there are no sites in the study area that are sensitive to ground-borne noise (e.g., recording studios, theaters, and museums), no ground-borne noise analysis was conducted.

Detailed results of the vibration prediction model are included in the Noise and Vibration Technical Report. As discussed in Section 4.12.1.2, FTA has different vibration impact criteria for General Impact Assessments and for Detailed Impact Assessments. The overall vibration velocity level is used for a General Impact Assessment and the maximum vibration level in any 1/3 octave band is used for a Detailed Impact Assessment. The approach used for this assessment was to first predict the overall vibration level for each cluster of sensitive receptors. Where the predicted overall vibration level exceeds the General Assessment Impact threshold (72 VdB for residential land uses), the spectrum of the predicted vibration was compared to the FTA impact threshold for a Detailed Impact Assessment to determine whether consideration of vibration mitigation is warranted.

Figure 4.12-15 shows the curve used to predict overall vibration levels as a function of distance from the tracks for train speeds of 55 mph. This curve is the average of the best-fit lines of overall vibration level as a function of distance derived from each of the four vibration propagation tests. The curve in Figure 4.12-15 shows that a General Impact Assessment indicates potential for vibration impact at distances up to 80 ft from the tracks.

The shaded band in Figure 4.12-15 shows the range of impact distances for a Detailed Assessment. The impact threshold for a Detailed Assessment is based on the maximum level in any 1/3 octave band compared to the General Assessment threshold that is the decibel sum of all 1/3 octave band levels. As a result, a General Impact Assessment always shows potential for impact at greater distances from the tracks than a Detailed Impact Assessment. As shown in Figure 4.12-15, the impact range is approximately 40 to 60 ft for a Detailed Assessment compared to 80 ft for a General Assessment.

Figure 4.12-16 shows the spectra of the predicted indoor vibration using all four of the transfer mobility functions measured in the LPAP2 corridor. All of the predictions include a 3 decibel factor to account for amplification that may be caused by resonances of the building structure. Also shown in

Figure 4.12-16 is the FTA impact threshold for a Detailed Assessment (residential land uses). The predicted vibration levels for all of the vibration test sites except V-3 are below the impact threshold at a distance of 50 ft from the tracks. At 75 ft the predicted spectrum for Site V-3 still exceeds the impact threshold by 1 to 2 decibels.

For the LPAP2, the estimated RMS velocity levels for sensitive receptors at representative distances are provided in Table 4.12-*8*. This table summarizes the results of the analysis in terms of anticipated *exceedances* of the FTA *General Assessment* criteria for "frequent events" (defined as more than 70 events per day). *The last column in Table 4.12-8 shows the number of residences where the FTA Detailed Assessment criteria are exceeded. The majority General Assessment impacts are below the threshold for a Detailed Assessment impact.*

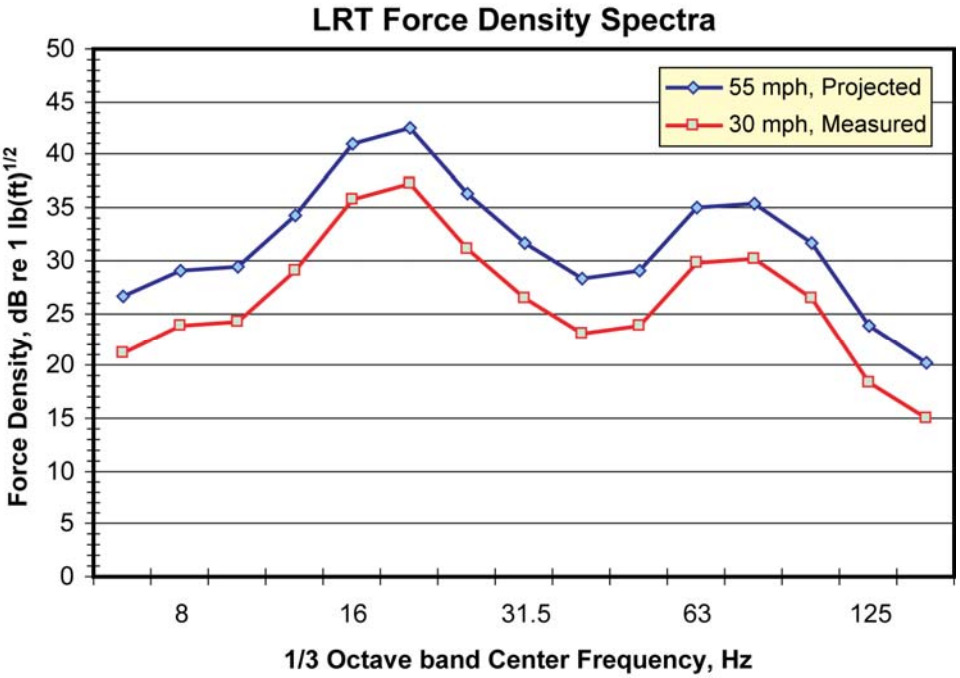


Figure 4.12-14: Force Density Function Used for Vibration Predictions, Ballast and Tie Track, 35 mph

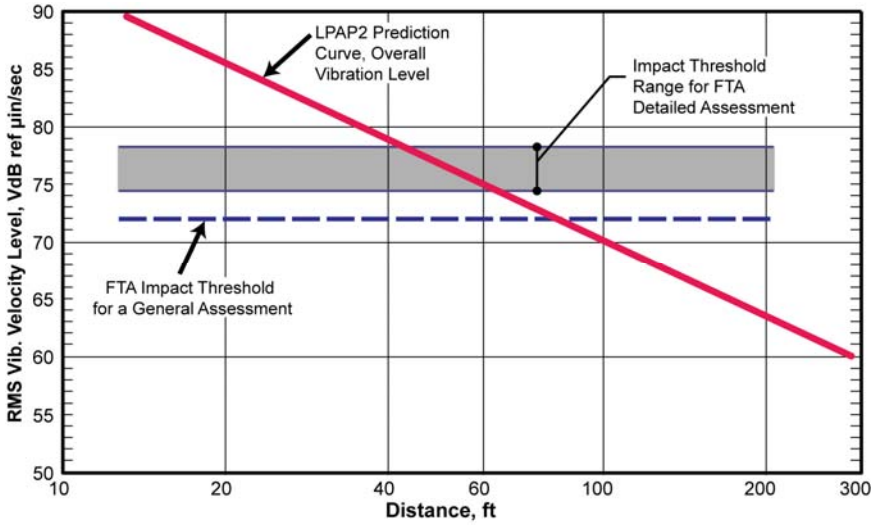


Figure 4.12-15: Predicted Overall Vibration Level vs. Distance, Ballast and Tie Track, 55 mph
(The predictions include a 3 decibel factor to account for possible outdoor-to-indoor amplification.)

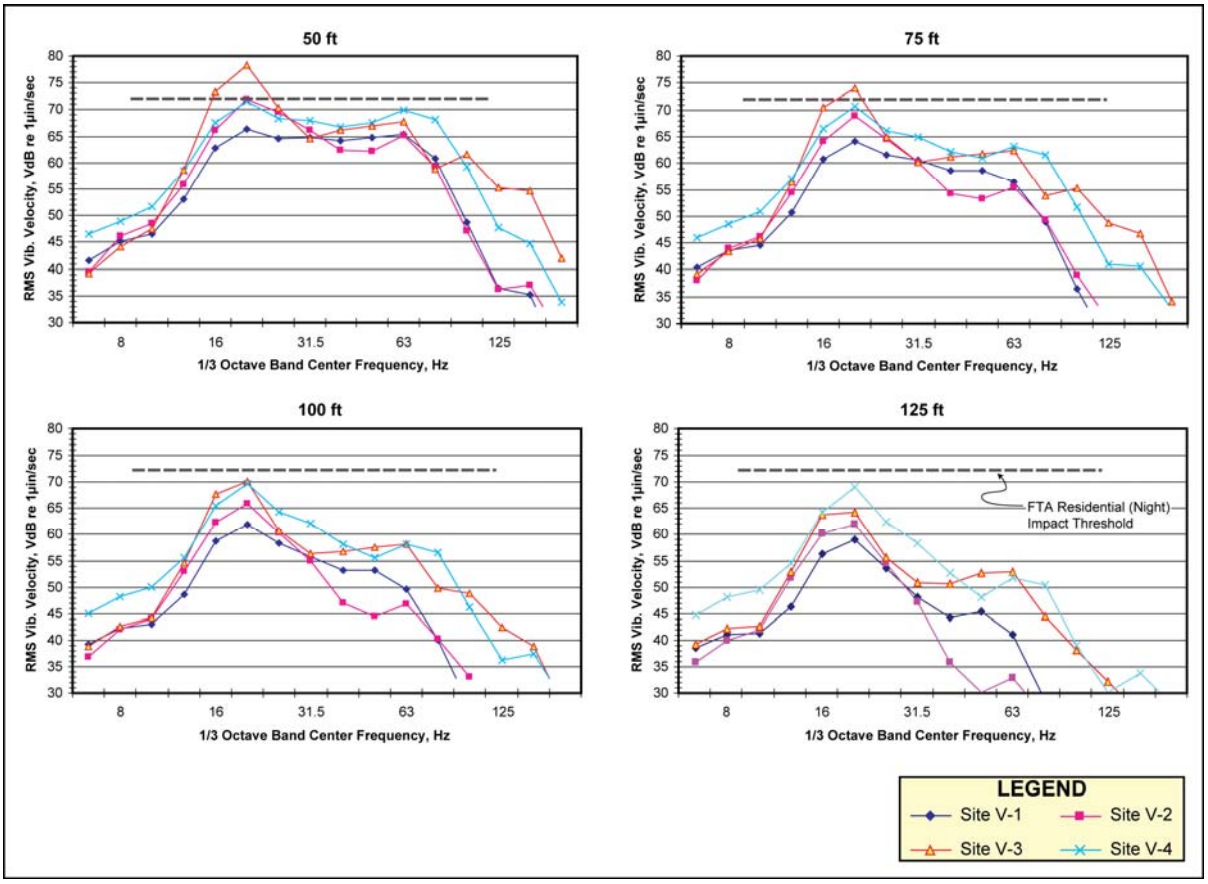


Figure 4.12-16: Predicted Outdoor LRT Vibration Spectra at 50, 75, 100 and 125 ft, 55 mph

(The predictions include a 3 decibel factor to account for possible outdoor-to-indoor amplification.)

Table 4.12-8: Projected Vibration Impacts at Residences Due to LRT Operations

Location	Civil Station	Side of Track	Speed (mph)	Dist. (ft)	Predict[1] (VdB)	Threshold[2] (VdB)	GA[3] Impacts	Amt Exceeds[4]	DA[5] Impacts
Meadowview Road Crossing – At-Grade Option – Base Case									
Jola Circle	347-351	OB	39	40	76	72	6	3.9	6
Laurie Way	351-354	OB	53	65	74	72	3	2.0	--
Andros Way	347-351	IB	39	80	69	72	--	--	--
Leros Ct	351-354	IB	53	80	72	72	--	--	--
Subtotal – Meadowview Road Crossing – At-Grade Option							**9**		**6**
Meadowview Road Crossing – Flyover Option									
Jola Circle	347-351	OB	39	40	76	72	6	3.9	6
Laurie Way	351-354	OB	53	65	74	72	3	2.0	--
Andros Way	347-351	IB	39	80	69	72	--	--	--
Leros Ct	351-354	IB	53	80	72	72	--	--	--
Subtotal – Meadowview Road Crossing – Flyover Option							**9**		**6**
Meadowview Road Crossing – Depressed Option									
Jola Circle	347-351	OB	39	40	76	72	6	3.9	6
Laurie Way	351-354	OB	53	65	74	72	3	2.0	--
Andros Way	347-351	IB	39	80	69	72	--	--	--
Leros Ct	351-354	IB	53	80	72	72	--	--	--
Subtotal – Meadowview Road Crossing – Depressed Option							**9**		**6**
Franklin Boulevard Crossing – At-Grade Option – Base Case									
N Laguna Drive	468-472	OB	52	78	72	72	--	--	--
Camino Royal Dr	468-469	IB	52	183	64	72	--	--	--
Villa Royal Way	469-478	IB	52	92	70	72	--	--	--
Subtotal – Franklin Boulevard Crossing – At-Grade Option							**0**		**0**
Franklin Boulevard Crossing – Flyover Option									
N Laguna Drive FO	468-472	OB	52	78	72	72	--	--	--
Camino Royal Dr FO	468-469	IB	52	183	64	72	--	--	--
Villa Royal Way FO	469-478	IB	52	92	70	72	--	--	--
Subtotal – Franklin Boulevard Crossing – Flyover Option							**0**		**0**
Cosumnes River Boulevard Crossing – At-Grade Option – Base Case									
Arroyo Vista Dr B	530-537	IB	47	90	70	72	--	--	--
Snowy Birch Way-AG	537-550	IB	35	235	60	72	--	--	--
Subtotal – Cosumnes River Boulevard Crossing – At-Grade Option							**0**		**0**
Cosumnes River Crossing – Flyover Option									
Arroyo Vista Dr B	530-537	IB	47	90	70	72	--	--	--
Snowy Birch Way-Aerial	537-550	IB	35	90	68	72	--	--	--
Subtotal – Cosumnes River Boulevard Crossing – Flyover Option							**0**		**0**
Portions of LPAP2 LRT Alignment not Affected by Design Options									
Laurie Way	361-366	OB	53	40	79	72	7	6.6	7
Reel Circle	366-371	OB	53	55	76	72	7	3.6	7

Table 4.12-8: Projected Vibration Impacts at Residences Due to LRT Operations

Location	Civil Station	Side of Track	Speed (mph)	Dist. (ft)	Predict[1] (VdB)	Threshold[2] (VdB)	GA[3] Impacts	Amt Exceeds[4]	DA[5] Impacts
Falls Circle	371-381	OB	53	70	73	72	13	1.3	--
Ann Arbor	383-391	OB	35	40	75	72	9	3.0	9
Andros Way	347-351	IB	53	80	72	72	--	--	--
Leros Ct	351-354	IB	53	80	72	72	--	--	--
Lesbos Ct	354-356	IB	53	80	72	72	--	--	--
Samos Way	356-359	IB	53	80	72	72	--	--	--
Marshwood Circle	359-363	IB	53	70	73	72	7	1.3	--
Willowside Circle	363-366	IB	53	75	73	72	6	0.6	--
Elk Wood Circle	366-371	IB	53	70	73	72	6	1.3	--
Woodgrove Ln	371-374	IB	53	75	73	72	3	0.6	--
Meadow Drive	374-380	IB	53	75	73	72	10	0.6	--
Deer Tree Ct	390-395	IB	53	270	60	72	--	--	--
Ruiz Ct	400-410	IB	45	270	59	72	--	--	--
McNamara Way	431-440	IB	35	366	54	72	--	--	--
Torrente Way	460-464	IB	52	366	57	72	--	--	--
N Laguna Drive	472-482	OB	52	78	72	72	--	--	--
Bolinas	482-486	OB	52	78	72	72	--	--	--
Brenham	486-489	OB	52	78	72	72	--	--	--
Clove Ct	489-492	OB	52	78	72	72	--	--	--
Essen Way	492-495	OB	52	78	72	72	--	--	--
La Almendra Way	495-511	OB	51	78	72	72	--	--	--
Birkdale Ct	518-520	OB	47	124	67	72	--	--	--
Midsummer Way	520-521	OB	47	124	67	72	--	--	--
Camino Royal Dr	468-469	IB	52	183	64	72	--	--	--
Villa Royal Way	469-478	IB	52	92	70	72.0	--	--	--
Cornina Ct	478-480	IB	52	98	70	72	--	--	--
Yvonne Way	480-495	IB	52	98	70	72	--	--	--
Hollyhurst Way	495-506	IB	53	95	70	72	--	--	--
Apartments	506-512	IB	53	98	70	72	--	--	--
Union House Way	522-525	IB	25	78	66	72	--	--	--
Narrowgauge Way	525-530	IB	42	85	69	72	--	--	--
Arroyo Vista Dr A	530-537	IB	47	89	70	72	--	--	--
Snowy Birch Way-AG	537-550	IB	35	235	60	72	--	--	--
Subtotal – LRT Alignment not Affected by Design Options							**68**		**23**

Notes:

1. Predicted vibration velocity level in VdB in living spaces inside residences. The predicted levels are rounded off to the nearest decibel.
2. FTA impact threshold for a general impact assessment.
3. Number of residences where predictions exceed general assessment threshold.
4. The amount that the predicted vibration levels exceed the general assessment threshold.
5. Number of residences where predictions exceed detailed assessment threshold. Vibration mitigation is considered for these receptors.

Source: ATS Consulting, August 2007

Table 4.12-9: Land Use Category 3 Vibration Impacts

Location[1]	Civil Station	Dist to Near Track (ft)	Speed (mph)	Project Vibration Level[2]	Vibration Impact Criterion[2]	# of Impacts
Valley Hi Covenant Church	521	460	31	51	75	0

Notes:

1. Assessment is for vibration-sensitive buildings only; outdoor land uses *and buildings with non-sensitive activities uses* are not included.
2. Vibration levels are measured in VdB referenced to 1 µin/sec.

Source: ATS Consulting, 2007.

Vibration-sensitive locations along the alignment are listed in Table 4.12-8 for Category 2 (residential) land uses and in Table 4.12-9 for Category 3 (institutional) land uses. The predicted project vibration level and the impact criterion level are indicated in these tables, along with the number of impacts projected for each receptor or receptor group.

As shown in Table 4.12-*8*, there are several locations where Category 2 receptors are expected to be impacted by the project (mitigation for these impacts is described in Section 4.12.*7*).

As shown in Table 4.12-*9*, no vibration impacts were identified for Category 3 receptors.

4.12.6 Noise Impact Mitigation Measures

To comply with FTA guidelines, severe impacts should be mitigated "...unless there are truly extenuating circumstances which prevent it." More latitude is allowed for mitigating moderate impacts although noise mitigation must be considered for all moderate impacts. This section discusses the mitigation measures recommended to eliminate all predicted noise impacts.

Noise Barriers

N&V-1 Noise barriers are the most common means of controlling noise from both rail and vehicular transportation systems. The basic concept is that the wall must block the direct path between the noise source and the receiver. The primary noise source on LRT vehicles is the steel wheels rolling on steel rails (wheel/rail noise). The source is located close to the ground, which means that relatively low barriers can be effective at controlling the LRT noise if they are placed close enough to the tracks. Typical barriers to control LRT noise are 4 to 8 ft high.

The equivalent to wheel/rail noise for automobiles and trucks is tire/pavement noise. However, the engine and exhaust noise of vehicular traffic are also important noise sources, particularly for trucks and buses. Because these noise sources are located 3 to 8 ft above the roadway surface, the effective height of the noise source is higher. This means that to be effective at controlling noise from vehicular traffic, roadway barriers often need to 10 to 12 ft tall or higher.

The primary requirements for an effective noise barrier are: (1) the barrier must be high enough and long enough to break the line-of-sight between the sound source and the receiver, (2) the barrier must be of an impervious material with a minimum surface density of

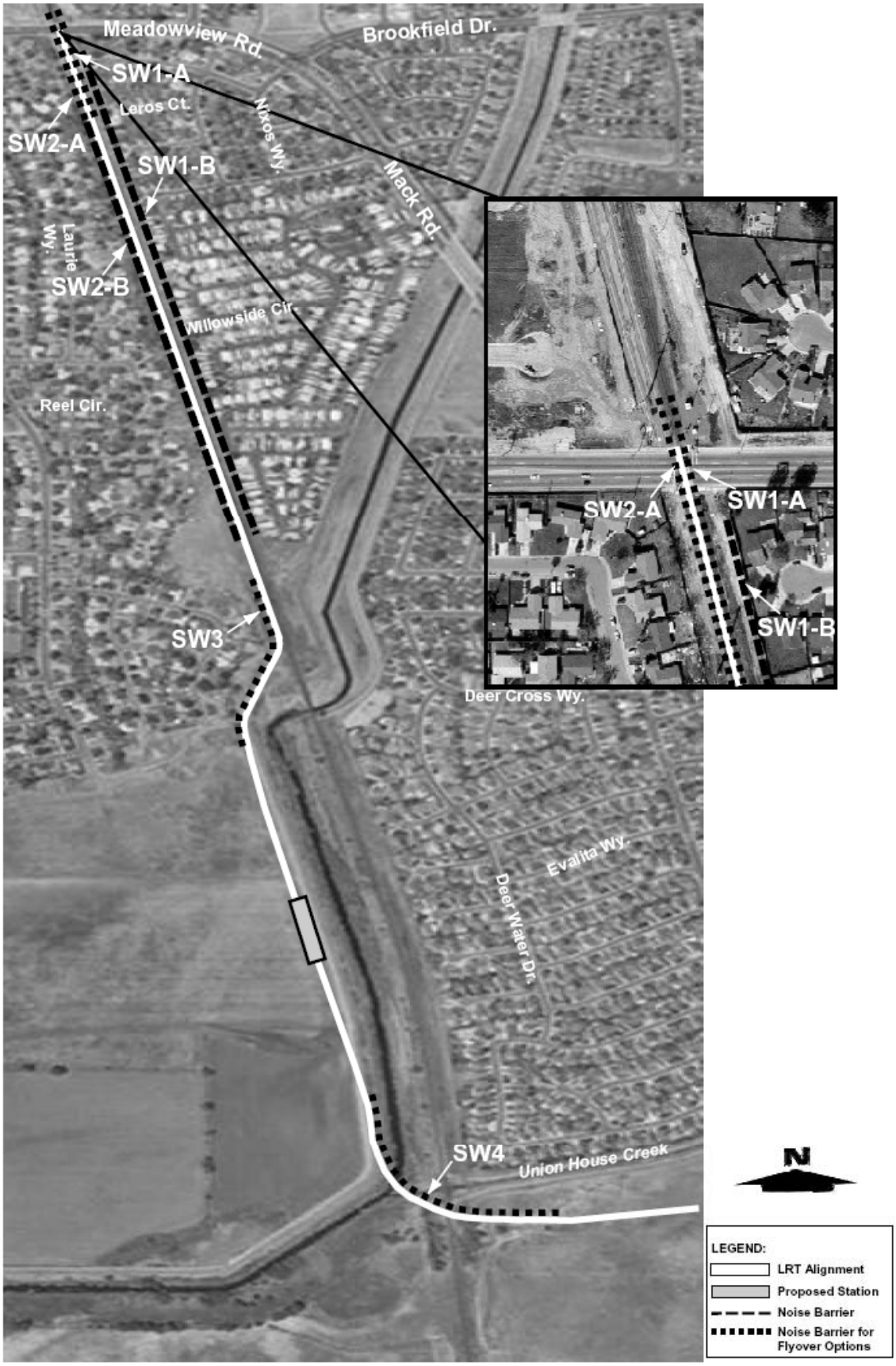
4 lb./sq. ft. and (3) the barrier must not have any gaps or holes between the panels or at the bottom.

Table 4.12-10 indicates the recommended noise barriers to mitigate the predicted noise impacts. The general locations of the barriers are shown in Figures 4.12-17 and 4.12-18.

Table 4.12-10: Recommended Noise Barriers

Location	Wall No.	Side	Civil Stations		Length (ft)	Dist from Tracks	Height (ft)[1]	Comments
			Start	End				
Base and At-Grade Options								
Meadowview to Super Levee	SW1	East	346	380	3400	80	12	Wall starts at south side of Meadowview.[2]
	SW2	West	346	380	3400	8	6	Includes 150 ft, 8 ft high "wrap around" on Meadowview Road. Sound insulation for four residences is an alternative to the 150 ft wrap around.
Super Levee	SW3	West	382	393	1100	8	6	
UPRR Flyover	SW4	E/N	415	431	1600	6	4	At edge of structure.
Franklin to Center Parkway	SW5	North	470	515	4500	8	5	Wall is high enough to protect second floor receivers.
	SW6	South	470	515	4500	8	5	An alternative for the first 2000 ft of barrier is to sound insulate the second floors of 13 residences.
Center Parkway to Bruceville	SW7	North	523	525	200	8	5	For esthetic reasons it may be desirable to make SW7/SW8 one continuous wall without the 300 ft gap between the two walls.
	SW8	North	528	535	700	8	5	
Meadowview Flyover								
Meadowview to Super Levee	SW1-A	East	345	353	800	6	4	Sound wall at edge of structure.
	SW1-B	East	348	380	3200	60	12	Same wall as SW1 except starting 100 ft to the south.
	SW2-A	West	345	353	800	6	4	Sound wall at edge of structure.
	SW2-B	West	353	380	2700	8	6	Same as SW2 except starting at bottom of flyover structure
Franklin Flyover								
Franklin Flyover	SW5-A	North	465	475	1000	6	5	Merge into wall SW5-B.
	SW5-B	North	475	515	4000	8	5	Same as wall SW5 except starts at bottom of flyover structure.
	SW6-A	South	465	475	1000	6	4	Merge into wall SW6-B.
	SW6-B	South	475	515	4000	8	5	Same as wall SW6 except starts at bottom of flyover structure.
CRB Flyover								
CRB Flyover	SW8-A	North	528	541	1300	20	6	Same as wall SW8 except continues to bottom of flyover structure.
	SW8-B	N/E	541	550	900	6	6	Last 200 ft could be reduced to 4 ft high.

Notes:
1. Wall height is normally measured from top of rail.
2. Height is measured from ground level not relative to top of rail. Replace existing wall in this area.



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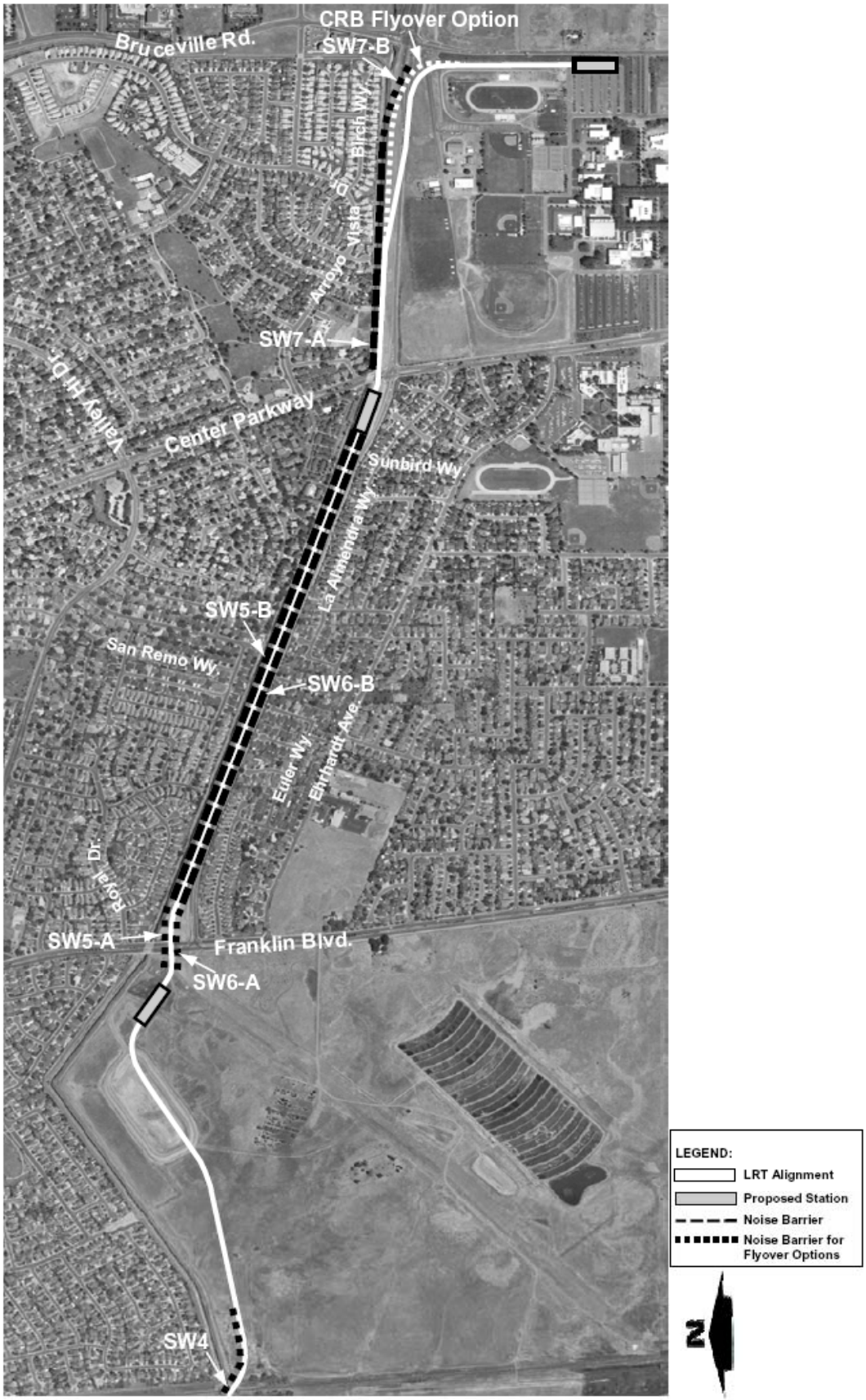
PRELIMINARY NOISE BARRIER LOCATIONS
Figure 4.12-17



South Sacramento Corridor
Phase 2 Project

PRELIMINARY NOISE BARRIER LOCATIONS
Figure 4.12-18

With these barriers, the predicted noise levels would be below the applicable FTA threshold for moderate impact at all sensitive receptors in the LPAP2 LRT corridor. The barriers range from 4 ft high on some elevated structures to 12 ft high east of the LRT tracks in the section between Meadowview and the Morrison Creek crossing. The barrier east of the tracks between Meadowview and Morrison Creek is higher than normal because it must be located at the UPRR right-of-way, which is up to 80 ft from the tracks. Because this barrier is so far from the LRT tracks, it must be higher to be effective. As noted in Table 4.12-10, the 12 ft high barrier between Meadowview and Morrison Creek is measured from the existing grade. The heights for the other barriers should be measured from the top of rail.

A number of residential areas along the LPAP2 alignment have existing noise barriers/privacy walls, especially along the Union Pacific rail corridor and on the south side of CRB. In addition, there is a low levee along Union House Creek between Franklin Boulevard and Center Parkway that provides some acoustic shielding for the residences north of CRB. Existing walls that are in good condition, such as the walls along the south side of CRB, have been incorporated into the LRT noise predictions. Walls that are in relatively poor conditions, such as many sections of the walls east of the UPRR right-of-way between Meadowview and the proposed UPRR flyover, have not been included in the noise prediction models.

The condition of all existing walls will be examined by RT staff and consultants during the preliminary engineering and final design of the LPAP2 to determine whether the walls can be considered effective for noise mitigation. The cost of new walls is included in the base cost estimate. As was done for Phase 1 of the South Sacramento Corridor, the community would be involved with the design of these noise walls.

Sound Insulation

N&V-2 Sound insulation is a viable alternative to noise barriers in areas where they are impractical or where they would be excessively expensive considering the number of residences that would be protected. Sound insulation of residences and institutional buildings to improve the outdoor-to-indoor noise reduction has been widely applied around airports and has seen limited application for transit projects. Substantial improvements in building sound insulation (on the order of 5 to 10 dBA) can often be achieved by adding an extra layer of glazing to the windows, by sealing any holes in exterior surfaces that act as sound leaks, and by providing forced ventilation and air-conditioning so that windows do not need to be opened for ventilation. The locations where sound insulation could be considered as an alternative to noise barriers are:

Meadowview Road At-Grade Option: There are several residences in the southwest quadrant of the Meadowview Road crossing where SW2, the sound wall west of the tracks would need to continue approximately 150 ft west on Meadowview to protect four residences on Jola Circle. An alternative is to improve the sound insulation of these four residences.

N. Laguna Drive south of CRB: There is an existing 8 to 9 foot wall along the south side of CRB in this area that would keep LRT noise at the ground floor level below the FTA impact threshold. However, there are approximately 13 two-story residences with windows that are higher than the wall. An alternative to the first 2000 ft of SW6 is to improve the sound insulation of all second-story windows that are higher than the existing wall and open into bedrooms or other noise-sensitive spaces.

The noise predictions indicate that all noise impacts would be mitigated with either the sound wall lengths and heights as given in Table 4.12-*10 or with the modifications to SW2 and SW6 discussed above plus sound insulation.*

Coordinating Mitigation with Related Projects

N&V-3 As discussed in Chapter 2, the City of Sacramento is considering two projects for CRB: widening it from two to four lanes between Bruceville Road and Franklin Boulevard and extending it westerly from Franklin Boulevard to I-5. An EIR on the widening project was prepared in 1991 (The Cosumnes River Boulevard – Franklin Boulevard to Bruceville Road Environmental Impact Report, City of Sacramento Planning and Development Department, December 1991), and an EIR has been completed for the extension project. The widening of CRB is included in the adopted 2006 Metropolitan Transportation Plan (MTP).

The timing of the *widening plan* is still uncertain, so this document reviews the impacts and mitigation for the LPAP2 project without the widening as well as the cumulative impacts of the *two projects.* In its comment letter regarding the SFDEIS/SFDEIR, the City notes that it cannot determine the appropriate noise mitigation for the CRB widening until and EIR is complete for that project. For the LPAP2, RT is mitigating the LRT portion of the cumulative noise impacts along Cosumnes River Boulevard (as currently identified) and will await the City's environmental review to determine if different noise mitigation should be pursued along this roadway. Mitigation measures included in the LPAP2 project would mitigate the impacts of the light rail to below FTA and RT's more stringent criteria levels.

Should the CRB project move forward into the environmental assessment and preliminary design stages before the LRT project is finalized, it may be feasible to coordinate the noise mitigation measures. For example, the existing wall along the south side of CRB ranges from 4 ft high near Center Parkway to 9 ft high near Franklin Boulevard. It is likely that mitigating noise impact from the CRB extension would require increasing the wall height to at least 9 ft for the entire extent between Franklin Boulevard and Center Parkway. This could reduce the need for a sound wall along the south boundary of the LRT right of way.

Additional Noise Mitigation Techniques

N&V-4 Other potential noise mitigation measures include minimizing the wheel impacts at crossovers and various approaches to reducing the incidence of wheel squeal. Wheel squeal is caused by the slip-stick interaction of the wheel tread and the rail surface caused when light rail vehicles negotiate tight radius curves. The high-pitched noise emitted when squeal occurs can be very annoying. Although new transit systems sometimes have problems with wheel squeal, the problems can almost always be resolved through some combination of adjusting track gage, small modifications to the wheel and rail profiles, application of friction modifier on the wheel tread or the rail surface, or application of a lubricant on the gage face of the rail or the wheel flange. Potential wheel squeal will be mitigated by implementing an ongoing rail grinding program along with the recommended wheel profile that was proposed and implemented into RT's system. The only locations where the conceptual plans have curves with tight radii are on the UPRR flyover, the Franklin Station, and the CRB flyover.

A crossover is the special trackwork used where two tracks cross either to provide a link between parallel tracks or for a turnout. The wheel impacts that occur at the gap where the two rails cross can substantially increase the noise and vibration levels in the vicinity of the crossover. Because the crossovers on this project have been located in areas where they do

not cause additional noise impacts at sensitive receivers, it is not necessary to consider use of crossover designs that minimize the wheel impacts.

Audible Warnings at Grade Crossings

N&V-5 Noise mitigation for the at-grade rail/roadway crossings will consist of calibrating the bell sound levels to be near the minimum sound level allowed by the CPUC. RT will specify that bells with easily adjustable volumes and adjustable ring rates be installed at the crossings to allow for field calibration. The calibrations will be preformed prior to initiation of revenue service. Reducing the bell sound level to near the minimum allowed by the CPUC is sufficient to reduce the predicted bell noise to a minimum of 6 decibels below the applicable FTA impact thresholds (see Table 4.12-7). Also, if approved by the CPUC, shrouds will be installed on the bells to direct the sound towards the grade crossings and away from the residences and may apply to the CPUC for gate-down-bell-stop variances.

4.12.7 Ground-Borne Vibration Mitigation

N&V-6 Vibration impacts that exceed the FTA Detailed Assessment criteria are considered to warrant mitigation, if reasonable and feasible. Table 4.12-11 indicates the locations along the corridor where mitigation is recommended to reduce the vibration levels. The approach that is expected to be the most cost-effective is ballast mats. A ballast mat is a resilient pad that is placed under the ballast. Typically, the ballast mat must be placed on a concrete or asphalt pad that is 6 to 12 inches thick. The concrete/asphalt pad provides a high-impedance (stiff) layer for the resilient layer to work against. Suitable ballast mats are available from several suppliers. Experience is that ballast mats can be very effective at reducing vibration at frequencies greater than 25 Hz.

Table 4.12-11 shows mitigation methods and locations for vibration impacts as projected from present data.

Table 4.12-11: Recommended Locations for Vibration Mitigation

Segment	Number of Impacts Before Mitigation	Civil Station	Length (Feet)	Mitigation Recommendation	Residual Impacts
Meadowview Road Crossing[1]					
Meadowview Road to Morrison Creek Bridge	6	347+00 to 350+00	300	Ballast mat	0
Portions of the LPAP2 LRT Alignment Not Affected By Design Options					
South of Meadowview Crossing	14	350+00 to 375+50	2,550	Ballast mat	0
Super Levee	9	384+00 to 390+50	650	Ballast mat	0

[1] All three Meadowview crossing options would require vibration mitigation starting just south of Meadowview Road.

Source: ATS Consulting, 2007.

4.12.8 Cumulative Impacts Summary

The Cosumnes River Boulevard segment of the proposed LPAP2 would experience increased localized noise impacts, from the added traffic of the Cosumnes River Boulevard Extension and Widening projects. A noise impacts analysis and recommended mitigation measures in Section 4.12.4, Noise Impacts, and Section 4.12.7, Mitigation Measures, was conducted for the *LPAP2 project alone and the* "worst case" for the Cosumnes River Boulevard segment of the proposed LPAP2 and Cosumnes River Boulevard Extension and Widening projects.

RT anticipates that it would share costs with the City of Sacramento for additional length and height of sound barriers that may be needed to address RT's proportional share of the combined noise impacts. For the LPAP2, RT is mitigating the LRT portion of the cumulative noise impacts along Cosumnes River Boulevard (as currently identified) and will await the City's environmental review to determine if different noise mitigation should be pursued along this roadway. Mitigation measures included in the LPAP2 project would mitigate the impacts of the light rail to below FTA and RT's more stringent criteria levels. If mitigation measures are provided and adhered to for the combined project, no substantially adverse cumulative noise impact would result.

The Sacramento County Streams Project would generate temporary noise impacts from construction due to the project's proximity to residences. Noise levels would increase more than five dBA, especially along haul routes. Mitigation measures, such as limiting the construction to daylight hours and restricting the construction period to six months, are included the South Sacramento County Streams Project Supplemental Draft Environmental Impact Report (December 2004). The Sacramento County Streams project area is also located in close proximity to buildings and structures, which may also result in damage to existing buildings from sheetpile driving activities, specifically from vibration impacts. The construction schedule for the Sacramento County Streams Project is not predicted to overlap with the present proposed project. The Freeport Regional Water Project will generate temporary increases in noise levels, which will be limited by noise shielding, and permanent increase in noise levels from facility operation, which will be minimized through the adoption of noise attenuation measures.

It is anticipated that no substantially adverse cumulative noise impact would result from the proposed project and the Cosumnes River Boulevard Extension and Widening projects with the adherence of the proposed mitigation measures. Given that the noise impacts from the Freeport Regional Water Project and the Sacramento County Streams Project will be temporary or mitigated, and their project construction will not overlap with the proposed project, no substantially adverse cumulative noise impacts will result from the related projects.

4.13 POPULATION, HOUSING, AND ENVIRONMENTAL JUSTICE

4.13.1 Demographic Characteristics

Demographic characteristics of the affected environment are derived from the 2000 U.S. Census Bureau and 2006 Metropolitan Transportation Plan (MTP) for2027. As identified in Figure 4.13-1, a total of 13 Census tracts directly adjacent to the LPAP2 alignment were used as the study area for demographic characteristics.

4.13.1.1 POPULATION, HOUSING, AND EMPLOYMENT GROWTH

Existing and projected population, housing and employment for the study area, Sacramento City and County, and the City of Elk Grove are shown in Table 4.13-1.

Population. According to *the 2006 MTP*, total population in the study area is expected to grow from 73,086 to *135,525* persons, an increase of *85* percent, between 2000 and *2030*. This growth is much greater than anticipated for Sacramento County and City, which are projected to increase by *63* and *52* percent, respectively, over the same period. A very substantial growth in population (*230* percent) is anticipated for the City of Elk Grove.

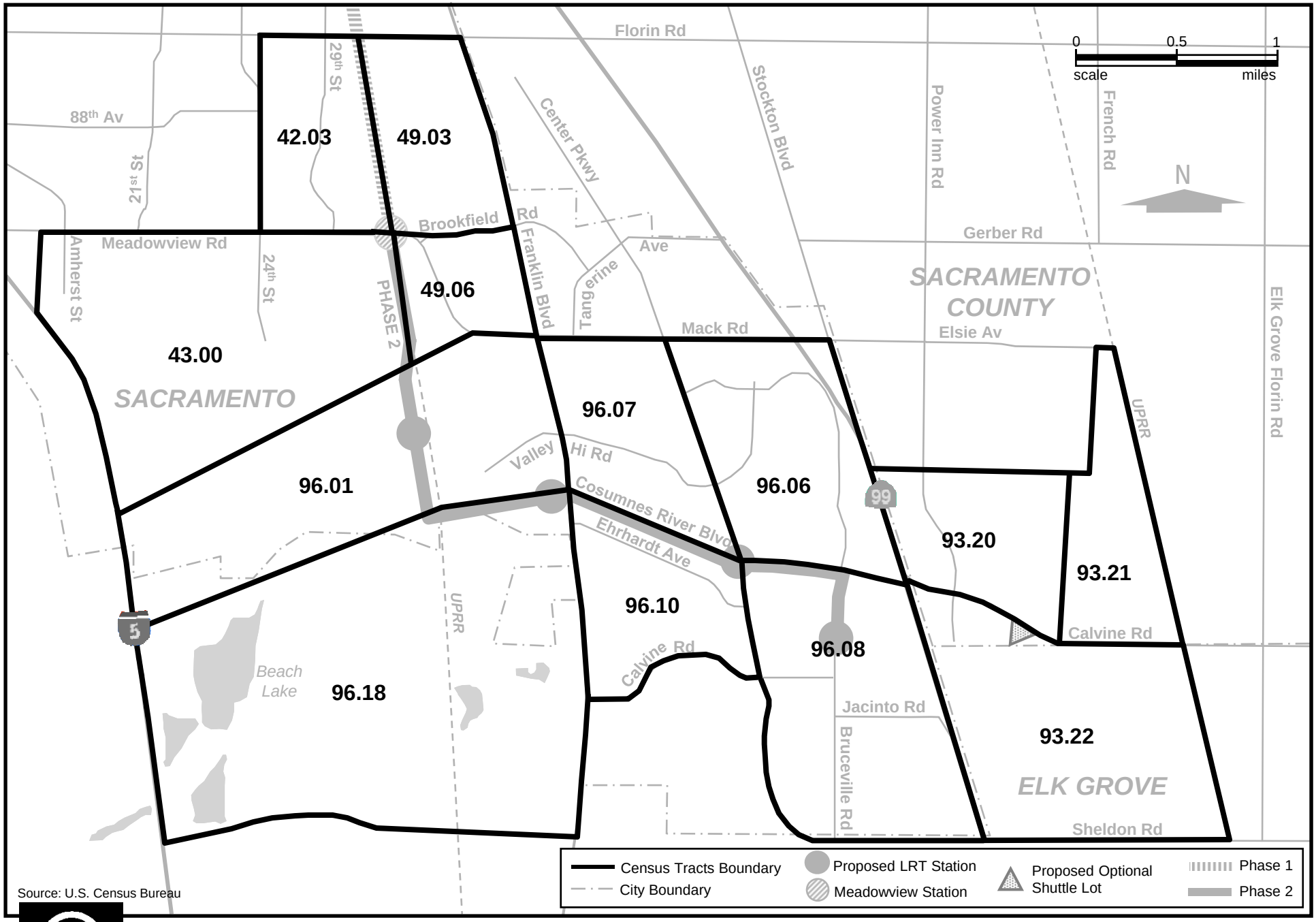
Housing. Housing in the study area is projected to increase by *102* percent to *44,109* dwelling units in *2030*. Over the same period, a substantial rise in housing (291 percent) is expected in Elk Grove, increasing total housing units from 18,894 to *73,795*. By contrast, the percentage of housing growth projected in both the County and City of Sacramento is much lower, *52* and *32* percent, respectively.

Employment. Jobs in the study area are anticipated to grow by *114* percent between 2000 and *2030*. Sacramento County is expected to have an increase similar to that of the study area (*102* percent). Employment in the City of Sacramento will increase by *70* percent. Total jobs in Elk Grove are projected to increase substantially, from 11,147 to*47,469*, a growth rate of *326* percent.

Table 4.13-1: 2000-2030 Population, Housing, and Employment in the Study Area

Study Area	Population				Housing (Dwelling Units)				Employment (Jobs)			
	2000	*2030*	Absolute Change	Percent Change	2000	*2030*	Absolute Change	Percent Change	2000	*2030*	Absolute Change	Percent Change
Total Study Area	73,086	*135,525*	*62,439*	*85%*	21,787	*44,109*	*22,322*	*102%*	11,810	*25,262*	*13,452*	*114%*
Sacramento County	1,223,499	*1,992,129*	*768,630*	*63%*	474,814	*720,291*	*245,477*	*52%*	473,211	*956,670*	*483,459*	*102%*
Sacramento City	409,610	*621,401*	*211,791*	*52%*	163,957	*216,234*	*52,277*	*32%*	268,336	*457,213*	*188,877*	*70%*
Elk Grove City	59,984	*197,944*	*137,960*	*230%*	18,894	*73,795*	*54,901*	*291%*	11,147	*47,469*	*36,322*	*326%*

Source: 2000 U.S. Census Bureau
2006 Metropolitan Transportation Plan (MTP) for 2027



Source: U.S. Census Bureau

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SOCIOECONOMIC STUDY AREA CENSUS TRACTS
Figure 4.13-1

4.13.1.2 HOUSEHOLD CHARACTERISTICS

A household, as defined by the U.S. Census Bureau, is a group of people, related or not, living together in a dwelling unit. Table 4.13-2 compares household characteristics in the study area to those of Sacramento County and the cities of Sacramento and Elk Grove.

Table 4.13-2: Household Characteristics

Study Area	No. of Households	Avg. Household Size	Total No. of Families
Total Study Area	20,887	3.50	16,985
Sacramento County	453,602	2.64	297,596
Sacramento City	154,581	2.57	91,137
Elk Grove City	18,526	3.22	15,366

Source: 2000 U.S. Census Data

In 2000, there were 20,887 households in the study area, with an average household size of 3.50 persons. Eighty-one percent were family households. Household characteristics in the City of Elk Grove were comparable to those in the study area with 3.22 persons per household and 83 percent families. In contrast, the average household size in the County and City of Sacramento was 2.64 and 2.57 persons per household, respectively, with 66 and 59 percent composed of family households.

4.13.1.3 ETHNIC MIX

An ethnicity profile of the study area population is derived from 2000 U.S Census data. The racial categories used are White, Black or African American, American Indian and Alaska Native, Asian, Native Hawaiian and Other Pacific Islander, Some Other Race, and Hispanic. Persons of Hispanic origin were sampled separately and are not included in other ethnic categories.

As shown in Table 4.13-3, there is greater ethnic diversity in the study area as compared to either the County or City of Sacramento or the City of Elk Grove. Asian and Black or African American populations each represent 24 and 23 percent of the study area, respectively. Twenty percent of the population in the study area is Hispanic. In comparison, the Black or African American population for the County and City of Sacramento represent 10 and 15 percent, respectively, and Asian populations represent 11 and 16 percent. The respective Hispanic population for the County and City of Sacramento is 16 and 21 percent. The percentages of Black or African American and Asian populations in the City of Elk Grove are eight and 17 percent, respectively. Fourteen percent of the population in the City of Elk Grove is Hispanic.

Table 4.13-3: Ethnic Composition in the Study Area

Study Area	Total Persons	White	%	Black or African American	%	Amer. Ind./ AK Native	%
Total Study Area	73,086	17,801	24%	16,795	23%	359	1%
Sacramento County	1,223,499	706,655	58%	118,073	10%	9,070	>1%
Sacramento City	409,610	164,974	41%	61,136	15%	3,149	1%
Elk Grove City	59,984	32,252	54%	4,967	8%	370	1%

	Asian	%	Native HI/ Other Pac. Islander	%	Some Other Race/Two or More	%	Hispanic	%
Total Study Area	17,508	24%	1,271	2%	4,589	6%	14,763	20%
Sacramento County	132,601	11%	6,788	>1%	54,422	4%	195,890	16%
Sacramento City	66,598	16%	3,687	1%	19,550	5%	87,974	21%
Elk Grove City	10,392	17%	336	1%	3,269	5%	8,398	14%

Source: 2000 U.S. Census Data

4.13.1.4 INCOME

According to the 2000 Census, the average poverty threshold for a family of four, including two children under the age of 18, is $16,895. The 2000 median household income for the study area census tracts ranged from $26,835 to $68,318, while 15 percent of households were below poverty level. Sacramento County had a median household income of $43,816, with 11 percent of the households under the poverty level. The City of Sacramento's median household income was $37,049 and 16 percent of all households were below poverty level. Median household income in the City of Elk Grove was $60,661; four percent of households were below poverty level.

Table 4.13-4: Household Income and Poverty Status

Study Area	Median Household Income	Households Below Poverty Level/Percent Below
Total Study Area	$26,835 - $68,318	3,145/15%
Sacramento County	$43,816	52,047/11%
Sacramento City	$37,049	24,603/16%
Elk Grove City	$60,661	804/4%

Source: 2000 U.S. Census Data

4.13.1.5 TRANSIT DEPENDENT POPULATIONS

Transit dependent populations are defined as households without private transportation. These individuals rely on public transportation services for access to employment opportunities, school, social/recreational functions, medical appointments, and mobility in general. Table 4.13-5 shows the representation of transit-dependent populations in the study area based on 2000 U.S. Census data. Approximately six percent of the households in the study area are without a private automobile. The study area census tracts in the northern segment of the corridor have the highest incidence of households without private transportation.

Table 4.13-5: 2000 Transit Dependent Populations

Study Area	Total Households	Households without Private Transport	% of Households without Private Transport
Total Study Area	20,887	1,331	6%
Sacramento County	453,602	39,405	9%
Sacramento City	154,581	19,947	13%
Elk Grove City	18,526	401	2%

Source: 2000 U.S. Census Data

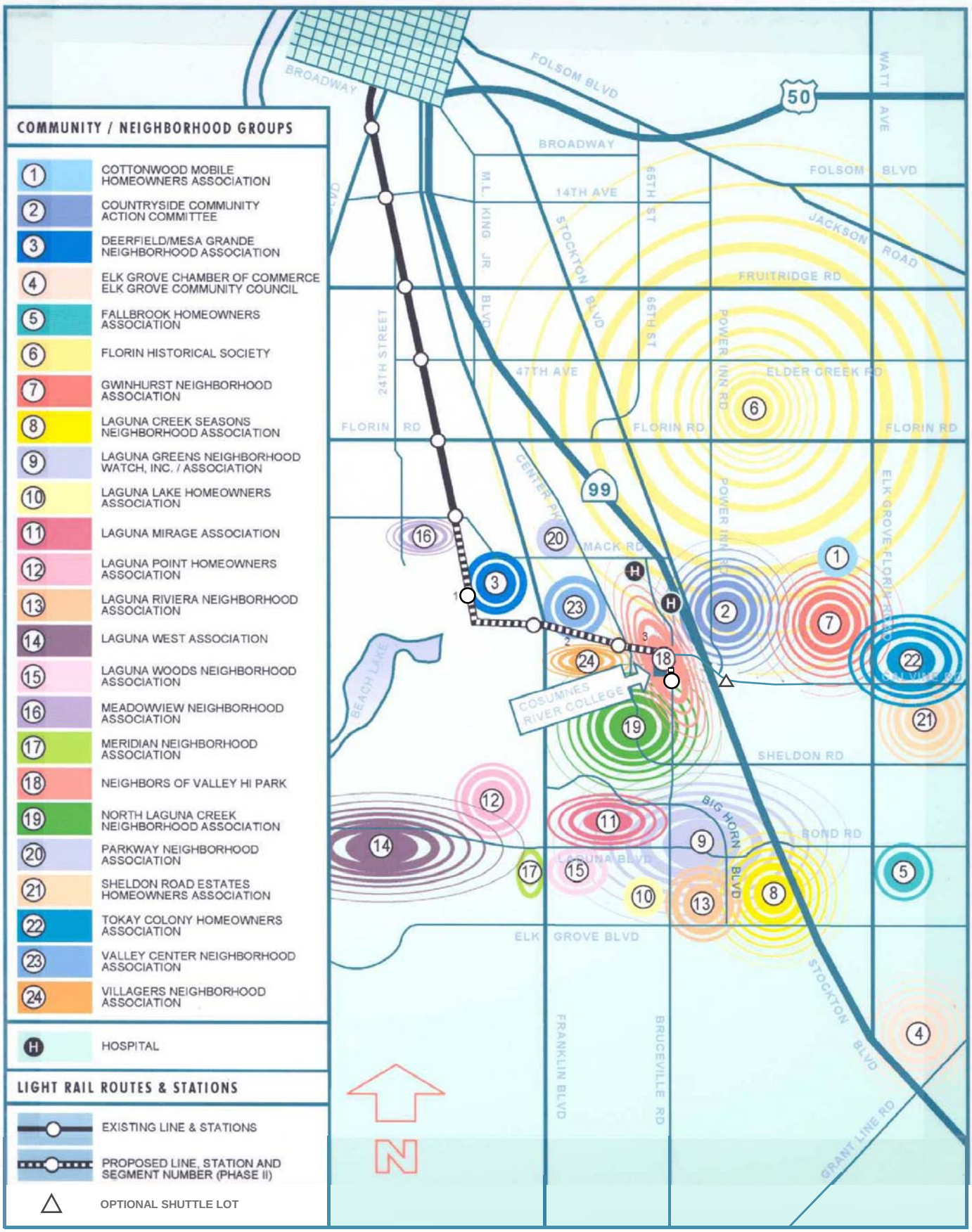
4.13.1.6 POPULATION GROWTH POLICIES

The *City of Sacramento General Plan* establishes overall growth policy statements to support the Plan's overriding goal of "improving and conserving existing urban development, while at the same time, encouraging and promoting growth in expansion areas of the City." The adopted growth policy statements that guide in the design of future urban development are related to quality of life, population and housing growth, economic development and employment opportunities, new growth areas, urban conservation and infill areas, annexations, transportation, local and regional government, natural resource conservation, and public services.

The City of Elk Grove has a "Vision Statement" for their *General Plan*, stating a desire for "continued growth which could be managed so that the desirable aspects of Elk Grove are not negatively affected." Development of new residential and commercial areas will be guided by the *General Plan's* land use and economic development policies.

4.13.2 Neighborhood and Businesses

Community and neighborhood associations in the vicinity of the study area, as defined by the City of Sacramento City Neighborhood Services Department, City of Elk Grove, and Elk Grove Chamber of Commerce, are described below and are shown on Figure 4.13-2. The descriptions of communities and neighborhood associations are keyed to their corresponding numbers in Figure 4.13-2.



Source: The Hoyt Company, 2002

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South Sacramento Corridor Phase 2 Project

COMMUNITY / NEIGHBORHOOD GROUPS
Figure 4.13-2

Cottonwood Mobilehome Homeowners Association (1). The Cottonwood Homeowners Association represents the interests of 148 tenants residing in the mobile homes located at Cottonwood Lane and Elsie Road. The association serves a residential area that also includes Florin High School.

Countryside Community Action Committee (2). The Countryside Community Action Committee represents a small residential area located in the vicinity of Countryside Community Park east of Power Inn Road.

Deerfield/Mesa Grande Neighborhood Association (3). The Deerfield/Mesa Grande Neighborhood Association is a residential and commercial area located near the intersection of Franklin Boulevard and Mack Road. The boundaries of the Deerfield/Mesa Grande Neighborhood Association are: Mack Road to the north, an undeveloped property to the south, Franklin Boulevard to the east, and Laguna Creek to the west.

Elk Grove Chamber of Commerce (4). The Elk Grove Chamber of Commerce is a voluntary group of business and professional leaders working together to develop, advance and promote the business community of the Elk Grove area. The Chamber currently includes over 600 members of the business community and serves as a central distribution and promotional point for information and activity designed to promote the civic, business and economic integrity of the Elk Grove area.

Fallbrook Neighborhood Association (5). The Fallbrook Homeowners Association is a small subdivision of 390 homes with approximately 1,100 residents. The association is located in a mixed residential/commercial area near Bond Road and Elk Grove-Florin Boulevard. This is an active neighborhood association whose purpose is to improve the quality of life for area residents. A primary goal is to provide a liaison between the neighborhood association and the City of Elk Grove to establish a nonpartisan forum for the discussion of neighborhood concerns and to sponsor special events that benefit the community as a whole.

Florin Historical Society (6). The Florin Historical Society is made up of 115 members. The society is a group of individuals primarily born and/or raised in the Florin area. Their purpose is to educate the community about the historic value and meaning of the Florin area. The Society represents a large area between Highway 50, Sunrise Boulevard, Calvine Road and Franklin Boulevard.

Gwinhurst Neighborhood Association (7). The Gwinhurst Neighborhood Association serves a small residential area located north of Calvine Road and east of Elk Grove-Florin Road.

Laguna Creek Seasons Neighborhood Association (8). The Laguna Creek Seasons Neighborhood Association represents a small residential neighborhood located east of SR 99 between Bond Road and Elk Grove Boulevard.

Laguna Greens Neighborhood Watch, Inc. (9). The Laguna Greens Neighborhood Watch, Inc. is an Internal Revenue Service-recognized 501(c) (3) tax exempt not-for-profit charity. The mission of the association is to educate the community and public about crime prevention, safety, and law enforcement resources. The primary goals are to create a network of concerned citizens; to provide activities for children and adults that promote interaction and communication among members of the community and the public; to create a liaison with local law enforcement and public officials to facilitate rapid response to community concerns; and to develop educational programs that increase awareness of crime prevention. The Laguna Greens Neighborhood Watch, Inc. publishes the Laguna Greens Guardian newsletter bi-monthly to provide information about neighborhood concerns and

safety. The Laguna Greens neighborhood is primarily residential with some commercial areas and is located between Sheldon Road, Elk Grove Boulevard, Franklin Boulevard, and the UPRR.

Laguna Lake Homeowners Association (10). The Laguna Lake Homeowners Association represents the residents of the Folks Ranch gated community located near the intersection of Elk Grove Boulevard and Bruceville Road.

Laguna Mirage Association (11). The Laguna Mirage Association consists of approximately 150 residents living along Laguna Mirage Lane between Laguna Boulevard, Stockton Boulevard, Big Horn Boulevard and Franklin Boulevard. The purpose of the Laguna Mirage Association is to monitor land use issues and to guide the design of the community.

Laguna Point Homeowners Association (12). The Laguna Point Homeowners Association is composed of 102 single family detached homes located in Elk Grove, west of Franklin and north of Laguna Boulevard. The area is mostly residential with some commercial businesses.

Laguna Riviera Neighborhood Association (13). The Laguna Riviera Neighborhood Association is made up of 300 homes located southeast of Laguna and Bruceville Roads. This is a small residential area that also includes a number of commercial businesses. The purpose of the association is to improve the quality of the Laguna Riviera neighborhood.

Laguna West Association (14). The Laguna West Association is made up of over 3,000 residents (multi-family and single-family) and businesses. This large, mixed use residential area also includes commercial and office businesses. The neighborhood is located west of I-5, east of the UPRR, and north of Elliot Ranch Road. The purpose of the Laguna West Association is to monitor land use and design issues for the community.

Laguna Woods Neighborhood Association (15). The Laguna Woods Neighborhood Association is composed of two residential subdivisions including approximately 400 homes. This community area is located between Laguna Woods Drive, Willow Vale Way, Laguna Oaks Drive, and Franklin Boulevard.

Meadowview Neighborhood Association (16). The Meadowview Neighborhood Association's primary mission is to provide people who live, own or work in the Meadowview neighborhood information and resources to address the issues and needs of the area. The neighborhood is a mix of residential and commercial properties and is located near the heavily trafficked intersection of Meadowview Road and 24th Street. The neighborhood is located between Meadowview Road, John Still Drive, Detroit Boulevard, and 21st Street.

Meridian Neighborhood Association (17). The Meridian Neighborhood Association consists of approximately 400 members with a broad mix of age, income, and ethnicity. The association serves a small residential neighborhood whose residents share a common goal to preserve and protect the quality of life and property values in their neighborhood. The neighborhood is located between Laguna Boulevard/Franklin Boulevard, Elliot Ranch Road, and the UPRR tracks.

Neighbors of Valley Hi Park (18). The Neighbors of Valley Hi Park represent a small residential area that is located between Valley Hi Drive, the city boundary, SR 99 and Center Parkway.

North Laguna Creek Neighborhood Association (19). North Laguna Creek is located in southwestern Sacramento California, near Laguna Creek. The purpose of the North Laguna Creek Neighborhood Association is to provide education and charitable assistance to the general public, and

to promote and maintain desirable neighborhood characteristics. The neighborhood is located between Cosumnes River Boulevard (CRB), Franklin Boulevard, and SR 99.

Parkway Neighborhood Association (20). The Parkway Neighborhood Association represents a small residential area that is located between Tangerine Avenue, Mack Road, and Center Parkway.

Sheldon Road Estates Homeowners Association (21). This association is made up of approximately 100 homes in the Sheldon Road Estates (east of Elk Grove Florin Road, North of Sheldon Road). The neighborhood is primarily residential with a fair amount of open space. All the properties in this area are agriculturally zoned and are between one and 10 acres.

Tokay Colony Homeowners Association (22). The Tokay Colony Homeowners Association is made up of approximately 1,000 homes within a four-mile radius. The neighborhood is mixed residential/commercial and is located from Short Road (off of Calvine) to Bradshaw. The purpose of the group is to disseminate information to the organization regarding community issues, elections, and environmental concerns.

Valley Center Neighborhood Association (23). The Valley Center Neighborhood Association represents a predominately residential area with some commercial businesses. The neighborhood is located between Valley Hi Drive, CRB, Center Parkway, and Franklin Boulevard.

Villagers Neighborhood Association (24). The Villagers Neighborhood Association serves a small residential community located between Ehrhardt Avenue, Calvine Road, Center Parkway, and Franklin Boulevard.

4.13.3 Property Acquisition and Relocation

Two residential units would be subject to relocation under the LPAP2 Alternative, as shown in Table 4.13-6. Additionally, the optional pedestrian overcrossing over CRB would result in property acquisitions and relocation affecting one residential property. No non-residential relocation would be required. The types of acquisitions associated with the alternatives are described below, along with the relative magnitude of each (Table 4.13-6). *On-site appraisals to determine actual market value will be conducted for each property to be relocated based on current market conditions prior to acquisition. Current market data (August 2007), indicate that there are adequate resources in the City of Sacramento to accommodate relocation of the displaced residential units.*

Federal and state laws require consistent and fair treatment of owners of property to be acquired, including just compensation for their property. Uniform and equitable treatment of displaced persons or businesses is also required by these laws. For purposes of presenting a conservative analysis, properties or easements are assumed to be acquired permanently. During final engineering, RT may determine that some parcels can be leased during construction, avoiding permanent displacement impacts. Also, the number of acquisitions and easements required could decrease during final design and engineering, as could the amount of land required from individual parcels. Estimates presented here are assumed to represent the “worst case” and are based on preliminary engineering right-of-way documents, which are available for review in RT's office. The cost of property acquisitions has been included in the project cost estimates.

4.13.3.1 NO-ACTION ALTERNATIVE

The No-Action Alternative would involve no property acquisitions and would therefore require no displacements associated with the present project.

Table 4.13-6: Summary of Right-of-Way Acquisitions (Including Easements) and Estimated Residential and Non-Residential Relocations

Alignment Segment/Options	Total Est. Land Area (Acres)	Total Est. Non-residential Relocations (Businesses)	Total Est. Building (Sq. Ft.)	Total Estimated Partial Residential Acquisition (acres)	Total Est. Residential Relocations (Units)	Total Estimated Residents
No-Action Alternative						
NO-ACTION TOTALS	0	0	0	0	0	0
TSM Alternative						
CRC PNR lot (east of Bruceville Road)	12.7	0	0	0	0	0
CRC PNR Lot	4.0	0	0	0	0	0
TSM Totals	**16.7**	**0**	**0**	**0**	**0**	**0**
LPAP2						
LRT Rail Alignment	35.0	0	0	0	*2*	0
Morrison Creek Station PNR Lot:	1.9	0	0	0	0	0
Franklin Boulevard Station PNR Lot	10.5	0	0	0	0	0
Center Pkwy Station:	0.7	0	0	0.01	0	0
CRC Station *Parking*	*6.3*	0	0	0	0	0
LRT TOTALS	***54.4***	**0**	**0**	**0.01**	***2***	***8***
Design Options						
Optional CRB Pedestrian Overcrossing	0.2	0	0	0	1	4[1]
Optional Shuttle Lot	3.5	0	0	0	0	0

[1] Estimate based on 2000 U.S. Census data for Census Tract 96.10 (3.71 Persons/Household).

Source: Parsons 2006

4.13.3.2 TSM ALTERNATIVE

The TSM Alternative would require the acquisition of approximately 16.7 acres of land to construct one bus park-and-ride (PNR) lot within the study area, as described below.

Cosumnes River College PNR Lot. RT would acquire approximately 4.0 acres of college property, currently used for parking and 12.7 acres of *property* for construction of about 1,420 parking spaces at the proposed Cosumnes River College (CRC) PNR lot.

4.13.3.3 LPAP2

Approximately *54.4* acres would be acquired for construction of the LPAP2 rail alignment, LRT stations and PNR lots, the pedestrian access at the *Franklin* and Center Parkway stations. The LPAP2 would require the *acquisition and* relocation of *two residential properties and the possible acquisition of an additional residential property* for the optional pedestrian overcrossing over CRB. No non-residential *relocations* would be required.

LPAP2 LRT Rail Alignment. Approximately 35.0 acres of UPRR, SRCSD, City of Sacramento, and private property would be acquired for construction of the LPAP2 LRT Rail Alignment, not including PNR lots. *Two* residential *relocations* would be required. *No non-residential relocations would be required.*

Morrison Creek Station PNR Lot. Construction of the Morrison Creek Station PNR would require approximately 1.9 acres of the Stone-Boswell property. An approximate total 5.6 acres of Stone-Boswell property is required for both the tracks and station.

Franklin Station PNR Lot. RT would acquire approximately 10.5 acres of SRCSD bufferlands for construction of approximately 650 parking spaces at the proposed Franklin Station and PNR lot. In addition, about 0.9 acres of bufferlands is required for a pedestrian path providing access to the station. No residential or non-residential relocation would be required.

Center Parkway Station. The Center Parkway Station would require approximately 0.7 acres of property owned by the City of Sacramento. In addition, less than 0.01 acres of residential property would be required for construction of a bus pull-out on Center Parkway. No residential or non-residential relocation would be required. In addition, about 1.2 acres of City property is required for a multi-use path providing access to the station.

Center Parkway Pedestrian Overcrossing Option. One single-family residence and approximately four persons would require relocation if a pedestrian crossing is constructed over CRB at Center Parkway. In addition, 0.01 acres of the Union House Creek embankment would be required for construction of the pedestrian crossing.

Cosumnes River College Station and PNR Lot. RT would acquire approximately 6.3 acres of property to construct an LRT station *and parking garage* (approximately 2,000 parking spaces). For the parking garage, approximately 6.3 acres of CRC property would be required. The garage would be located either north or south (base case) of the college entrance off of Bruceville Road. No residential or non-residential relocation would be required for the parking structure.

Optional Shuttle Lot. The optional shuttle lot at Calvine/Auberry would acquire approximately 3.5 acres of undeveloped property owned by RT. No residential or non-residential relocation would be required.

4.13.3.4 RELOCATION ASSISTANCE PROGRAM AND RELOCATION RESOURCES

The Uniform Relocation Assistance and Real Property Acquisition Act of 1970, as amended, mandates that certain relocation services and payments be made available to eligible residents, businesses and non-profit organizations displaced by construction and operation of transit-related projects. The Act establishes uniform and equitable procedures for land acquisition, and provides for uniform and equitable treatment of persons displaced from their homes, businesses, or farms by federally and federally assisted programs.

Owners of private property have federal and state constitutional guarantees that their property will not be taken or damaged for public use unless they first receive just compensation. Just compensation is measured by the "fair market value" of the property to be taken. Where acquisition and relocation are proposed, RT would follow provisions of the Uniform Act, as amended, and in conformance with all applicable regulations. All real property to be acquired would be appraised to determine its fair market value. An offer of just compensation, not less than the approved appraisal, would be made to each property owner.

Each homeowner, renter, business, or non-profit organization displaced as a result of the project would be given advance written notice and would be informed of eligibility requirements for relocation assistance and payments.

4.13.4 Effects on Neighborhoods and Businesses

Effects of the project alternatives on neighborhoods and businesses, including community cohesion, are described below. Community cohesion addresses the degree to which residents have a sense of belonging to their neighborhood or experience attachment to community groups and institutions, as a result of continued association over time. Possible community cohesion impacts of a project include effects on interactions among persons and groups, whether certain people would be isolated from others, and the perceived impact on community quality of life.

4.13.4.1 NO-ACTION ALTERNATIVE

The No-Action Alternative would not construct new facilities that would affect neighborhoods and businesses or community cohesion; however, this alternative would not relieve existing and future congestion in the study area, enhance transit linkages between the City of Elk Grove and Downtown Sacramento, or improve accessibility within communities.

4.13.4.2 TSM ALTERNATIVE

The TSM Alternative would provide additional bus services that would improve local and regional linkages among neighborhoods, businesses and community facilities. Construction of one bus PNR lot at CRC would not divide or disrupt an existing residential neighborhood or community. As described in Section 4.13.3, no residential or non-residential relocations are anticipated.

4.13.4.3 LPAP2

Benefits to neighborhoods from the LPAP2 would include increased accessibility and mobility, decreased congestion on many local streets, improved air quality, and potential for economic development around the proposed LRT Stations. The LPAP2 would increase connectivity and improve travel times between neighborhoods and businesses within the corridor as well as develop linkages with neighborhoods and employment locations systemwide.

Since the LPAP2 LRT track alignment would be constructed primarily within railroad and public roadway rights-of-way or on undeveloped land, impacts to neighborhoods and businesses would be minimized. Construction of the LPAP2 LRT stations, PNR lots and optional shuttle lot would not constitute any new physical or psychological barriers that would divide, disrupt or isolate neighborhoods, individuals, or community focal points in the corridor. Although there are a number of neighborhoods in the vicinity of these proposed facilities, physical barriers (e.g. UPRR railroad,

roadways, Union House Creek and privacy walls) currently separate the residential areas from the proposed LPAP2 LRT alignment, station, PNR lot and optional shuttle lot locations.

Displacements and relocation impacts are discussed above in Section 4.13.3. The relocation of *two* residence*s and the possible relocation of a third residence* for the Center Parkway Pedestrian Overcrossing design option *are* not anticipated to substantially disrupt the community since the residences represent less than one percent of the total occupied dwelling units in the community and since relocation assistance would be provided as described in Section 4.13.4.4.

Based on FTA noise criteria, perceptible noise and vibration impacts as a result of passing trains would affect residences at some locations along the alignment, but these impacts are not expected to disrupt neighborhood functioning or cohesion or the function and viability of businesses. Noise and/or vibration mitigation is proposed for all severe impacts, thereby reducing neighborhood noise to acceptable levels. Noise impacts as a result of the LPAP2 are discussed in Section 4.12.4.

Visual changes, as discussed in Section 4.1.2 would be noticeable to some residents in neighborhoods in the vicinity of the LPAP2 LRT alignment, stations, and PNR lots. Most of the visual additions would be consistent with the visual setting of the UPRR and roadway corridors and would not affect the existing visual integrity of study area neighborhoods. Continued public participation would be encouraged regarding station design in the final design stage of the project.

Accessibility and traffic impacts and mitigation measures are discussed in Section 3.3.6. As described, several intersections would exceed City of Sacramento thresholds for project impacts with the LPAP2. These intersections occur on major arterials within the study area (Franklin Boulevard, CRB, Center Parkway and Bruceville Road) where substantial traffic growth and attendant congestion are anticipated. As described in Section 3.3.5, mitigation measures would ensure that the LPAP2 would not worsen conditions at these intersections but would contribute to reducing congestion by reducing vehicle miles traveled. These effects would benefit local neighborhood circulation.

4.13.5 Environmental Justice

Executive Order 12898 (Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations), dated February 11, 1994, calls on federal agencies to identify and address disproportionately high and adverse human health or environmental effects of federal programs, policies, and activities on minority populations and low-income populations. In 1997, the U.S. Department of Transportation (DOT) issued its DOT Order to establish procedures for use in complying with EO 12898 for its operating administrations, including FTA. The EO defines key terms and provides guidance for identifying and addressing disproportionately high and adverse impacts to low income and minority populations. If disproportionately high and adverse impacts would result from the proposed action, mitigation measures or alternatives must be developed to avoid or reduce the impacts, unless the agency finds that such measures are not practicable.

Impacts and benefits of transportation projects result from the physical placement of such facilities, and also from their ability to improve or impede access to neighborhoods or portions of the region. This analysis examines whether ethnic minority and/or low-income populations in the project area would experience disproportionate impacts, and if they are inconsistent with the benefits created.

4.13.5.1 Environmental Justice Setting

The South Sacramento Corridor as a whole consists of a variety of neighborhoods and a diverse, multi-ethnic population. The ethnic composition for the study area, as described in Table 4.13-3, is

more diverse, with higher percentages of Black and Asian populations than Sacramento County and City, and the City of Elk Grove. Study area census tracts show a wide dispersal of minority populations throughout the corridor. Approximately 76 percent of all study area residents are members of minority groups, which also includes individuals of Hispanic/Latino origin. This compares to a 42 percent minority population in Sacramento County, a 59 percent minority population in Sacramento City, and a 46 percent ethnic minority population in the City of Elk Grove.

The 2000 median household income of the census tracts located in the project area ranged from $26,835 to $68,318. As shown in Table 4.13-4, the overall percentage of households in the study area below poverty level was 15 percent, which is comparable to the Sacramento City percentages and slightly higher than the County percentage of 11 percent. Four percent of households in the City of Elk Grove were below poverty level. Concentrations of households below poverty level are highest in the census tracts in the northern segment of the corridor in the vicinity of the Phase 1 terminus.

4.13.5.2 EQUITY OF IMPACTS OF THE ALTERNATIVES ON (AND BENEFITS FOR) MINORITY AND LOW-INCOME NEIGHBORHOODS

No-Action Alternative. Under the No-Action Alternative, planned improvements to the highway network would serve residents with automobiles who currently use those facilities, although congestion would continue to increase, along with travel times.

TSM Alternative. Under the TSM Alternative, improved bus service and one new bus PNR lot would be provided. These benefits would be shared by all riders, depending on their trip purposes, origins and destinations, and there would not be a disproportionate distribution of benefits to certain groups. Construction of the CRC transit center and PNR lot would not require business or residential relocation. Potential impacts related to air and noise intrusion, traffic, and visual effects on area residents, including minority and low-income populations, would be minimized through mitigation measures included in the project (see Sections 3.3, 4.1, 4.3, and 4.12). There would be no increase in hazardous materials in the area as a result of the TSM Alternative.

LPAP2. Consistent with the project purpose stated in Chapter 1, the LPAP2 would improve access to employment, education, medical, and retail centers within the region. Residents would be able to ride the LRT with improved travel times on exclusive right-of-way, even though congestion on some area roads and freeways would continue to increase. These benefits would be shared by all riders, depending on their trip purposes, origins and destinations, and there would not be a disproportionate distribution of benefits to certain groups.

The introduction of light rail tracks, LRT stations, and PNR lots along the LPAP2 alignment would not cause disproportionately high and adverse impacts on minority or low-income populations. The proposed LPAP2 Project is mostly at-grade except at four locations: the Meadowview Road flyover option, the proposed LRT crossing of the UPRR and Union House Creek, the Franklin Boulevard LRT flyover option, and the Bruceville Road LRT flyover option. The northern segment of the corridor already contains freight railroad tracks, where well established communities have developed with this physical feature in place. There would be no increase in the production, transport or disposal of hazardous wastes as a result of the LPAP2, nor would operation of the LRT increase the use of hazardous materials in populated areas. The construction of the LRT rail alignment, stations, and PNR lots would cause residential displacement of *two* residence*s and one residence* for the optional pedestrian overcrossing over CRB and no business displacement. All potential impacts on area residents, including minority or low-income populations, would be minimized through mitigation measures included in the project.

In summary, project benefits – improved transit service, greater accessibility, and shorter travel times – would accrue equally to residents in the study area. Based on the above discussion, the LPAP2 would not cause disproportionately high and adverse effects on any minority or low-income populations as discussed in E.O. 12898 regarding environmental justice.

4.13.6 Growth Inducement

None of the proposed project alternatives would induce unplanned growth in the South Sacramento Corridor. Working with the City of Sacramento and local developers, RT is pursuing and has pursued increased land use intensity and transit oriented development in the immediate station areas of Morrison Creek and CRC so that the LPAP2 will be supportive of coherent and efficient land use patterns for the planned growth in the LPAP2 corridor. See Sections 4.10.2 (Local Development Plans and Policies) and 4.10.4.1 (Land Use Impacts at Proposed LPAP2 LRT Station Locations) for supporting discussion.

4.13.7 Mitigation Measures

Measures to mitigate impacts to neighborhoods and businesses as a result of noise and vibration and visual changes are described in their respective sections, as identified above.

4.14 PUBLIC SERVICES AND FACILITIES

4.14.1 Setting

Public services and facilities located near the LPAP2 alignment, including police, fire, medical, educational, and cultural, are listed in Table 4.14-1 and shown in Figure 4.14-1, which also shows the public services and facilities study area. Facilities that would provide improved access under the project alternatives are highlighted. These facilities would be within walking distance (a 0.5-mile radius) from a proposed LRT station, bus stop or optional shuttle lot locations. Parks and recreational facilities are described in Section 4.15.

4.14.1.1 POLICE AND FIRE PROTECTION SERVICES

Police protection and traffic enforcement in the study area are provided by the Sacramento County Sheriff's Department, Sacramento City Police Department, City of Elk Grove Police Department, and the California Highway Patrol. A headquarters station for the California Highway Patrol is located in the study area. The City of Sacramento has current plans for a fire station to be located east of Bruceville Road and south of Cotton Lane.

Fire protection services and emergency medical rescue in the study area are provided by the cities of Sacramento and Elk Grove and the Sacramento Metro Fire District, which provides service to the outer regions of Sacramento County. Two fire stations are located in or near the study area.

4.14.1.2 HOSPITALS

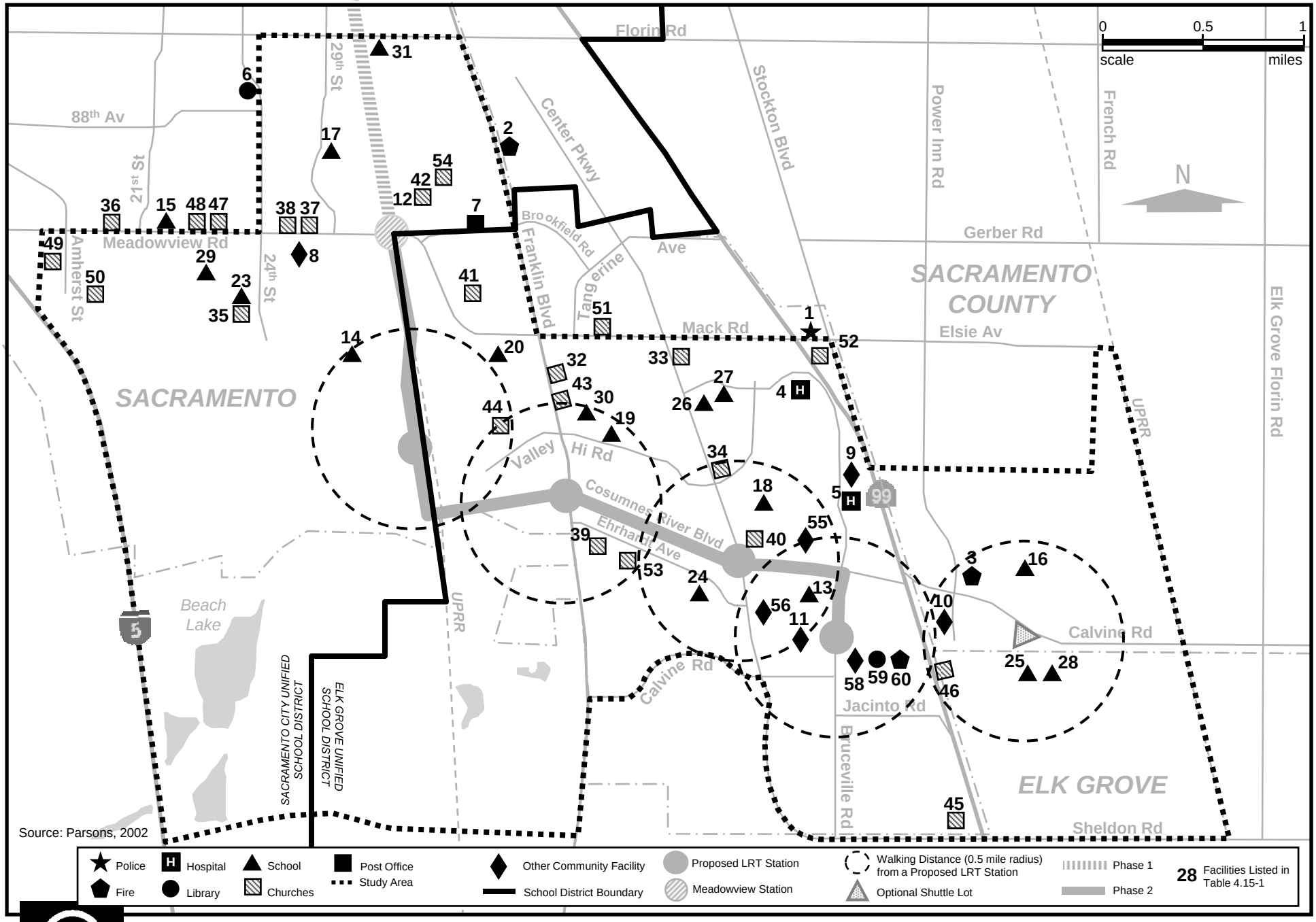
There are two major medical facilities located in the study area: Kaiser Foundation Hospital South and Methodist Hospital of Sacramento.

Table 4.14-1: Existing Public and Cultural Facilities

ID#	Name of Facility	Location of Facility
Law Enforcement		
1	South Sacramento California Highway Patrol	6 Massie Court
Fire Stations		
2	Sacramento City Fire Station #57	7927 East Parkway
3	Sacramento Metro Fire Station #51	8210 Meadowhaven Drive
60	Fire Station (planned)	
Hospitals		
4	Kaiser Foundation Hospital South	6600 Bruceville Road
5	Methodist Hospital of Sacramento	7500 Hospital Drive
Libraries		
6	Martin Luther King Regional Library	7340 24th St. Bypass
59	Library (Planned)	
Post Offices		
7	Sacramento Branch	4301 Brookfield Drive
Other Community Facilities		
8	State Office of Civil Defense	2800 Meadowview Road
9	Park & Ride Lot	Bruceville Road and Bell Road
10	Park & Ride Lot	E. Stockton Boulevard and Old Calvine Road
11	Cosumnes River College Transit Center	Consumes River College
12	Light Rail Station (Open 2003)	Meadowview Road. and UPRR
58	Community Center (Planned)	
Colleges and Universities		
13	Cosumnes River College	8401 Center Parkway
Schools – Public Elementary		
14*	Susan B. Anthony	7864 Detroit Boulevard
15	Freeport	2118 Meadowview Road
16	Isabelle Jackson	8351 Cutler Way
17	Edward Kemble	7495 29th Street
18	Herman Leimbach	8101 Grandstaff Drive
19*	Prairie	5251 Valley Hi Drive
20	Union House	7850 Deer Creek Drive
22	Woodbine	2500 52nd Avenue
Schools – Private Elementary		
23	Saint Anne's	7720 24th Street
Schools – Public High		
24	Valley	6300 Ehrhardt Avenue
25	Monterey Trail	8661 Power Inn Road
26	Rio Cazadero	7825 Grandstaff Drive
27	Las Flores	5900 Bamford Drive
31	Luther Burbank	3500 Florin Road
Schools – Public Middle		
28	Edward Harris	8691 Power Inn Road
29	John Still	2250 John Still Drive
30*	Samuel Jackman	7925 Kentwal Drive
Houses of Worship		
32	Second Greater Faith Missionary	7300 Franklin Boulevard
33	St. Andrew Lutheran	7833 Center Parkway
34	Hope United Methodist Church	6161 Valley Hi Drive
35	St. Anne's Church	7724 24th Street
36	Sacramento Chinese Baptist Church	1821 Meadowview Road
37	Cathedral-Praise and Worship Center	2875 Meadowview Road
38	Genesis Missionary Baptist Church	2801 Meadowview Road
39*	Greater Faith Baptist Church	5230 Ehrhardt Avenue
40	Valley Hi Covenant Church	8355 Arroyo Vista Drive
41	Dien Thoai Phuc Am	83 Hermes Circle
42	Maranatha Missionary Outreach	3658 G Parkway
43*	Prince of Peace Church	7501 Franklin Boulevard
44	Southside Alliance Church	4204 Equinox Way
45	Church of Christ	8320 Sheldon Road
46	Celebration of Life Ministries	8555 E Stockton Boulevard
47	Southgate Seventh Day Adventist Church	2299 Meadowview Road
48	Progressive Church of God	2251 Meadowview Road
49	Calvary Baptist Church	7650 Amherst Avenue
50	Mt. Marriah Baptist Church	1717 Janrick Avenue
51	Church of Christ	5051 Mack Road
52	Laguna Baptist Church	45 Quinta Court
53*	Valley Hi-Meadowgate Congregations	5490 Ehrhardt Avenue
54	Veevalu Onosal Ministries	15 Driad Court
Cultural Facilities		
55	Culture Gallery by Stefanie	7193 Surreywood Way
56	River Stage Theater	8401 Center Parkway

*Facility would be provided improved access under the TSM and LPAP2 alternatives as compared to existing conditions. The facility would be within walking distance (0.5-mile radius) of a proposed bus stop or LRT Station.

Source: Parsons, 2004



Regional Transit

South Sacramento Corridor Phase 2 Project

PUBLIC AND CULTURAL FACILITIES
Figure 4.14-1

4.14.1.3 SCHOOLS

Public school districts in the study area include Sacramento City Unified and Elk Grove Unified. Schools and school district boundaries are shown in Figure 4.14-1. There are 17 elementary and secondary schools within the study area, including one private elementary school. The new Monterey Trail High School and Edward Harris Middle School, located at 8661/8691 Power Inn Road, are scheduled to open in June 2004 with a projected joint capacity of 4,860 students.

Cosumnes River College (CRC), a local community college with enrollment of over 10,000 students, is located at 8401 Center Parkway in the study area.

4.14.1.4 CULTURAL FACILITIES

The CRC area is the primary cultural center in the project vicinity. Cultural facilities include the River Stage Theater, situated on the college campus, and the Culture Art Gallery, located nearby.

The Martin Luther King Regional Library is the only library within the study area. The City of Sacramento has current plans for a library to be located east of Bruceville Road and south of Cotton Lane. The Sacramento Public Library functions as a joint City-County library that operates as a single facility but is governed by both the Sacramento City Council and the Sacramento County Board of Supervisors.

4.14.1.5 HOUSES OF WORSHIP

There are a number of houses of worship of various denominations located in the study area. These facilities, which serve as community focal points, are identified in Figure 4.14-1.

4.14.1.6 WATER, SEWER, AND SOLID WASTE

Three of the county water purveyors serve the study area: Sacramento County Water Management District (SCWMD), Citizens Utility of California, and the City of Sacramento. Water districts are responsible for securing and developing their own water supply either through obtaining surface water rights from the U.S. Bureau of Reclamation or drilling wells for groundwater in their jurisdiction. Citizens Utility of California serves the study area north of Calvine Road and east of SR 99, while the City of Sacramento serves the study area west of SR 99. Only the SCWMD provides water service to the Elk Grove portion of the study area.

Groundwater is the primary source of water supply for domestic, municipal and agricultural uses in Sacramento County, whereas surface water provides nearly 85 percent of the total water supply in Sacramento City. Three treatment facilities treat and supply surface water to city areas: the Sacramento River Water Treatment Plant, the Riverside Water Treatment Plant, and the American River Water Treatment Plant.

The Sacramento Regional County Sanitation District (SRCSD) is responsible for sewage treatment and disposal in the study area, including the City of Elk Grove. Wastewater is treated at the district's Regional Wastewater Treatment Plant that treats an average of 165 million gallons per day (MGD) of dry weather flow and is capable of treating 400 MGD of wet weather flow.

Solid waste collection in the study area is provided by the Solid Waste Division of the City of Sacramento Department of Public Works and the Sacramento County Department of Waste Management and Recycling. In the City of Elk Grove, solid waste is collected by Central Valley Waste.

4.14.1.7 GAS/ELECTRIC

The Sacramento Municipal Utility District (SMUD) and the Pacific Gas and Electric Company (PG&E) provide electrical power and natural gas services in the study area.

4.14.1.8 TELEPHONE/CABLE

Local telephone service in the study area is provided by SBC Services/Pacific Bell. AT&T Broadband is the main cable service provider for the study area.

4.14.2 Impacts

4.14.2.1 NO-ACTION ALTERNATIVE

The No-Action Alternative would not result in direct long-term project impacts on community facilities.

4.14.2.2 TSM AND LPAP2 ALTERNATIVES

Improved transit access to community facilities would occur as a result of the TSM and LPAP2 alternatives. Tables 4.14-1 and 4.14-2 identify the location and number of each type of facility that would be provided with improved access under the project alternatives as compared to existing conditions. These facilities would be within walking distance (0.5 mile) of a proposed bus stop or LRT Station. Ten community facilities, including four park and recreational facilities (see Section 4.15), would realize direct benefits of improved bus and LRT service. These facilities include Prairie and Susan B. Anthony Elementary Schools, Samuel Jackman Middle School and three houses of worship. Enhanced bus and LRT service from CRC to the Meadowview Road LRT Station and express bus service from Elk Grove would also facilitate access between the study area and community facilities located downtown and in other regional activity centers.

Table 4.14-2: Community Facilities Provided Improved Access Under the TSM and LPAP2 Alternatives*

Schools	Parks and Recreational Facilities	Houses of Worship	Other	Total
3	4	3	0	10

*Facility would be within walking distance (0.5 mile) from a proposed bus stop or LRT Station.

4.14.3 Mitigation Measures

The TSM and LPAP2 alternatives would both improve accessibility to community facilities within and outside of the study area. No facilities would be displaced by either alternative, and no mitigation is proposed.

Measures to mitigate impacts to community facilities as a result of air emissions, parking displacements, noise and vibration, and visual changes are described in their respective sections of this environmental document.

4.15 RECREATIONAL FACILITIES

4.15.1 Setting

The Sacramento City Parks and Community Services Department and the Elk Grove Community Services District provide a variety of park facilities in the study area including neighborhood parks, community parks, city regional parks, city parkways, open spaces, school parks, and trails. In addition to the operation and maintenance of parks, the park divisions are also responsible for school green spaces, river access points and public building landscapes and street plantings. Other recreational facilities in the study area include the CRC Stadium and the CRC Athletic Fields. Park and recreational facilities in the study area are listed in Table 4.15-1 and shown in Figure 4.15-1.

4.15.2 Impacts

4.15.2.1 NO-ACTION ALTERNATIVE

The No-Action Alternative would not result in direct long-term project impacts on parks or recreational facilities.

4.15.2.2 TSM AND LPAP2 ALTERNATIVES

The TSM and LPAP2 alternatives would improve transit access to four park and recreational facilities in the study area. As shown in Table 4.15-1, Susan B. Anthony, Mesa Grande, Prairie and Reith parks would be provided improved access under the project alternatives as compared to existing conditions. These facilities would be within walking distance (0.5 mile) of a proposed bus stop or LRT Station. Enhanced bus and LRT service from the CRC to the Meadowview Road LRT Station and express bus service from Elk Grove would also facilitate access between the study area and park and recreational facilities located downtown and in other regional activity centers.

Under the LPAP2, the CRB at-grade crossing alignment would cut through a portion of the berm at the northeast corner of the CRC Stadium. A new retaining wall would be required along the western portion of the trackway to support the stadium embankment.

If the CRB grade separation option is used, the tracks would fly over the northeastern corner of the stadium berm and part of the berm would be incorporated in the flyover's abutment. There would be no adverse effect on the operations or use of the stadium under either the at-grade or grade-separated option. Visual effects as a result of these design options are described in Section 4.1.

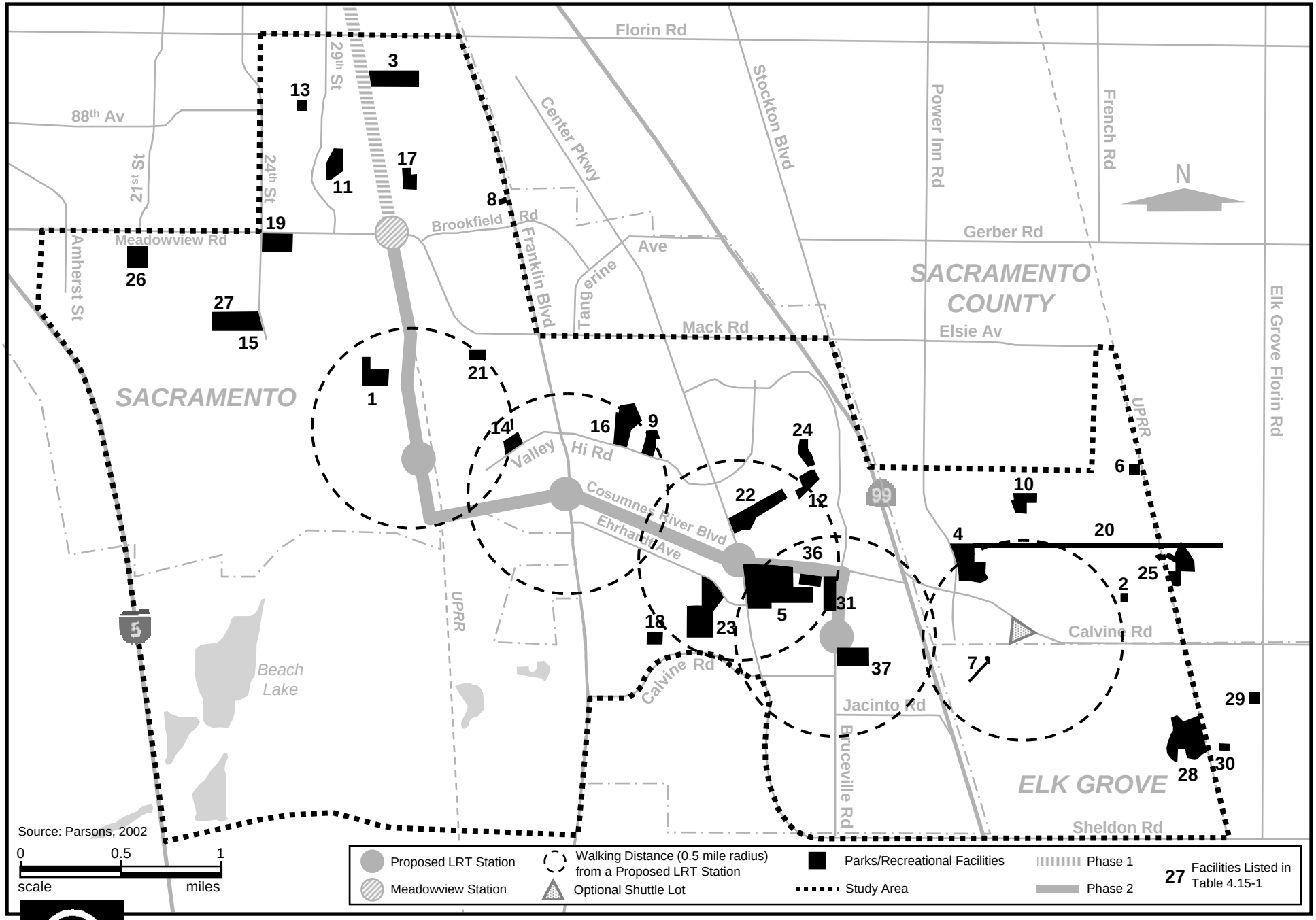
For the LPAP2, RT proposes to construct a 2,000-space parking structure in the southeast corner of the CRC campus. LPAP2 parking options at the CRC campus include a structure north of the main campus entrance and surface parking on the CRC campus and across Bruceville Road. For the TSM, RT would construct parking on the northern portion of the campus and again across Bruceville Road. Parking constructed by RT on the campus would note be dedicated solely to transit riders but would rather be available for both students and transit riders.

Table 4.15-1: Existing Parks and Recreational Facilities in the Study Area

ID#	Name of Facility	Location of Facility	ID#	Name of Facility	Location of Facility
1*	Susan B. Anthony Park	7880 Detroit Boulevard	2	Calvine Station Park	New Point Drive and New Ridge Court
3	Burbank Park	Luther Drive and Bentley Avenue	4	Countryside Community Park	Power Inn Road near Calvine Road
5	Cosumnes School Park	8401 Center Parkway	6	*Cottonwood Park*	*Wolfboro Court*
7	Fales Park	Park Front Way and Chattan Way, Elk Grove	8	Franklin Villa Park	10 Caselli Circle
9	Hite Park	5375 Valley Hi Drive	10	Toby Johnson Park	Boron Way and Cutler Way
11	Kemble School Park	3065 Loma Verde Way	12	Leimbach Park	Grandstaff Ave. near Herman Leimbach School
13	Martin Luther King Jr. Park	2705 Gardendale Road	14*	Mesa Grande Park	4325 Valley Hi Drive
15	Meadowview Park	7760 24th Street	16*	Prairie Park	Valley Hi Drive and Kentwal Drive
17	Pollock Ranch Park	3800 Robinridge Way	18*	Reith Park	Rightwood Way and Valley Lark Drive
19	Samuel Pannell Meadowview Community Center Park	2450 Meadowview Road	20	Tillotson Parkway	Elk Grove Florin Road between Calvine Road and Brittany Park Drive
21	Union School Park	Deerglen Way and Red Deer Way	22	Valley Hi Community Park	8185 Center Parkway
23	Valley School Park	Sidney Ave. and Carlin Ave.	24	Wood Park	6755 Bodine Circle
25	Hardester Park	Ardith Dr. and Hardester Way	26	Freeport Park	Monarch Ave. and 19th Street
27	Still School Park	24th Street and John Still Drive	28	Jones Park	Shasta Lily Dr. at the UPRR
29	Gage Park	8888 Silverberry Avenue	30	Hrepich Park	8620 Black Kite Drive
31	CRC Stadium	8401 Center Parkway	36	CRC Athletic Fields	8401 Center Parkway
37	Shasta Park Site (in development)	Bruceville Road and Shasta Avenue			

*****Facility would be provided improved access under the TSM and LPAP2 alternatives as compared to existing conditions. The facility would be within walking distance (0.5-mile radius) of a proposed bus stop or LRT Station.

Source: Parsons, 2004



South Sacramento Corridor Phase 2 Project

PARKS AND RECREATIONAL FACILITIES
Figure 4.15-1

CRC and the Los Rios Community College District have expressed a preference for a parking structure rather than surface parking. For the surface parking option however RT worked in close collaboration with CRC and the Los Rios Community College District to identify the best location. Given its close proximity to the campus student facilities and the opportunity for a parking lot access road from CRB generally midway between Center Parkway and Bruceville Road (at the location where the LRT would cross CRB at grade), the additional surface parking is proposed to be located on the northern portion of the campus on property currently used for playing fields.

4.15.3 Mitigation Measures

The TSM and LPAP2 alternatives would both improve accessibility for area residents to parks and recreational facilities within and outside of the study area.

For the surface parking options on the CRC campus. RT will relocate the existing playing fields that are currently located on the site where the surface parking is proposed. The playing fields would be relocated to the west of the new parking area – an area proposed by CRC and the Los Rios Community College District.

Measures to mitigate impacts to parks and recreational facilities as a result of air emissions, noise and vibration, and visual changes are described in their respective sections of this environmental document.

4.16 SAFETY AND SECURITY

4.16.1 Security at RT Facilities

RT contracts with a private security company for maintaining the security of its transit facilities. This service provides security guards assigned to the Main Administrative Building, (1400 29th Street) and Bus Maintenance Complex, (2811 O Street). They are also assigned to the Light Rail Administrative and Maintenance Yard, (Metro) at 2700 Academy Way. Using bicycles, vehicles, or on foot, security guards patrol the current light rail stations. Their primary purpose is to discourage vandalism and theft during LRT operating hours. At night, after operating hours, two mobile guards patrol the LRT system.

As described in Section 4.14.1.1, general law enforcement and fire protection services in RT's service area are provided by the city and community police and fire departments in which the transit facilities are located. RT contracts for the full-time assignment of 19 officers from the Sacramento Police Department and nine deputies from the Sacramento County Sheriff's Department. These, and when necessary, other police officers respond to law enforcement problems and emergencies on buses, LRT vehicles, and at LRT stations throughout the day, seven days a week. Police also support RT's Fare Inspection Officers in apprehending individuals who evade fare and violate other transit system regulations. RT Police use current technology, such as video surveillance systems and building proximity cards, to help reduce and prevent crime at all RT properties[7].

[7] Building proximity cards are used to restrict access to required buildings. Such buildings can be accessed by placing the building proximity card in front of the proximity reader, located near the doorway.

RT holds training sessions each year for all fire personnel from the various fire protection agencies that would likely respond to transit emergencies. The training covers procedures for gaining access to buses and LRT vehicles, de-energizing LRT vehicles and overhead catenary wires, and other specialized procedures for fire safety of transit facilities. Fire personnel also participate in an emergency drill staged annually by RT.

4.16.2 Impacts

4.16.2.1 No-Action and TSM Alternatives

The No-Action Alternative would not result in safety or security impacts except for the increased potential of worsening congestion on area roadways to degrade emergency response times. For the TSM Alternative, RT security services would extend to include the increased bus services to be provided. Costs for these additional security services are included in the cost estimate for the TSM Alternative.

4.16.2.2 LPAP2

As outlined in Section 4.16.1 above, RT already has a well-developed program for providing safety and security to its facilities and transit vehicles. Under the LPAP2 this existing program would be extended to the new facilities and service. RT has already started planning coordination between police and fire services on the corridor for the future extension.

Under the LPAP2, stations and parking lot areas would be provided with the same level of security services as existing facilities; therefore no adverse impact is anticipated. The project team met with RT security staff and police services on April 15, 2004 to present and solicit comments on the safety and security issues and approaches described in the following paragraphs. No issues or concerns were raised. Costs for the additional security services are included in the cost estimates for the LPAP2.

Safety and Security in Station Areas. The new rail stations along the LPAP2 would create activity centers with increased pedestrian activity, auto and bus drop-offs and loadings, and PNR traffic. This activity would have the potential for safety and/or security incidents at and in the vicinity of stations. Large parking areas or structures would increase the risk of vandalism to vehicles.

Park-and-ride lots and structures proposed at three LRT stations would require mixed circulation of autos and pedestrians in parking areas, with an increased potential for auto-pedestrian conflicts, primarily during busy peak periods. The safety and security of LRT passengers using station facilities would be a concern during all time periods, although peak periods and late evenings are typically the times requiring additional oversight.

Various design and operational improvements would be made under the LPAP2 to provide a high level of system safety and security. LRT station designs would be open and well demarcated for pedestrian access. Sidewalks and pedestrian paths through parking areas would help separate pedestrian traffic from auto and bus traffic. Fencing or other barriers would be provided to direct pedestrian movements and to discourage crossing of the freight track and local streets except where designated and to prevent access to neighboring private land uses. Special provisions would be made for pedestrian access to station platforms. Pathways of travel for disabled individuals would be

maintained and conform with all federal (e.g., Americans with Disability Act), State, and local codes. All station platforms and PNR lots would be well lighted.

Auto and bus drop-off and loading for LPAP2 LRT stations would be allowed only in designated areas. At each LPAP2 LRT station with designated passenger drop-off areas, the design would separate through traffic and auto and bus drop-off activity. Park-and-ride lot circulation would be designed to separate the major flows for auto parking from buses and kiss-and-ride drop-off. Roadway improvements are proposed that would facilitate circulation and help avoid conflicts between station traffic and general traffic at each location.

RT would extend its passenger safety and security program to include the improvements made under the LPAP2, and the proposed LRT stations would be subject to the same security and safety supervision. RT proposes to add officers from both the Sacramento Police Department and the Sacramento County Sheriff's Department when Phase 2 of the South Line opens. PNR lots would have contract security personnel present during the hours between 6:00 a.m. and 6:00 p.m. on weekdays. Roving security checks would be made during other periods. The additional law enforcement personnel would assist as needed with safety and security issues throughout the system.

RT would continue to rely on the Sacramento City Fire Department and the Sacramento Metropolitan Fire District for fire safety and emergency response for the South Sacramento Corridor Phase 2 extension. Both fire departments currently respond to RT light rail line fire safety issues and are familiar with LRT operations. RT met with the Sacramento Fire Department on June 13, 2005 to discuss coordination of the LPAP2 facilities and operations with the Department. Additional training would be provided by RT to all fire departments whose territory may include the South Sacramento Corridor Phase 2. Training would include vehicle construction for extrication operations, electrical hazard recognition and abatement, and special firefighting tactics. RT would assure that fire service personnel and equipment have maximum access to LRT facilities when responding to emergency incidents. Where traffic signal modifications and/or new installations are planned, RT would install receiving devices compatible with those used by the fire department to change traffic signals as needed to facilitate access during an emergency response. RT would provide fire departments with specialized procedures and tools required to safely move and secure high power electrical lines in the event of an emergency. All materials used in construction of LRT vehicles would be evaluated for fire resistance and the appropriate fire suppression methods would be provided to the fire departments.

LRT and Vehicular Traffic. The relative frequency of accidents suggests that private auto travel is a more accident-prone mode of travel than public transit. For example, a 2001 Study based on 1997 Bureau of Transportation Statistics for the United States as a whole reported that motor vehicles had a fatality rate of 0.93 per million passenger-miles compared to less than 0.7 per million for all public transit modes combined. During the same year, LRT had an accident rate of less than 0.01 per million passenger-miles, nationwide.[8] By reducing the level of auto traffic in the corridor, the LPAP2 would be expected to have an overall beneficial effect on accident rates and resulting injuries.

A specific analysis was performed that reviewed RT's LRT accident history at comparable at-grade crossings. Thus resulting accident projections consequently reflect local conditions. For vehicular traffic, the comparison was based on the aggregated experience of similar crossings on the Folsom and South Corridor Phase 1 LRT lines. The accident history considered California Public Utilities Commission reportable accidents for years 2001 through 2006. The results of this review showed

[8] Light Rail Now, "FACTS, Public Transit = Much Safer Travel," *Light Rail Progress*, March 2001.

that expected accident rates would vary between 0.080 and 0.138 accidents per year which equates to an accident rate of 0.01 accidents per million vehicles crossing. For comparison, the expected accident rate at any of the adjacent intersections would be on the order of 100 times greater. The cumulative accident of all the proposed grade crossings would be 0.47 accidents per year.

The accident savings of diverting new transit riders from driving on the freeways to downtown Sacramento would amount to about five fewer accidents per year compared to the TSM Alternative and 12 fewer accidents compared to the No-Build Alternative. Therefore, the South Sacramento area would be safer with the new riders on the LRT system rather than driving to work, even with the creation of at-grade crossings.

Portions of the LRT tracks and stations would be adjacent to an active freight railroad and other portions would traverse high volume roadways that require crossings by pedestrians and vehicular traffic, increasing the potential for accidents. The proposed at-grade crossings and their adjacent intersections were analyzed for traffic impacts, identified safety issues, and proposed mitigation measures. Field reconnaissance was undertaken to ascertain the traffic control characteristics of the crossings and their adjacent intersections. Available traffic volume data from the City of Sacramento was assembled for a.m. and p.m. peak hours and supplemented with new counts conducted during the a.m. and p.m. peak commuter periods. Volumes were then projected for Year 2012 (opening day) and Year 2030.

The proposed at-grade crossings and their adjacent intersections were analyzed utilizing the methodology known as "operational analysis" to evaluate potential impacts from queuing, changes in levels of service and changes to intersection efficiency. The operational analysis showed impacts to vehicular operations due to LRT operations; however, these impacts could be mitigated using lane configuration and traffic signaling improvements.

Therefore at-grade crossings are proposed at Meadowview Road, Franklin Boulevard and Center Parkway, with LRT trains crossing on average every 10 minutes during peak periods, 15 minutes off-peak and 30 minutes during evenings and weekends. LRT trains would also cross at-grade at the College's east entrance road off Bruceville Road. LRT crossings of the entrance road would be limited to several during peak hours as crossings of the road are only required to gain access to the tail (storage) tracks south of the entrance. LRT speed to and from the tail tracks would be a maximum 10 mph.

The crossing of Cosumnes River Boulevard is proposed to be grade separated with LRT trains crossing over the roadway on a bridge structure. This will eliminate traffic and safety impacts to the roadway that would have been caused by the skewed at-grade crossing of a high volume roadway.

The traffic signals near the at-grade crossings of Franklin Boulevard, Center Parkway and the Cosumnes River College Entrance Road would be pre-emptive, thereby minimizing LRT delay and increasing safety. The pre-emptive devices cause a change in the normal sequence of a traffic signal when an LRT vehicle approaches. Thus the cross-traffic would have a red phase when the train approaches the at-grade crossing.

For the proposed at-grade crossings identified safety hazards were mitigated using proven and effective measures to include two quadrant warning devices (crossing gates with flashing lights and bells) raised medians, warning signs, pavement markings and fencing. With these safety hazard mitigation measures*, the accident risk can be reduced to low levels. For more specific safety measures provided at the project's four grade crossing, see Appendix K.*

Monitoring and maintenance of at-grade protection would be undertaken by RT. LRT trains would be manually operated, with wayside signals (automated block signaling) and modern radio communications providing train operators current information on the status of system operations. Operators would be responsible for the safety of revenue train operation and be required to proceed at caution or stop the train in the event of an emergency, such as guideway obstructions (vehicles, pedestrians or other intrusions) or system failures. *The site distance of the crossings from an approaching train is also sufficient to allow the train operator enough* reaction time *to* stop or slow the train in *order to avoid collisions with guideway obstructions.*

LRT Passengers. Consistent with the existing transit operations, on-board the light rail vehicles (LRVs), operators would continue to have primary responsibility for the safety of passengers. Operators would be able to contact system administration or RT's emergency services for assistance, if needed, and modify train operations as appropriate. RT's roving fare inspectors and assigned city and county law enforcement personnel would also be available, either on-board trains or in station areas, to provide assistance in maintaining passenger safety and security. RT also publishes LRT safety brochures and makes safety presentations at schools, businesses and community facilities to educate the public regarding safe riding habits, and these publications and presentations would continue.

LRT and Freight Operations. LPAP2 LRT vehicles would operate on separate tracks but alongside UPRR freight service between Meadowview Road and Union House Creek. UPRR currently operates about *thirteen* freight trains per day on the freight tracks in the corridor, at speeds of a *maximum of* 40 miles per hour. Operations of LRT and freight trains in this corridor pose hazards for either mode in the event of train accidents (e.g., derailments) and for LRT passengers, primarily at crossings and station areas.

LRT trains would be operated on exclusive track and never on trackage also used by freight trains. To help avoid disruption of either freight or LRT service in the rare event of a derailment or other accident, a minimum 20 feet spacing (centerline of track to centerline of track) of adjacent LRT and freight tracks would be maintained. These shared corridor conditions are already in place in Sacramento. Since initiation of light rail service in September 2003, the Phase 1 South Line LRT shares the corridor with the UPRR from downtown Sacramento to Meadowview Road, a distance of approximately 6.2 miles. The LPAP2 would add about 1.4 miles of LRT in the shared use corridor, an increase of about 23 percent.

To evaluate the risk to LRT passengers, it is helpful to look at expected accident rates for derailments and train collisions, the two types of freight train accidents that would have the highest probability of affecting the LRT. Based on data developed for analyzing the accident increases expected for the Conrail acquisition in Washington, D.C.,[9] this increase in the length of the shared use corridor for Sacramento LRT–UPRR operations translates to a cumulative expected increase in freight train derailment frequency adjacent to the LRT of one accident every 380 years compared with one derailment every 465 years along the Phase 1 segment. Likewise for train collisions, the expected accident rate for the extended shared corridor would increase from one freight train collision every 2,000 years to one collision every 1,700 years. These increases are well below the level of significance usually considered for this type of event, i.e., one accident every 100 to 150 years. Consequently, the risks to LRT passengers from operating in the shared use corridor would be considered very minimal.

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[9] *Conrail Acquisition, Draft Environmental Impact Statement,* Surface Transportation Board, Washington, DC, December 1997, Table B-5 - Stratified Accident Rates for Mainlined Segments, p. B-12.

4.16.3 Safety of Children

In April 1997, President Clinton signed Executive Order (EO) 13045, requiring every public agency to ensure that its activities address disproportionate risks to children that result from environmental health risks or safety risks. EO 13045 defines "environmental health risks and safety risks" to mean risks to health and safety that are attributable to products or substances that the child is likely to come in contact with or ingest. Such substances include air, food, water, soil, and products that people use or to which they may be exposed.

The alternatives considered in this SFEIS/SFEIR were evaluated in terms of their potential to disproportionately expose children to environmental health risks and safety risks, as defined in EO 13045. A two-part methodology was employed. First it was ascertained whether the alternative was found to result in land use, safety and security, air quality, water, parklands, soil, or construction impacts, or any other impacts that could foreseeably affect environmental health and safety. The second step was to identify any evidence that such impacts would disproportionately affect children.

4.16.3.1 NO-ACTION ALTERNATIVE

The No-Action Alternative would contribute to continued highway congestion and resultant air and noise emissions; however, there is no evidence that these effects would result in disproportionate health or safety risks to children.

4.16.3.2 TSM ALTERNATIVE

Increased bus service associated with the TSM Alternative would have no adverse impacts to educational land uses, safety and security, parklands, or soil. Improved bus services would relieve traffic congestion and improve air quality. The TSM Alternative would therefore not expose children to environmental health or safety risks.

4.16.3.3 LPAP2

At grade vehicular crossings and associated pedestrian crosswalks were designed to meet all required design criteria of the CPUC and City of Sacramento. Appropriate active grade crossing warning systems, pavement delineation and signage are provided to meet those criteria. Preliminary engineering level plans are included in Appendix K detailing the proposed improvements.

Two bike/pedestrian paths are proposed in the project. One provides access to the Franklin Station from the end of Deer Lake Drive and the other provides access primarily to the Center Parkway Station (and also the Franklin Station). Both paths meet State of California standards for a Class 1 bike/pedestrian path and therefore will be twelve feet wide. For the first path this will consist of a standard eight foot paved travel way with a two foot earthen shoulder on each side. For the second path twelve foot paved path is to be provided.

The improvements proposed under the LPAP2 would result in no adverse impacts to educational land uses; safety and security; air quality; or soil. Minor impacts to water resources are expected as a result of stormwater runoff from the parking lots. Runoff impacts will be mitigated, as discussed in Section 4.9, to minimize any long-term effect on bodies of water. Thus, there would be no disproportionate health risks to children.

During construction of the LPAP2, mitigation measures would be employed to minimize the short-term construction impacts discussed in Section 5.2. Mitigation measures will assure safe pedestrian access around the construction sites, fencing of construction sites, reduction of construction dust and noise, and safe handling of any hazardous materials that may be encountered. In many cases, residential areas nearest the construction sites are located behind walls and/or across major roadways from the proposed LPAP2 LRT line and station sites, although there are areas in which back yards abut the railroad right-of-way. Construction fencing will help protect children from hazards associated with construction activity. Due to the physical separation between most land uses occupied by children and project construction, and the use of construction fencing, there is no reason to expect that children would be disproportionately affected by construction activities.

No impacts to child safety are expected during operations of the LPAP2. In most cases, residential areas would be separated from the right-of-way by walls, fences or roadways. At-grade rail crossings and station areas would be signalized and would comply with Public Utilities Commission regulations. These measures would be adequate to ensure the safety of children. Nonetheless, RT's safety and community outreach program is ongoing, including safety programs at schools. This safety program would be expected to identify any unanticipated safety issues for immediate resolution.

4.16.4 Mitigation Measures

The following mitigation measures will be taken by RT to ensure the safety and security of TSM or LPAP2 facilities, passengers and operations, and to avoid disruption of emergency services to local residents and businesses. These measures would be expected to avoid adverse safety and security effects of either alternative. With these measures, the proposed project alternatives would not disproportionately expose children to health or safety risks.

4.16.4.1 TSM ALTERNATIVE

TS-1 RT security services would be extended to the increased bus services.

4.16.4.2 LPAP2

During preliminary engineering for the LPAP2, RT has coordinated with security representatives from RT's internal security and the Sacramento City Fire Department to review appropriate security and emergency access provisions at the LRT stations. RT will also:

S-1 Continue to coordinate during final design with security representatives from RT's internal security and the Sacramento City Fire Department to review appropriate security and emergency access provisions at the LRT stations.

S-2 Increase security services and assigned law enforcement personnel for the LPAP2, consistent with its security practices.

S-3 Expand fire safety and emergency response training to include fire districts in the South Sacramento Corridor that will be responsible for providing these services.

S-4 Invite public participation regarding station design details during the final design phase of the project to identify and address safety and security concerns.

4.17 UTILITIES

This section identifies existing utilities within the project area, describes how the project alternatives would affect them and proposes mitigation measures as needed.

4.17.1 Setting

Underground and above-ground utilities exist along the LPAP2 alignment that may be affected by the LPAP2 Project. These utilities include electricity, sanitary sewer, storm drain, gas, oxygen, water and telephone. Facilities include a wide variety of pipes, inlets, manholes, conduits, poles, towers, suspended wires, detention basins and a sewer lift station. Table 4.17-1 summarizes the expected types of utilities and their respective owners. All known utilities along the LPAP2 are depicted on the strip maps of the LPAP2 in Chapter 2 (Figures 2.4-3 through 2.4-19).

4.17.2 Impacts

The types of improvements proposed under the TSM or LPAP2 alternatives do not create new demand for water supplies, stormwater or wastewater transport or treatment, or solid waste disposal capacity or facilities. The potential for impact is limited to physical disruption of existing utilities, the need for relocation of utilities prior to construction of new transportation facilities, or unanticipated interruptions in utility services.

4.17.2.1 TSM ALTERNATIVE

The new park-and-ride lot proposed under the TSM Alternative may require minor utility relocations or new utility services, potentially affecting existing and planned utilities. Affected utilities would be relocated only following consultation with their owners. It is anticipated that any required utility relocations could be managed with only short-term disruptions to utility service.

4.17.2.2 LIGHT RAIL TRANSIT ALTERNATIVE

Coordination with state and local utility providers has been extensive throughout the conceptual design phase of the project; see Section 8.4 for a detailed chronology of meetings with local stakeholders and interested parties, including utility service providers. Table 4.17-2 summarizes the utility modifications proposed or required to implement the LPAP2. Although the LAP2 LRT alignment was designed to reduce or minimize utility impacts, some impacts to underground and above-ground utilities would occur. Some utilities may be moved to the edges of the LRT right-of-way. Where space within the right-of-way is not available, some utilities would be relocated to easements in adjacent properties or parallel street rights-of-way. Underground gas, water, storm drain and sanitary sewer utilities crossing the trackway would be provided with additional protection including minimum depth of ground cover and possibly steel casings in accordance with state and federal pipeline safety laws.

of-way is constrained in its ability to accommodate relocation of this pipeline. Sufficient space does not exist on the westerly half of the right-of-way due to the proposed LPAP2 LRT facilities. The easterly half has other existing underground utilities that limit the available space for a relocated pipe line. In addition the possibility of a future new second UPRR track needs to be accommodated on the

easterly half, once again constraining available space. Due to these constraints, it is proposed to relocate the pipeline into the Detroit Boulevard right-of-way as generally shown in Figure 4-17.1.

Table 4.17-1: Utility Summary for LPAP2

Owner	Light Rail Transit Alternative
MCI	• Underground fiber-optic cables run parallel along the west side of the UPRR corridor.
US Sprint	• Underground fiber-optic cables run parallel along the east side of the UPRR corridor.
Pacific Bell	• Underground fiber-optic cables run parallel along the east side of the UPRR corridor south of Morrison Creek.
Sacramento Municipal Utility District (SMUD)	• 230kv overhead lines run parallel along the west side of the UPRR railroad corridor. • 69kv overhead lines run parallel to and cross the project alignment at several locations. • Underground electrical lines cross Cosumnes River Boulevard at Franklin Boulevard, Center Parkway and Bruceville Road. • A 20-inch underground natural gas line runs parallel along the east side of the UPRR railroad corridor. Smaller gas lines cross the proposed LPAP2 LRT alignments in the UPRR corridor, at Center Parkway and are present in the Bruceville Road corridor. • *Future 69kV line along the planned Cosumnes River Boulevard and light rail route east of the UPRR, heading east to connect to the 69kV line at the existing SMUD-Franklin Erhardt Substation Site.* • *Underground 12kV line along the east side of Bruceville Road.*
AT&T	• Underground fiber-optic cable crosses Bruceville Road. • Additional AT&T cables may be located within Pacific Bell conduits in the UPRR right-of-way.
Pacific Gas & Electric (PG&E)	• 115kv overhead lines run in the Bruceville Road corridor. • A 20 inch underground gas line parallel along the west side of the UPRR corridor.
Sacramento Regional County Sanitation District (SRCSD)	• Sewer lines pass under the proposed LPAP2 LRT alignment at various locations. • *The Center Parkway Station sits on top of two large sewer interceptor pipelines.*
County Sanitation District 1 (CSD-1)	• Two large sewer interceptor lines run adjacent to and cross under the LAP2 LRT alignment in the Cosumnes River Blvd. corridor. • A sewer line lift station, SO-25, at the northeast corner of Cosumnes River Boulevard and Center Parkway.
City of Sacramento	• Storm drain, sanitary sewer and water pipelines cross and parallel the proposed LPAP2 LRT alignment at various locations. • Detention basins are located near Franklin Boulevard and Center Parkway.

Table 4.17-2: Utility Modifications Proposed for the Light Rail Transit Alternative[1]

Utility Types	Owner (Where Known)	UPRR Corridor	Cosumnes River Blvd Corridor	Bruceville Road Corridor
Underground Fiber Optic Cable	MCI, Sprint, PacBell, AT&T	• No modifications required.	• Protect cables at Center Parkway	• Protect cables at College entrance
Underground Gas Lines	PG&E, SMUD	• Relocate PG&E 20" gas line in UPRR corridor to Detroit Blvd. corridor. • Protect pipes at crossings as required.	• Protect pipes at crossings as required.	• Coordinate relocation and protection with road widening project
Overhead Electrical Lines	SMUD, PG&E	• Provide protective foundation collars around SMUD 230kV tower foundations. • Raise SMUD and PG&E local distribution lines wire heights as required at crossings	• Raise SMUD 69kV wires at optional Franklin Blvd flyover	• Possible relocation of line and/or replacement of lattice towers with tubular poles for PG&E 115kV line conflicts.
Underground Electrical Lines	SMUD	• N/A	• Protect crossings at Franklin Blvd and Center Parkway	• N/A
Overhead Telephone Lines	PacBell	• No relocations expected • Raise wires at crossings as required.	• No relocations expected • Raise wire height at crossings as required.	• No relocations expected • Raise wires at crossings as required.
Underground Sanitary Sewers	SRCSD, City of Sacramento	• *No relocations expected.*	• *Protect SRCSD facilities, including pipes, manholes and other facilities as required.* • *Provide all weather maintenance access for crews and vehicles to manholes, structures, etc. at Center Parkway Station.*	• N/A
Underground Sanitary Interceptors	CSD-1	• N/A	• No relocations expected • Provide maintenance access to manhole vaults • Provide protection of pipes at crossings as required.	• N/A
Underground Oxygen Line	CSD-1	• N/A	• No relocations expected • Protect pipe as required.	• N/A
Underground Water Lines	City of Sacramento	• Protect pipes at crossing as required.	• Protect pipes at crossings as required.	• Protect pipes at crossings as required.
Storm Drains, Culverts, Detention Ponds	City of Sacramento	• Extend culverts.	• Reconfigure detention pond near Franklin Blvd. • Relocate pipes, inlets and vaults as required.	• Relocate pipes and inlets • Coordinate with road widening

[1] Modifications identified are based on conceptual engineering. Specific treatments to be determined in preliminary and final engineering phases.

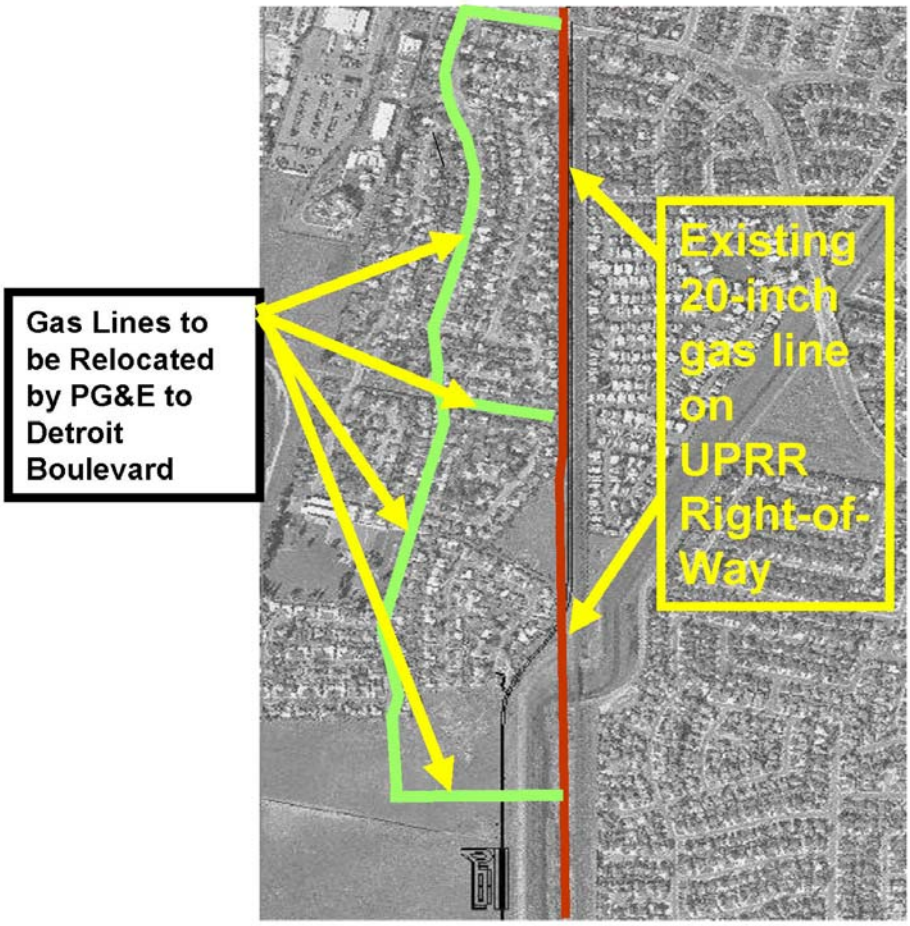


Figure 4.17-1. Proposed Gas Line Relocation

PG&E's 20" gas pipeline, located in an easement in the western half of the UPRR right-of-way, would require relocation out of the UPRR Corridor. The current pipeline is located under the proposed LPAP2 LRT alignments/embankment from Meadowview Road to just north of Morrison Creek. To maintain access to this pipeline, it will need to be relocated out from under the LRT. The UPRR right-

The relocation of the pipe line would begin in the existing Meadowview Station where it would head west along the south edge of the station property. It would then cross Meadowview Road at the intersection of Detroit Avenue and head south in Detroit Boulevard. The pipeline would be in the street and follow Detroit Boulevard until it current terminus at the Stone-Boswell property. The pipeline would then exit the Detroit Boulevard right-of-way and turn east into a new easement where it would proceed easterly until its reconnection with the existing pipeline alignment in the Union Pacific right of way.

Relocation of the 20" pipe line into Detroit Boulevard will also require the extension and reconnection of an existing 10" gas pipeline that ties into the existing 20" pipeline in the Union Pacific right-of-way approximately midway between Meadowview Road and Morrison Creek. It is proposed to extend this 10" pipeline directly to the west to reconnect with the new 20" pipeline alignment in Detroit Boulevard. This would require new easements through 10 parcels of private property. Currently PG&E has easements across these parcels for an overhead electrical transmission line. The new

easements for the 10" pipeline would be procured on behalf of PG&E and would be in addition to the existing electrical line easements.

Construction of the relocated pipeline would take approximately six to eight weeks, and would progress on a block by block basis in the street. An individual block would be affected by construction for a few days.

4.17.3 Design Requirements and RT Practices

Planning and continued coordination with utility providers during the preliminary engineering and final design stages of the project would be necessary to minimize or eliminate interruption in utility service to customers. This would include submitting a set of detailed plans for the RT project to utility providers for their use in preparing their utility relocation plans.

The close coordination that has characterized RT's relations with local utility providers throughout the preliminary engineering phase will continue during the final design, and construction stages of the LPAP2 to identify any potential conflicts and formulate strategies to overcome potential problems. If interruptions of utility service are required, they would be restricted in time duration and geographic extent. Careful scheduling of these disruptions and advance notification to occupants of the adjacent properties that would be affected by temporary service interruptions would help to avoid any critical service periods. These practices would fully address the potential impact.

4.17.4 Mitigation Measures

No mitigation would be needed.

4.18 SECTION 4(f)

This Section is no longer applicable. The adopted design options for the LPAP2 will not use 4(f) properties.

4.19 CUMULATIVE IMPACTS

4.19.1 Regulatory Context

NEPA defines cumulative impact as the impact on the environment that results from the incremental impact of the project action when added to other past, present, and reasonably foreseeable future actions, regardless of what agency or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time. NEPA provides the context and carries the mandate to analyze the cumulative impacts of federal actions. The purpose of cumulative impacts analysis is to ensure that federal decisions consider the full range of consequences of actions.

CEQA defines cumulative impacts as "two or more individual effects which, when considered together are considerable," and suggests that cumulative impacts may "result from individually minor but collectively significant projects taking place over a period of time" (State CEQA Guidelines Section 15355). The CEQA Guidelines suggest two alternative methods for assessing potential cumulative impacts. The first is a list-based approach that considers past, present, and reasonably foreseeable future projects that may produce related or cumulative impacts. The second uses a summary of land

use, population and employment projections contained in an adopted general plan or related planning document that is designed to evaluate regional or areawide conditions. Both approaches are applied to the present project.

Because the regional plan is typically based upon more specific local planning projects, the "projections approach" incorporates all such locally programmed projects. Also, this approach is particularly appropriate to transportation projects because it takes into account all of the future travel demand that would be generated by the anticipated land use and employment changes. FTA guidelines require that regional growth projections from the metropolitan planning organization be used as input for the assumed future year conditions. The projections approach is ideally-suited to address regional transportation, land use and population impacts. Section 4.19.2 discusses the potential for cumulative impacts related to environmental issues that are addressed through the areawide model.

A list-based approach is used to address issues "on the ground" that relate to the proposed project footprint. These issues are discussed in Section 4.19.4, Impacts Related to Right of Way Requirements. The list-based cumulative impacts evaluation takes into consideration the related projects described in Section 2.9, Related Projects, which are as follows:

- Sacramento Light Rail South Line Phase 1 *– Project completed*
- South Sacramento County Streams Project *– Morrison Creek portion nearly completed*
- Cosumnes River Boulevard Extension
- Cosumnes River Boulevard Widening
- Bruceville Road Widening *– Project Completed*
- Freeport Regional Water (Diversion) Project *– Currently under construction*
- College Square Market Place (Private Developer) *– Northern portion completed*
- Monterey Trail High School/Edward Harris Jr. Middle School (Elk Grove Unified School District) *– Project completed*
- Shasta Park Site at Bruceville Road and Shasta Avenue
- Transit for Livable Communities

4.19.2 Issues That Are Addressed Cumulatively Through the Areawide Land Use and Transportation Model

The primary travel forecasting tool for the South Sacramento Corridor Phase 2 Project was the Sacramento Metropolitan Travel Demand Model or "SACMET" model. This model was used for development of the *2006* Metropolitan Transportation Plan (MTP) for *2027*, and for regional air quality conformity analyses. Inputs to this model included local government projections of future land use and employment intensities and location, as modified and adopted by SACOG, along with programmed highway, street, and transit improvements as identified by SACOG, its member jurisdictions, and RT, for the Year *2027*. The demographic forecasts used for the SACMET travel forecasts will be those adopted by SACOG for use in the MTP for *2027*. If a proposed project is sufficiently programmed to be "reasonably foreseeable," it is included in the adopted regional forecast. Otherwise, a proposed project is considered to be beyond the project forecasting horizon.

Because the impact analyses in this SFEIS/SFEIR are based upon the adopted regional land use forecasts for the year *2030*, the land use and transportation impacts of all such developments are included, cumulatively, and additional analysis of potential cumulative impacts of specific development projects is redundant. This cumulative assessment encompasses the transportation, air

quality, land use, noise, and socioeconomic (population, housing, and employment) impacts of all of the projects included in the regional forecasts, as reported in Chapter 3 and Sections 4.3, 4.10, 4.12, and 4.13 of Chapter 4 this document. Separate discussion of the cumulative noise effects of the LPAP2 in combination with the CRB extension and widening projects is provided in section 4.12, since these projects would concentrate noise impacts in specific locations similar to development impacts "on the ground." Either the TSM or LPAP2 Alternative would facilitate planned regional transportation and development projects and reduce its air quality and transportation impacts while increasing transportation system carrying capacity.

4.19.3 Noise

Cumulative noise effects of the listed related projects are generally addressed by basing the impacts analyses in this SFEIS/SFEIR on adopted regional land use and employment forecasts to the year *2030*, which include development and transportation impacts on areawide noise. The Cosumnes River Boulevard segment of the proposed LPAP2 would experience increased localized noise impacts, however, from the added traffic of the Cosumnes River Boulevard Extension and Widening projects. The present document presents noise impacts analysis and recommended mitigation measures for these cumulative "worst case" noise impacts; see Section 4.12.4, Noise Impacts, and Section 4.12.7, Mitigation Measures. *Section 4.12.9, Cumulative Impacts, summarizes potential cumulative noise impacts from the proposed project and its directly related projects.*

To the extent necessary, RT anticipates that it would share costs with the City of Sacramento to provide the additional length and height of sound barriers that would be needed to address the combined noise impacts. *The timing of the CRB widening plan is still uncertain, so this document reviews the impacts and mitigation for the LPAP2 project without the widening as well as the cumulative impacts of the two projects. In its comment letter regarding the SFDEIS/SFDEIR, the City notes that it cannot determine the appropriate noise mitigation for the CRB widening until and EIR is complete for that project. For the LPAP2, RT is mitigating the LRT portion of the cumulative noise impacts along Cosumnes River Boulevard (as currently identified) and will await the City's environmental review to determine if different noise mitigation should be pursued along this roadway. Mitigation measures included in the LPAP2 project would mitigate the impacts of the light rail to below FTA and RT's more stringent criteria levels.*

Should the CRB project move forward into the environmental assessment and preliminary design stages before the LRT project is finalized, it may be feasible to coordinate the noise mitigation measures. For example, the existing wall along the south side of CRB ranges from 4 ft high near Center Parkway to 9 ft high near Franklin Boulevard. It is likely that mitigating noise impact from the CRB extension would require increasing the wall height to at least 9 ft for the entire extent between Franklin Boulevard and Center Parkway. This could reduce the need for a sound wall along the south boundary of the LRT right of way.

If these mitigation measures are provided, no substantially adverse cumulative noise impact would result. The project's cost estimates include the full cost of noise mitigation measures.

4.19.4 Impacts Related to Right-of-Way Requirements

Impact issues that may contribute to cumulative impacts with other projects are described in the following paragraphs.

4.19.4.1 FLOODPLAINS

The two cumulative impact issues for floodplains are: (1) increase in permeable surfaces due to paving and other construction that would increase runoff and flood hazard and (2) facilitation or promotion of development within the floodplain that would expose more of the built environment and people to flood hazards.

The Freeport Regional Water (Diversion) Project will not increase permeable surfaces or facilitate development of floodplains, and therefore will not generate cumulative floodplain impacts. The proposed project facility will be constructed during a limited construction period, incorporate design measures to control erosion and construction will be located on the river side of an existing levee to limit flooding in the Sacramento River. Pipeline construction for stream and river floodplains are designed and scheduled to ensure that the potential for increased flooding during construction is avoided or minimized. During construction of the new dam, the Pardee Reservoir would remain operational and flood storage would be increased to minimize increased flooding.

The construction of the other related projects identified above would increase permeable surfaces beyond the approximately 54.4 acres of LRT facilities proposed as part of the LPAP2 project. Specifically, the CRB Extension and Widening could contribute to increases in runoff volumes and flooding through the construction of impervious surfaces. In addition, the CRB Extension and Widening could require the displacement of a 100-year flood storage volume with the installation of bridge support columns over Morrison Creek, which could potentially cause an increase flood hazards and displacement of flood storage capacity. The South Sacramento County Streams Project being developed by the Army Corps of Engineers (ACOE) and the Sacramento Area Flood Control Agency (SAFCA) will offset the cumulative increase in impermeable surface and flood risk by reducing the flooding hazard in the general area through improved drainage and flood protection.

With respect to the second issue, the proposed project would have a beneficial impact by promoting more concentrated development in the South Sacramento area. The footprint of development would be reduced by planned development, which is expected to be more focused around the LRT stations, particularly for the Morrison Creek and CRC Station areas. This will occur as RT continues to work with local government planners and developers to encourage transit oriented development around stations (See Section 4.10.4.1, Land Use Impacts at Proposed LPAP2 LRT Station Locations).

Station areas identified for development would not be located within the 100 year floodplain. Specifically, with the development of the South Sacramento County Streams Project (SSCSP), the Morrison Creek Station area and the developable area to the west would not be within the 100-year floodplain. The area surrounding the CRC Station is not in the 100-year floodplain, either before or after implementation of the SSCSP. For the station area that would be located in the floodplain, namely the Franklin Station, no development is anticipated given that this area is within the "Sanitation District B Bufferlands. Thus the LPAP2 Project would not contribute to cumulative development in the floodplain in comparison to the No-Action Alternative.

4.19.4.2 RELOCATIONS

The primary issue is whether the combined impact of residential and non-residential displacements, resulting from the present project combined with those of the related projects, will cumulatively strain the relocation resources of the area. The Freeport Regional Water (Diversion) Project, South Sacramento County Streams Project, and the Cosumnes River Boulevard Extension and Widening Project would not require displacement of residences or businesses. The Freeport Regional Water (Diversion) Project would mandate the relocation of utilities, the Pardee Recreation Area, roads and bridges (including the State Route 49 bridge), Pardee Dam Road, and Stony Creek Road. The relocation of the Pardee recreation and boating facilities would be completed before other project work related to the Freeport Regional Water (Diversion) Project to avoid interference with construction activities

Given that the proposed project alternatives would displace two residences for the LPAP2 and one residence for the optional pedestrian overcrossing over CRB) and no businesses; that the housing market in South Sacramento is expanding; and that the other related projects appear to use reserved right-of-way corridors or undeveloped areas that do not include residences or businesses, the combined impact does not appear to be at a level to place strain on local relocation resources. The South Sacramento Corridor Phase 1 LRT involved acquisition of 63 parcels, with relocation of 12 residential and 12 businesses that was successfully completed over five years ago. LPAP2 relocations will therefore not contribute to future cumulative demand for relocation resources for the LPAP2.

4.19.4.3 BIOLOGICAL RESOURCES

Loss of jurisdictional wetlands under the LPAP2 would be 0.3*11* acres. These impacts include the loss of 0.*99* acres of seasonal wetlands that provide suitable habitat for four vernal pool crustaceans. Up to 0.*46* acres of suitable habitat for giant garter snake and 0.*34* to *66.85* acres of nesting/foraging habitat for 13 special-status birds would be required.

Of the related projects, the South Sacramento Corridor Phase 1 LRT project resulted in loss of up to 2.03 acres of vernal pools, 0.011 acres of freshwater emergent wetlands, 0.21 acres of seasonal ponded depressions, and associated habitat for vernal pool crustaceans. The SSCSP could also potentially affect jurisdictional wetlands and habitat for special-status species. The cumulative impact of these projects on jurisdictional wetlands would be less than one acre. Cumulative impacts to vernal pools and seasonal wetlands that provide suitable habitat for vernal pool crustaceans would be slightly over two acres.

The CRB Extension would result in approximately .81 to .97 acres of wetlands, depending on the selected alternative. The proposed project could potentially affect up to 16 acres of grassland habitat, including 12 mature cottonwood and 10 willow trees, which provide habitat for nesting and migratory birds. Relocation of the SMUD Pipeline could temporarily disturb an additional 11.2 acres of Swainson's hawk foraging habitat. Potential indirect effects on vernal pool invertebrates, such as pool fairy shrimp, mid-valley fairy shrimp, California linderiella and vernal pool tadpole shrimp, could result because of increased sedimentation from soil erosion or hazardous material leakage. Additional species that may be impacted by the loss of wetlands include the giant garter snake, northwestern pond turtles, double-crested cormorant, white-faced ibis, white-tailed kite, northern harrier, Cooper's hawk, western burrowing owl, loggerhead shrike and the tricolored blackbird.

The Freeport Regional Water (Diversion) Project will result in the loss of sensitive resources including wetlands and riparian woodlands. These impacts include the loss of approximately 0.2 to 0.3 acres of seasonal wetlands and four to seven acres of perennial wetlands, depending on the alternative selected. These wetland areas serve as habitats for the Swainson's hawk, San Joaquin Pocket Mouse, bald eagles, anthicid beetle, Sacramento valley tiger beetle, valley elderberry longhorn beetle, nesting cliff swallows and the roosting bat species.

South Sacramento County Streams Project will potentially affect approximately 63.91 acres of wetlands and 74.41 acres of upland habitat. The project could have direct and indirect impacts on the habitats of the giant garter snake, valley elderberry longhorn beetle, vernal pool invertebrates and nesting birds of prey including the white tailed kite, Swainson's hawk, burrowing owl and other protected raptors. Direct and indirect impacts could also affect special-status plan species, including the Suisun marsh aster, rose mallow, Delta tule pea, Sanford's arrowhead and the blue skullcap.

The above projects will result in cumulative wetlands impacts, which will result in indirect and direct impacts to various plant and animal species, such as the Swainson's hawk, giant garter snake and vernal pool invertebrates. Compensation measures would be implemented by each project to ensure no net loss of wetlands, provide for replacement habitat, and to ensure no harm to the species; therefore, there is no unmitigated cumulative impact. Implementation of mitigation measures would be subject to approval by the USFWS, ACOE, and CDFG.

4.19.4.4 AGRICULTURAL RESOURCES

Impacts of the LPAP2 to agricultural resources would be approximately 5.6 acres. Of the related projects, CRBE and Shasta Park Site also appear to have potential for impact to agricultural resources. These projects are estimated to take on the order of 75 to 100 acres of agricultural lands. The South Sacramento County Streams Project requires the conversion of 9.7 acres of economically viable prime, unique and of statewide importance farmland, which can not be fully mitigated and is an unavoidable project impact. The construction of the Freeport Regional Water (Diversion) Project could affect prime farmland and farmland of statewide importance, resulting in a permanent loss of approximately 12 to 33 acres in the 80-foot-wide operations corridors and a temporary loss of about 7–30.5 acres in the 50-footwide construction corridors.

In compliance with the Farmland Protection Policy Act, acquisition of farmland would be subject to review by the NRCS for its determination of whether the agricultural property that would be acquired is farmland subject to the Act, whether the proposed takes involve prime farmlands or farmlands of statewide importance, and whether the project proponents need to consider avoidance alternatives. Some of the above projects would also be subject to review by the County of Sacramento, which has adopted regulations to preserve agricultural lands. Construction-phase preventive measures would be implemented by each project to avoid harm to the resources.

4.19.4.5 HAZARDOUS WASTE

The LPAP2 would have the potential to encounter hazardous waste at two sites. There is no specific information available on the exposure of the related projects. Temporary impacts from storage, use and transportation of hazardous material may also result from the Freeport Regional Water (Diversion) Project, South Sacramento County Streams Project and the Cosumnes River Boulevard Extension and Widening Project. The South Sacramento County Streams Project may include exposure to contaminated soil and/or groundwater due to the presence of pesticide residue in the soil, historical railroad alignments, and utilities near treatment plants near the project area. The CRB Extension Project may have a higher potential of exposure to hazardous waste materials due to the

accommodation and relocation of the existing SMUD facilities and the potential for aerially deposited lead (ADL), polychlorinated biphenyls (PCBs) in transformers and heavy metals.

Sampling and testing of identified areas will be conducted, as required, for some of the above projects. Worker health and safety plans implemented during construction for all projects should ensure, however, that there will be no harmful exposure to humans or the environment from hazardous materials and waste. Thus there would be no cumulative impact.

4.19.4.6 OTHER IMPACTS

For cultural resources, the proposed project would have no impact. For geology and soils and water quality, the alternatives would have no impact after application of design requirements and best practices. For public services and facilities and parks and recreation, there would be beneficial impacts. In the absence of specific information on the related projects, these impacts are not considered further for contribution to cumulative impacts.

4.19.5 Phase 3

Given that the mode (e.g., LRT vs. BRT) and alignment (e.g., Bruceville Road vs. Cotton Lane) for Phase 3 will be the subject of a future alternatives analysis and environmental evaluation, the impacts of Phase 3 are not reasonable foreseeable at this point. Cumulative impacts of LPAP2 and Phase 3 cannot be defined at this point, therefore.

4.*20* IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES

The No-Action Alternative would not directly involve the use of resources, except insofar as it would include planned and programmed capital improvements, which require money, materials, and labor to construct. The TSM Alternative and the LPAP2 would also include capital improvements, which would require money, materials, and labor. If construction cost is a general indicator of the magnitude of resources required for each alternative, then the resources required for the LPAP2 (approximately $*270* million in YOE) is approximately $*216* million more than the estimated TSM Alternative costs and approximately $*270* million more than the No-Action alternative.

The LPAP2 would also require an irretrievable conversion of *5.6* acres of farmland and use of 0.34 acres of jurisdictional wetlands. There would be permanent impacts to 0.14 acres of seasonal wetlands that provide suitable habitat for four vernal pool crustaceans. Up to 0.04 acre of suitable habitat for giant garter snake and 0.70 to 63.34 acres of nesting/foraging habitat for 13 special-status bird species would be used by the LPAP2. These uses would not result in jeopardy to the survival of any of the species affected. Compensation measures to be specified in consultation with the resource agencies would ensure no net loss of wetlands, provide for replacement habitat, and ensure implementation of measures to minimize harm to the species.

Because the LPAP2 and the TSM Alternative would reduce vehicle miles of travel within the region when compared to the No-Action Alternative, they would also reduce the level of vehicular fossil fuel consumption, with a greater reduction anticipated from the LPAP2. Operation of the light rail transit service on the LRT alignment would require the use of electricity for power and would have greater propulsion energy requirements than the No-Action and the TSM Alternatives, although the LPAP2 is expected to carry more passengers than the TSM Alternative.

4.21 RELATIONSHIP BETWEEN LOCAL SHORT-TERM USES OF THE ENVIRONMENT AND THE MAINTENANCE AND ENHANCEMENT OF LONG-TERM PRODUCTIVITY

The No-Action Alternative would not involve a short-term use of the environment but would allow long-term conditions, such as increased congestion on roadways in the South Sacramento Corridor, to worsen, affecting buses as well as automobiles.

The TSM Alternative would involve limited short-term use of the environment during the construction of the PNR lot through the use of fuel and construction materials and increases in noise and air emissions. By supporting bus service within the South Sacramento Corridor, however, the TSM Alternative would enhance transit access and long-term productivity of area residents.

The LPAP2 would involve short-term uses of the environment during the construction period through the use of fuel and construction materials, increases in noise levels and air pollutants, and increases in traffic congestion and detours around construction sites. These short-term effects and uses of resources would result in long-term benefits such as improved access to the retail and employment centers and community facilities served by the project. Improved access would be realized by transit-dependent populations, corridor workers and corridor residents seeking to avail themselves of employment, retail, entertainment and recreation opportunities throughout the greater Sacramento area. Improved access, when combined with a decrease in vehicle miles of travel on the regional highway network, improved air quality, and reduced energy consumption, would contribute to the long-term livability and productivity of the Sacramento region.

CHAPTER 5: CONSTRUCTION PHASE EFFECTS

5.1 OVERVIEW OF CONSTRUCTION ACTIVITY REQUIREMENTS

This section identifies the anticipated sequence, schedule, and methodology of construction for the TSM and LPAP2 alternatives. While the contractor would have a certain degree of freedom to plan construction activities and select methodologies, RT will specify in the construction contracts, that the contractor use sequences, schedules, and construction methods that are not detrimental to the surrounding community. Nighttime construction would occur only for those activities involving street closures required to accommodate construction of trackways crossing roadways.

5.1.1 TSM Alternative

As part of the TSM Alternative, a PNR lot at Cosumnes River College would be constructed. Construction would require approximately six months. Construction would occur during normal weekday daytime shifts. Improvements would include grading, asphalt pavements; concrete walkways, curbs and gutters; storm drainage system; traffic signal modifications; and landscaping and area lighting. Equipment used for construction would include scrapers, bull dozers, front end loaders, backhoes, graders, paving machines, water trucks, earth compactors, small crane, concrete trucks and concrete pumpers. Large and small trucks would import and export material to and from the sites.

5.1.2 LPAP2

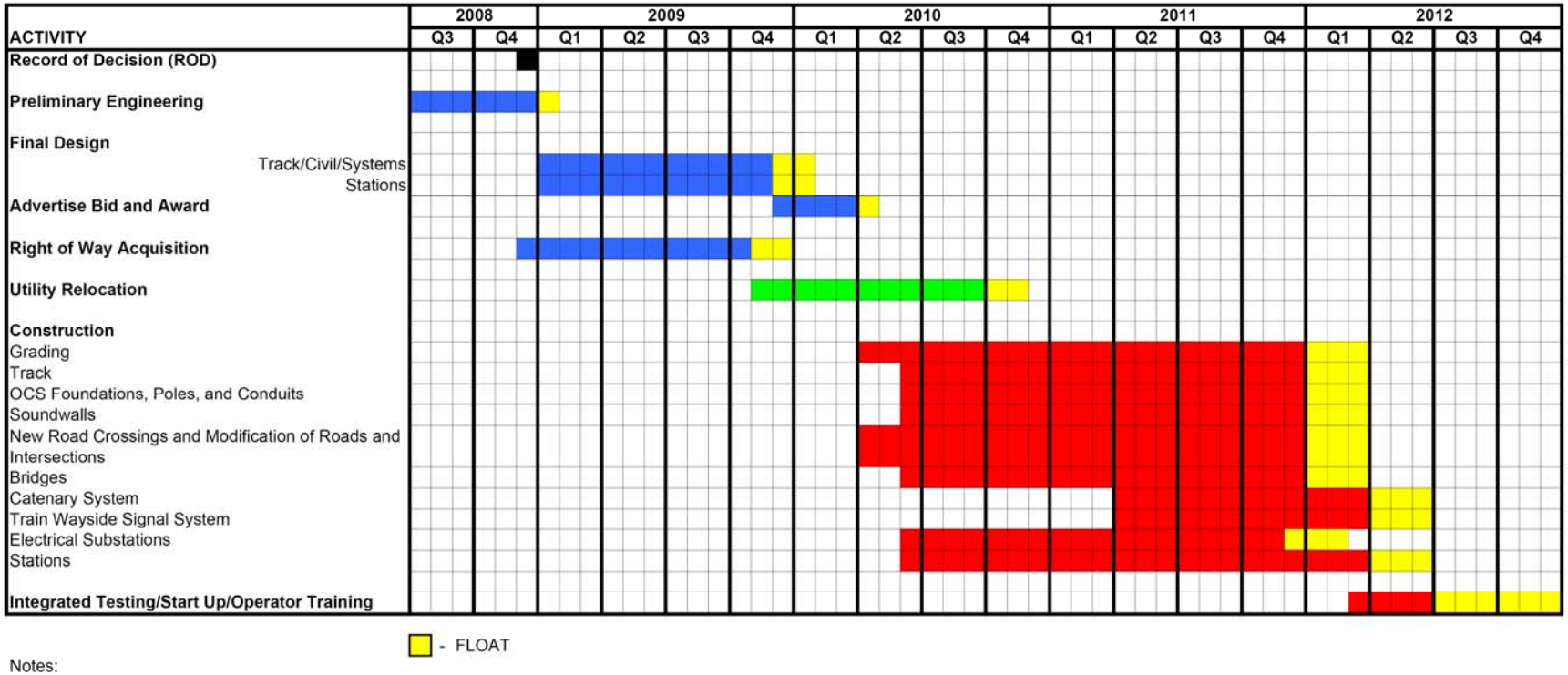
Construction of the LPAP2 would require approximately two to three years and would be phased as indicated in Figure 5.1-1.

5.1.2.1 UTILITY RELOCATION AND PROTECTION

Utility relocations and protection to be performed by the utility companies could start as soon as approximately six months before construction begins by RT's contractor. Utility relocations by utility companies would continue while RT's contractor begins grading in the areas in which utility relocations have been completed. Utility relocations would be completed approximately six to nine months after RT's contractor begins construction.

To facilitate maximum flexibility of construction operations by RT's contractor, utility relocation work is preferably done prior to any other construction. Water supply and sewer relocations would usually be performed by RT's contractor. Relocation of gas, electricity, communications and other selected utilities is usually performed by the respective owners or their contractors.

Figure 5.1-1: Project Design and Construction Schedule – South Sacramento Corridor Phase 2 Project



Notes:
1. The schedule assumes that construction can begin while utility relocations are ongoing. Many areas of the project are constructed in areas where there are no utilities to be relocated. Therefore it is assumed the Division 1 Specifications will provide required staging for the contractor to first work in area without utility relocations.

Equipment for utility work consists of trenching machines, small earth moving machines such as backhoes and front end loaders, earth compactors, dump trucks, specialized equipment for laying pipe or conduit, and cranes in cases where overhead electrical pole lines are being relocated or replaced. Where construction work occurs in roadways, the existing pavement would be sawcut, and trenches excavated with backhoes. Trenches would need to be shored, possibly by using temporary trench shields or by driving sheet piling. Utility relocation and protection work in roadways would be staged to minimize or eliminate impacts to the traveling public and may involve occasional night and weekend work to mitigate these impacts. In the case of night work portable lighting and a generator would be required.

5.1.2.2 LPAP2 CIVIL AND STRUCTURAL

This work would include the following items:

- Site preparation to include clearing, grubbing and grading of the area for the LPAP2 LRT trackway, stations and electrical substations pads.
- Track roadbed construction, including trackway underdrain system and geotextile fabric.
- Drainage improvements to include swales and pipes.
- Underground conduits and duct banks for LRT systems improvements.
- Foundations for catenary poles and wayside signals.
- Concrete slabs for station platforms and electrical substations pads.
- Bridges, retaining walls, and soundwalls.

Grading, track roadbed construction and foundations for overhead catenary system poles would most likely proceed linearly from one end of the project to the other end. Track construction would follow behind completed grading operations. Grading and track roadbed construction would take about one and half to two years. Water trucks would periodically spread water during grading operations to control dust. Foundations for the overhead catenary system poles would be constructed along with grading as would construction of drainage improvements, underground conduits and duct banks, retaining walls and sound walls.

Construction of road crossings and modification of adjacent roadways/intersections would be concurrent with the progression of grading operations. As required to minimize or eliminate impacts on the traveling public construction may take place at night or on weekends.

Civil work would be performed with equipment such as scrapers, graders, bulldozers, front end loaders, backhoes, earth compactors, paving machines, small crane and water trucks. Excavated material or fill material would be moved by dump trucks.

Bridge structures can be constructed independently from other ongoing work. Work can begin after relocation of utilities is complete in the structure's area. The time required to construct each structure would vary depending on its size and complexity. Relatively short structures such as the Morrison Creek Bridge could be constructed in approximately six months, while the longer and more complex bridge spanning Morrison Creek, Union Pacific Railroad and Union House Creek would require approximately nine months to a one year.

Structures work would be performed with equipment such as auger drilling rigs, cranes, backhoes, front end loaders, excavators, and earth compactors. Concrete for structures would be delivered by concrete truck mixers and placed with concrete pumps. Falsework and other materials required for the construction of structures would be handled by trucks.

LRT civil and structures except as noted otherwise would occur during normal weekday shifts during daylight hours to minimize impacts.

Street closures for several hours at a time may be needed to install and remove falsework over local streets *for the CRB flyover and* LPAP2 optional LRT grade separation structures are constructed at Meadowview Road *or* Franklin Avenue. These temporary closures may occur at night or on weekends to minimize or eliminate impacts to the traveling public.

5.1.2.3 TRACK

Track construction would follow grading operations and construction of the track roadbed. Track construction would take about 1 to 1 1/2 years. It would follow closely behind completion of grading and track roadbed construction. Together grading, track roadbed and track construction would take approximately 1½ to 2 years.

Track construction involves placing rails, ties, rail fasteners, ballast, rail hardware and special trackwork. Specialized equipment is used, such as track liners, ballast tampers, ballast regulators and rail grinders. Track construction would include new grade crossings, which would involve limited partial or complete closure of individual streets. Closure of streets may occur during nights or on weekends to minimize or eliminate impacts to the traveling public. Rail is usually delivered from steel mills in 78-foot-long lengths by rail cars. The rails are then welded into strings about 0.25-mile long at a rail welding location. To take advantage of delivery of rail on the Union Pacific tracks the welding location will need to be along the UPRR corridor. Likely potential sites would include in the vicinity of the Meadowview Station or just north of Morrison Creek. Another option would be if the contractor chose to take delivery via truck. They could then set up their welding location at a proposed station PNR lot.

The welded strings are moved to their final installation locations via completed sections of track using rail mounted rolling supports (rail buggies). Special welding equipment is used to field-weld the strings together. Ballast is usually delivered to the site by dump trucks and rail cars. Cross ties are usually delivered by truck and set in place with a rubber-tired front end loader or similar equipment. After the track structure is assembled it is adjusted to its final alignment with special rail-mounted equipment (liner and tamper) that aligns the track and tamps (consolidates) the ballast. A track mounted rail grinder would then make a pass on the rails to clean them of minor corrosion. Welding of rail into strings and track construction would occur during normal weekday shifts during daylight hours to minimize any impacts.

5.1.2.4 LPAP2 LRT SYSTEMS

LPAP2 LRT systems work includes traction power system, overhead catenary system, wayside signaling, communication lines and grade crossing warning devices. Construction of traction power electrical substations would be constructed independent of track construction but would be concurrent with track construction. The portions of the systems that are installed underground in conduits would be constructed prior to construction of the track on the completed roadbed. After an initial length of track construction is completed, construction of the overhead portion of the system elements to include catenary system (poles and wires), overhead signal system wires and overhead communication lines would begin and would follow close behind. Track-mounted equipment is used to set the poles and string the various systems overhead lines. Construction of the systems work would be completed a couple of months after completion of the rough track construction, but ahead of final track surfacing.

Typically grading for the traction power electrical substations and construction of the substation concrete foundation pads is performed at the time of grading for the trackway. The setting of the

premanufactured substation units then occurs independently of other ongoing work and is completed ahead of, or at the same time as, the overhead catenary system.

Street closures for several hours at a time may be needed to install wires over streets at grade crossings. Temporary traffic control may also be required at existing signalized intersections to facilitate connection of grade crossing warning device pre-emption to the existing traffic signal system. This work could be done at night or on weekends to minimize impacts to the traveling public.

Overhead catenary system, signal system, and SCADA system would use trackmounted trucks and small cranes to erect poles and attach hangers and wires. Wayside signal construction would also involve placing small prefabricated signal bungalows in selected locations. Grade crossing warning devices and signal bungalows would be erected with small rubber-tired cranes. Installation of grade crossing warning devices could occur at night or on weekends to minimize or eliminate impacts to the traveling public.

Construction of LRT Systems facilities would occur during normal weekday shifts during daylight hours to minimize any impacts except as noted above.

5.1.2.5 DEMOLITION

This work would consist of removing existing site improvements. Relatively little demolition work would be associated with this project. Depending on whether the optional Center Parkway pedestrian overcrossing is built, one residential wooden-framed building may be removed. Demolition is usually performed by bulldozers, excavators, front end loaders and other relatively light equipment. No heavy wrecking equipment is anticipated. Dump trucks would be used to haul away the debris. Demolition would occur during normal weekday shifts during daylight hours to minimize any impacts.

5.1.2.6 STATIONS

The LPAP2 includes construction of park and ride lots at the Morrison Creek *and* Franklin Boulevard *stations* and *a parking garage at the* CRC station. A station at Center Parkway is proposed without a park and ride lot. An optional satellite parking facility would be constructed at the Calvine/Auberry site. Other than the concrete platforms stations can be constructed independently of trackway grading and track construction operations. Platforms and their amenities would be constructed after construction of the track. Station construction work could begin after utility relocations are completed in the station areas. The stations are distant enough from each other that simultaneous construction of stations would not introduce severe cumulative impacts. Multiple stations could be constructed at the same time as preferred by the contractor. Each station can be constructed in approximately one year or less, depending on the size and complexity.

Earthwork would be done with equipment such as scrapers, graders, bulldozers, front end loaders. Paving would be done with paving machines and compaction equipment. Trucks would import and export materials to the sites. Drainage and utility construction would involve trenching with backhoes, placing pipes, and backfilling with front end loaders. The parking lot construction would be done independent of the trackway and track construction, but scheduled to be completed near the same time as the LRT systems work.

Station landscaping would consist of planting plus some hardscape construction and installation of underground pipes for water supply and irrigation controllers at each station site. Landscaping would be installed after the completion of the station platform and parking lot improvements. The work is manual labor intensive; no heavy equipment would be used. Trucks would be used to import material.

Construction of station improvements would occur during normal weekday shifts during daylight hours to minimize any impacts.

5.1.2.7 CONSTRUCTION STAGING AREAS

Table 5.1-1 shows the staging areas that will be made available to the contractor(s) for use during constructio. The total areas of these staging areas provide more available space than other recent similar LRT extension projects (i.e., the Folsom Extension and South Corridor Phase 1 Project). The staging areas for those projects consisted primarily of one station site for each -- Sunrise Station (4.2 acres) and Florin Station (13.4 acres) respectively.

Table 5.1-1: LPAP2 Staging Areas	
Triangular site made up of UPRR parcels to be acquired between Stations 375+00 and 383+00 along west side of LRT corridor.	*Approximately 4 acres.*
Morrison Creek Station Area	*Approximately 1.5 acres.*
Franklin Boulevard Station Area	*Approximately 6.5 acres.*
CRB Corridor between Union House Creek and existing CRB roadway, and between Franklin Boulevard and Bruceville Road. A temporary construction easement is required from the City of Sacramento for this easement.	*Approximately 11.5 acres.*
Northeast corner of CRC Campus between the northerly fence along CRB and the campus access road. A temporary construction easement is required from the school district for this easement.	*Approximately 2 acres.*
Existing North CRC Parking Lot adjacent to proposed CRC LRT station. This lot gets reconstructed as part of the LRT project. A temporary construction easement is required from the school district for this easement.	*Approximately 4 acres.*
Southeast Corner of CRC Campus where the south surface parking lot is proposed for this project. This is located south of the proposed parking garage. A temporary construction easement is required from the school district for this easement.	*Approximately 4 acres.*
TOTAL	*Approximately 33.5 acres*

For the LPAP2 construction, the primary staging area will be the Franklin Boulevard Station area which is approximately 6.5 acres. Combined with the other identified areas, significantly more area than what was provided for the other prior recent LRT projects, will be made available. The other recent projects were similar LRT extension type projects but of significantly more length, over six miles each, while the LPAP2 is 4.3 miles in length. Thus, the proposed LPAP2 staging areas will be more than adequate.

5.2 CONSTRUCTION PHASE IMPACTS AND MITIGATION

RT has developed a series of design requirements and construction best practices designed to minimize the impact of projects and construction on the community. These design requirements and construction best practices are outlined below for particular impact types. In all cases, these requirements and practices will be made part of all appropriate construction contracts. Furthermore, RT will hold regular project planning meetings with the Cities of Sacramento (and Elk Grove and the County if required by

optional satellite Calvine/Auberry shuttle lot) to minimize impacts and to better coordinate construction activities with community needs.

5.2.1 Aesthetics

5.2.1.1 IMPACTS

Project construction would be multi-phased and would occur in different locations at different times. All construction activities, whether for the proposed PNR lots in the TSM Alternative or for facilities included in the LPAP2 (grading, trackwork, systems, stations, bridges and structures, optional Calvine/Auberry shuttle lot) would mostly involve the use of relatively light equipment, stockpiling of soils and materials, and other visual signs of construction. While evidence of construction activity would be noticeable to area residents and others in the vicinity, these short-term visual changes would not substantially alter the character of the areas within or surrounding the existing railroad corridor (i.e., in the northern segment of the alignment), where occasional freight trains and track maintenance activities are accepted existing visual elements. It is also important to note that significant segments (UPRR Corridor and Morrison Creek Station segments) of the project are mostly out of view of the traveling public. These construction-related visual changes as well as those that may occur along the remainder of the corridor would be temporary. The visual setting and long-term visual impacts of project operations are discussed in Section 4.1.

5.2.1.2 MITIGATION MEASURES

CA-1 RT will require the contractor to maintain the site in an orderly manner, removing trash, waste, and securing equipment and vehicles at the close of each day's operation.

CA-2 To reduce glare from lighting used during nighttime construction activities, RT will require the contractor to direct lighting onto the immediate area under construction only, and to avoid shining lights toward residences and traffic lanes. Nighttime construction would possibly occur only for those activities involving street closures for mitigating impacts to the traveling public such as grading and installation of tracks across roadway, installing of grade crossing safety devices and utility relocations.

CA-3 To reduce dust the contractor would be required to use water trucks during grading to keep the ground moist.

5.2.2 Agriculture

It is not anticipated that construction activities would disturb agricultural land, crops or soils. Permanent effects on agricultural land in the project area are described in Section 4.2.

5.2.2.1 MITIGATION MEASURES

Construction access roads, staging and equipment laydown areas would be delineated to avoid agricultural property. Provisions will be incorporated into the construction contracts to designate areas for construction worker parking to avoid impacts to agricultural land. No mitigation is required.

5.2.3 Air Quality

5.2.3.1 TSM ALTERNATIVE

Construction would generate short-term pollutant emissions from the following construction activities: (1) site preparation, (2) grading, (3) construction workers traveling to and from construction sites, (4) delivery and hauling of construction supplies and debris to and from construction sites, and (5) fuel combustion by on-site construction equipment. These construction activities would temporarily create emissions of dusts, fumes, equipment exhaust, and other air contaminants. PM_{10} would be the air pollutant of greatest concern, particularly during grading and excavation activities.

Table 5.2-1 presents the estimated daily worst-case emissions associated with construction of the proposed project. As shown, the criteria pollutants are not anticipated to exceed the SMAQMD and federal thresholds.

Table 5.2-1: Worst-Case Daily Construction Emissions - TSM Alternative (pounds per day)

Construction Phase	CO	ROG	NO_X	SO_X	PM_{10}
Site Preparation	*11.9*	*2.7*	*24.1*	*0.03*	*46.5*
Grading	*16.7*	*3.8*	*34.1*	*0.04*	*46.9*
Maximum	*16.7*	*3.8*	*34.1*	*0.04*	*46.9*
SMAQMD Construction Threshold	n/a	n/a	85.0	n/a	n/a
Federal Threshold	550.0	140.0	140.0	550.0	550.0
Potential Threshold Exceedence?	No	No	No	No	No

Source: Air Quality Technical Report, Terry A. Hayes Associates, *2007*

Construction activity would potentially result in traffic delays and associated CO hotspots. CO hotspots typically occur at severely congested intersections with high traffic volumes. Based on the CO hotspot modeling, over 4,000 vehicles would have to idle continuously for one hour to create a CO hotspot during construction activity. Traffic flows would be maintained and diversions would be installed to remove traffic from intersections that would be congested as a result of construction activity. As such, construction activity would not result in delay to over 4,000 vehicles in one hour and construction activity would not result in the generation of a CO hotspot.

5.2.3.2 LIGHT RAIL ALTERNATIVE

Construction for the LPAP2 consists of demolition, utility relocations and protection, grading and track construction, bridge structures, retaining and sound walls, LRT Systems facilities, and stations. This alternative would include construction of four new LRT stations, three new park-and-ride lots, and an optional park and ride lot (at Calvine/Auberry). Construction would last approximately 1½ to 2 years. Although construction-related emissions are short-term, adverse air quality impacts may still result.

Construction for the Light Rail Alternative would generate pollutant emissions from the following construction activities: (1) site preparation, (2) grading/excavation, (3) construction workers traveling to and from construction sites, (4) delivery and hauling of construction supplies and debris to and from construction sites, and (5) fuel combustion by on-site construction equipment. These construction

activities would temporarily create emissions of dusts, fumes, equipment exhaust, and other air contaminants. However, PM_{10} is the most significant source of air pollution from construction, particularly during grading and excavation activities.

Under worst-case scenario, it is assumed that track construction, station construction, grade separation, and bridge structure construction would occur concurrently. Table 5.2-2 presents the estimated daily worst-case emissions associated with construction of the proposed project. *As shown, the criteria pollutants are not anticipated to exceed the SMAQMD and federal thresholds.*

Table 5.2-2: Worst-Case Daily Construction Emissions - Light Rail Alternative (pounds per day)

Construction Phase	CO	ROG	NO_X	SO_X	PM_{10}
Light Rail Alignment	*19.4*	*4.4*	*41.1*	*0.05*	*78.9*
Stations / Park-and-Ride Lots	*16.7*	*3.8*	*34.3*	*0.04*	*86.0*
Total Emissions (Worst-Case Scenario)	*36.1*	*8.2*	*75.4*	*0.09*	*164.9*
SMAQMD Construction Threshold	n/a	n/a	85.0	n/a	n/a
Federal Threshold	550.0	140.0	140.0	550.0	550.0
Potential Threshold Exceedence?	No	No	*No*	No	No

Source: Air Quality Technical Report, Terry A. Hayes Associates LLC, *2007*

Construction activity would potentially result in traffic delays and associated CO hotspots. CO hotspots typically occur at severely congested intersections with high traffic volumes. Based on the CO hotspot modeling, over 4,000 vehicles would have to idle continuously for one hour to create a CO hotspot during construction activity. Traffic flows would be maintained and diversions would be installed to remove traffic from intersections that would be congested as a result of construction activity. As such, construction activity would not result in delay to over 4,000 vehicles in one hour and construction activity would not result in the generation of a CO hotspot.

5.2.3.3 MITIGATION MEASURES

Although construction activity would not result in an impact exceeding criteria thresholds, RT would establish special provisions in the contract documents to implement the following best management practices to minimize fugitive dust and PM_{10} for either the TSM or LPAP2 alternative. All construction contracts shall require that the contractor warrantee that construction equipment has been properly tuned and shall implement best management practices to minimize idling, avoid sensitive receptor locations, and maximize the use of low emission fuels.

CAQ-1 The construction area and vicinity (500-foot radius) will be swept (preferably with water sweepers) and watered at least twice daily. Site-wetting will occur often enough to maintain a 10 percent surface soil moisture content throughout all earth-moving activities.

CAQ-2 All unpaved roads, parking and staging areas will be watered at least once every two hours of active operations.

CAQ-3 Site access points will be swept/washed within thirty minutes of visible dirt deposition.

CAQ-4 On-site stockpiles of debris or dirt will be enclosed, covered or watered at least twice daily.

CAQ-5 All haul trucks hauling soil, sand and other loose materials will be covered and will maintain at least two feet of freeboard.

CAQ-6 All haul trucks will have a capacity of no less than twelve and three-quarter (12.75) cubic yard.

CAQ-7 At least 80 percent of all inactive disturbed surface areas will be watered on a daily basis when there is evidence of wind-driven fugitive dust.

CAQ-8 Operations on any unpaved surfaces will be suspended when winds exceed 25 mph.

CAQ-9 Traffic speeds on unpaved roads will be limited to 15 miles per hour.

CAQ-10 Operations on any unpaved surfaces will be suspended during first and second stage smog alerts.

CAQ-11 Truck loading zones will be maintained in the construction area.

CAQ-12 Temporary traffic control will be provided during all phases of construction activities to improve traffic flow.

CAQ-13 Best efforts will be used to limit truck idling to no more than two minutes.

CAQ-14 Non-toxic soil stabilizers (according to manufacturers' specifications) will be applied to all inactive construction areas.

CAQ-15 A plan subject to approval by the SMAQMD will be prepared to demonstrate that heavy-duty (greater than 50 horsepower) off-road vehicles that are to be used during construction would achieve a project-wide fleet-average reduction of approximately 20 percent for NO_X and approximately 45 percent for PM_{10} when compared to the most recent CARB fleet average at the time of construction. Late model engines, low-emission diesel products, alternative fuels, engine retrofit technology, after-treatment products, and/or other options as they become available can be used to reduce emissions.

CAQ-16 A comprehensive inventory of all off-road construction equipment, equal to or greater than 50 horsepower, that would be used an aggregate of 40 or more hours during any portion of the construction phase will be submitted to the SMAQMD. The inventory will include the horsepower rating, engine production year, and projected hours of use or fuel throughput for each piece of equipment. The inventory will be updated and submitted monthly throughout the construction phase. The inventory would not be required for any 30-day period in which no construction activity occurs. At least 48 hours prior to the use of subject heavy-duty off-road equipment, the project representative will provide SMAQMD with the anticipated construction timeline, which will including start date, the name and phone number of the project manager, and the name and phone number of the on-site foreman.

CAQ-17 Emissions from all off-road diesel-powered equipment used during construction will not exceed 40 percent opacity for more than three minutes in any one hour. Any equipment found to exceed 40 percent opacity (or Ringelmann 2.0) will be repaired immediately and the SMAQMD will be notified within 48 hours of identification of non-compliant equipment. A visual survey of all in-operation equipment will be made at least weekly, and a monthly summary of the visual survey results will be submitted throughout the duration of the construction phase, except that the monthly summary will not be required for any 30-day period in which no construction activity occurs. The monthly summary will include the quantity and type of vehicles surveyed, as well as the dates of each survey. The SMAQMD and/or other officials may conduct periodic site inspections to determine compliance. This mitigation measure will not supercede other SMAQMD or State rules or regulations.

5.2.3.5 IMPACTS AFTER MITIGATION

Projected construction air quality impacts with the implementation of design requirements/RT practices and mitigation measures previously described are shown in Table 5.2-3 (TSM Alternative) and Table 5.2-4 (LPAP2). For both alternatives, the daily *NO_X and* PM_{10} emissions during construction would not exceed SMAQMD or federal significance thresholds. *However, mitigation measures identified in Section 5.2.3.4 would reduce NO_X and PM_{10} emissions and construction activity would be below criteria thresholds.*

Table 5.2-3: Worst-Case Daily Construction Emissions After Design Requirements/RT Practices and Mitigation

TSM Alternative (pounds per day)

Construction Phase	CO	ROG	NO_x	SO_x	PM_{10}
Site Preparation	*11.9*	*2.7*	*16.8*	*0.03*	*23.1*
Grading	*16.7*	*3.8*	*24.7*	*0.04*	*23.3*
Maximum	*16.7*	*3.8*	*24.7*	*0.04*	*23.3*
SMAQMD Construction Threshold	n/a	n/a	85.0	n/a	n/a
Federal Threshold	550.0	140.0	140.0	550.0	550.0
Potential Threshold Exceedence?	**No**	**No**	**No**	**No**	**No**

Source: Air Quality Technical Report, Terry A. Hayes Associates, *2007*

Table 5.2-4: Worst-Case Daily Construction Emissions After Design Requirements/RT Practices and Mitigation

Light Rail Alternative (pounds per day)

Construction Phase	CO	ROG	NO_x	SO_x	PM_{10}
Light Rail Alignment	*19.4*	*4.4*	*33.1*	*0.05*	*39.5*
Stations / Park-and-Ride Lots	*16.7*	*3.8*	*28.1*	*0.04*	*42.8*
Total Emissions (Worst-Case Scenario)	*36.1*	*8.2*	*61.2*	*0.09*	*82.3*
SMAQMD Construction Threshold	n/a	n/a	85.0	n/a	n/a
Federal Threshold	550.0	140.0	140.0	550.0	550.0
Potential Threshold Exceedence?	**No**	**No**	**No**	**No**	**No**

Source: Air Quality Technical Report, Terry A. Hayes Associates, *2007*

5.2.4 Biological Resources

5.2.4.1 IMPACTS

Impacts reported in the following paragraphs would be in addition to any permanent effects as reported in Section 4.4.

TSM Alternative. Construction of the PNR lot*s* under the TSM Alternative at Cosumnes River College may disturb small areas of *ruderal/disturbed vegetation* communities that *may* provide *potential* habitat for western burrowing owl. No wetland areas would be affected by the PNR lot construction. The PNR lot site*s* primarily consist of ruderal*/*disturbed vegetation, with some developed properties; therefore, construction-related impacts on biological resources would be minimal. Temporary impacts to natural resources from construction activities due to air pollution from dust and construction equipment, increased runoff and soil erosion, and construction noise would be minimized through the use of Design Requirements and RT Practices as described in Section 5.2.3.2.

LPAP2. Construction of the LPAP2 would cause temporary disturbance to approximately 0.05 acre of wetlands/waters at the Morrison Creek/Union House Creek/UPRR flyover*, which represent potential aquatic habitat for the giant garter snake. In addition, approximately 8.39 acres of potential upland habitat for the giant garter snake may be temporarily impacted*.

LPAP2 construction activities may also disturb riparian and non-native grassland natural communities *and indirectly affect a vernal pool* that provide potentially suitable habitat for a variety special-status species as shown on Table 4.4-2. The status of all species with potentially suitable habitat in the project vicinity is reported in Section 4.4. Protections are suggested based solely on the presence of potentially suitable habitat, even where it is of relatively low quality. All sensitive habitat and wetland areas that could be avoided during construction would be identified for avoidance during project design. The following preventive measures would adequately address construction-related impacts to wetland areas and special-status species. These measures will be reviewed by all appropriate agencies, including the USFWS, CDFG, and the ACOE.

5.2.4.2 MITIGATION MEASURES

Construction impacts would be minimized through the use of Best Management Practices *(BMPs)* and procedures that have been established for the construction of large-scale public works projects*, and measures identified in the BO*. Procedures pertinent to biological resources include the following:

CB-1 *RT shall include a copy of the BO within its solicitations for design and construction of the LPAP2 making the primary contractor responsible for implementing all requirements and obligations included within the BO, and to educate and inform all other contractors involved in the project of the requirements of the BO.*

CB-2 *Measures consistent with Best Management Practices (BMPs), including Storm Water Pollution Prevention Plan (SWPPP) and Water Pollution Control Program (WPCP), will be implemented to minimize effects to giant garter snake and prevent pollution of streams, waterways, and other bodies of water during construction. BMPs will be implemented to prevent sedimentation from entering Environmentally Sensitive Areas (ESAs) and to reduce erosion, dust, noise, and other deleterious aspects of construction related activities. These BMPs may include, but are not limited to, silt fencing, temporary berms, restrictions on cleaning equipment in or near ESAs, installation of vegetative strips, and temporary sediment disposal. Runoff from dust control and hazardous materials will be retained on the construction site and prevented from flowing into the ESAs.*

CB-3 Clearing and grubbing procedures that specify that only trees and plants designated for removal shall be removed*.*

CB-4 Excavation techniques to ensure the stability of subsurface materials as well as retention of excavated materials within the construction areas*.*

CB-5 Construction within wetlands would be avoided during the rainy season to prevent excess siltation and sedimentation.

CB-6 Materials and fluids generated by construction activities would be placed at least 100 feet from wetland areas or drainages until they could be disposed of at a permitted site.

CB-7 After construction activities are complete, any temporary fill or construction debris *will* be *re*moved and disturbed areas restored to their pre-project conditions.

CB-8 All natural communities and wetland areas located outside the construction zone that could be affected by construction activities will be temporarily fenced off using high visibility fencing and designated as Environmentally Sensitive Area(s) (ESAs) to prevent accidental intrusion by workers and equipment. The fencing shall be inspected and maintained on a regular basis throughout the construction process and will only be removed when construction of the project has been completed.

CB-9 *Prior to commencement of construction activities, high visibility fencing will be erected around the habitats of federally listed species to be avoided by the LPAP2 Project, in order to identify and protect these designated ESAs from encroachment of personnel and equipment. These areas will be avoided by all construction personnel. The fencing will be inspected before the start of each work day and maintained until completion of the project. The fencing may be removed only when the construction is completed. Applicable setbacks for each of the listed species are discussed below. Signs will be posted every 50 feet along the edge of these ESAs, with the following information: "This area is habitat of federally threatened and/or endangered species, and must not be disturbed. These species are protected by the Endangered Species Act of 1973, as amended. Violators are subject to prosecution, fines, and imprisonment." The signs should be clearly readable from a distance of 20 feet, and must be maintained for the duration of construction.*

CB-10 A USFWS-approved biological monitor will inspect construction-related activities at the project site where threatened and endangered species may occur to ensure that no unauthorized take of federally listed species or destruction of their habitat occurs. The monitor will have the authority to stop construction activities that may result in unauthorized take of federally listed species or destruction of their habitat until appropriate corrective measures have been completed. The monitor will be responsible for immediately reporting any unauthorized impacts to the USFWS. *At least 30 days prior to initiating construction activities, the RT shall submit the names and resumes of the biological monitor(s) for the project to the USFWS for approval.*

CB-11 *A Worker Environmental Awareness Training Program for construction personnel shall be conducted by the USFWS-approved biologist for all construction workers, including contractors, prior to commencement of construction activities. The program shall provide workers with information on their responsibilities with regard to giant garter snake, Valley elderberry longhorn beetle, vernal pool crustaceans, and other special-status species, as appropriate; and overview of the life history of these species; information on take prohibitions; protections afforded these animals under the ESA, and an explanation of the relevant terms and conditions of the BO. Written documentation of the training must be submitted to the USFWS within thirty (30) days of completion of the training. As needed, training shall be conducted in Spanish for Spanish language speakers.*

CB-12 The number and size of access roads and staging areas, and the total area of project activities will be restricted to the minimum necessary for the duration of the project construction activities. *Routes and boundaries will be clearly demarcated.* Stockpiling of construction

materials, portable equipment, vehicles, etc. will be confined to the construction staging areas. Movement of heavy equipment to and from the project area will be restricted to established roadways to minimize disturbance. Project-related vehicles shall observe a 20-mile per hour speed limit within construction areas, except on City and County roads and on County, State, and Federal highways. All heavy equipment, vehicles, and supplies will be stored at the designated staging area at the end of each work period.

CB-13 To eliminate an attraction to predators of giant garter snake, all food-related trash items, such as wrappers, cans, bottles, and food scraps, must be disposed of in closed containers and removed at the end of each work day from the entire project site.

CB-14 A post-construction walkthrough will be conducted to assess whether any damage occurred to vegetation within buffer areas. Damage may include accidental cutting of vegetation or visible physical damage to roots, stems, and leaves. If damage is observed, vegetation within the buffer areas will be restored with appropriate native plant species.

CB-15 RT will maintain and monitor the project site for one (1) year following the completion of construction and restoration activities. Monitoring reports documenting the restoration effort should be submitted to the USFWS upon the completion of the restoration efforts and one (1) year after the restoration implementation.

Prevent the Introduction or Spread of Noxious Weeds

CB-16 The contractor will be responsible for avoiding the introduction of new noxious weeds and the spread of weeds previously documented at the project area. The following measures will be implemented during construction.

- Minimize surface disturbance to the greatest extent possible.
- Seed all disturbed areas with certified weed-free native and non-native mixes, as provided in the revegetation pan developed in cooperation with CDFG. Mulch with certified weed-free mulch. Rice straw may be used to mulch upland areas.
- Clean equipment before entering or exiting the project area.
- Use native, non-invasive species or nonpersistent hybrids in erosion control plantings to stabilize site conditions and prevent the colonization of invasive species.
- Provide all seed mixes to be used on SRCSD property to SRCSD Bufferlands staff for review and approval prior to use.

Special-Status Plant Species:

Special-status plant surveys were conducted within the project area during May 18 and June 27, 2006, during which no special-status plant species were observed. Special-status plant surveys are valid for a period of three years (USFWS 2000). If construction of the proposed project is not initiated within 3 years from the date of the special-status plant surveys, additional surveys may be required. As no special-status plants were observed on-site, no specific avoidance, minimization, or mitigation measures are recommended.

Special-Status Wildlife:

Vernal pool fairy shrimp, Midvalley fairy shrimp, Vernal pool tadpole shrimp, and California linderiella

CB-17 Where possible, vernal pool fairy shrimp, Midvalley fairy shrimp, vernal pool tadpole shrimp and California linderiella habitat will be protected by a 50-foot buffer zone (ESA) with exclusionary fencing to make it easily avoided by construction crews. The fencing shall be inspected and maintained on a regular basis throughout the construction process and will only be removed when construction of the project has been completed.

Valley Elderberry Longhorn Beetle

CB-18 *Prior to the initiation of construction activities, RT shall conduct a survey to assess the status of existing elderberry shrubs within the project site, if any. If elderberry shrubs are discovered within the project site, RT shall reinitiate consultation with the USFWS in order to analyze and assess any possible impacts to Valley elderberry longhorn beetle regarding the proposed project.*

CB-19 Project construction shall be prohibited within 100 feet of the elderberry plants during the beetle emergence and matting period (e.g., March 15 through June 30) to eliminate any indirect effects of construction on the beetle or its eggs.

CB-20 No application of herbicides, insecticides, and/or other chemical agents shall occur within 100-feet of the elderberry plants or where they might drift or wash into the area of elderberry plants.

CB-21 Protective fencing shall be established around all shrubs that are not to be removed prior to initiating any construction activities on the site. Protective fencing will be established a minimum of 20 ft (6 m) outside the perimeter of the driplines of *each* elderberry plant *within 100 feet of the project alignment*. Signs will be posted every 50 ft along the edge of the elderberry avoidance area(s), stating that the area(s) is protected habitat. The buffer areas shall be protected from adverse effects resulting from the project. There will be no physical alterations of any type within the area enclosed by the fencing. The fencing shall be inspected and maintained on a regular basis throughout the construction process and will only be removed when construction of the project has been completed.

CB-22 A post-construction walk through will be conducted to assess whether any damage occurred to vegetation within the buffer areas. If damage is observed, vegetation within the buffer areas will be restored with appropriate native plant species. Erosion control measures and exotic weed abatement measures shall be implemented. If unanticipated damage is done to elderberry shrubs, the USFWS will be notified and appropriate compensation will be implemented.

Western Pond Turtle

CB-23 A qualified biologist shall conduct a pre-construction survey of all project affected aquatic habitats no more than 24 hours prior to instream construction or disturbance of riparian vegetation. If western pond turtles are found to be present within the immediate construction area, on-site monitoring and possibly relocation shall be implemented to ensure that no western pond turtles are injured during the construction phase. Plans for on-site monitoring and/or relocation shall be submitted to the appropriate agencies (e.g., CDFG) for approval prior to implementation.

Giant Garter Snake

CB-24 *Construction activity within giant garter snake habitat shall be conducted between May 1 and October 1 (the active period for the species). If it appears that construction activity may go beyond October 1, RT shall contact the USFWS as soon as possible, but not later than September 15 of the year in question, to determine if additional measures are necessary to minimize take. Construction within 200 feet from the banks of giant garter snake aquatic habitat will be avoided during the snake's inactive season (October 2 through April 30).*

CB-25 Where possible, giant garter snake habitat will be protected by a 200-foot buffer zone (ESA) with exclusionary fencing to make it easily avoided by construction crews.

CB-26 Best management practices for water quality will be implemented during construction.

CB-27 Aquatic habitat will be dewatered 15 days prior to the initiation of construction activities. If complete dewatering is not possible, potential prey items (e.g., amphibian larvae and fish) will be removed, to the extent feasible, so that snakes and other wildlife are less attracted to the construction area.

CB-28 *At most, 24-hours* prior to commencement of construction activities, a *USFWS-approved* biologist will survey the project area for the presence of giant garter snakes. *The biologist will provide the USFWS with a written report that adequately documents the monitoring efforts within 24-hours of commencement of construction activities.* If a lapse in construction activity of two weeks or greater occurs, the survey of the project area will be repeated.

CB-29 *Tightly woven fiber netting or similar material will be used for erosion control and other purposes at the project site to ensure that the giant garter snake does not get trapped or become entangled. This limitation shall be communicated to the contractor through the use of special provisions included in the bid solicitation package.*

CB-30 A qualified, USFWS-approved biological monitor shall be present during construction activities within suitable habitat. If a snake is encountered during construction, the biological monitor will have the authority to stop construction activities in the immediate area until appropriate corrective measures have been completed or it has been determined that the snake will not be harmed. The biological monitor will redirect construction activities away from the snake, so that it will be allowed to move away from the work area on its own volition. Capture and relocation of trapped or injured individuals can only be attempted by personnel or individuals with current USFWS recovery permits pursuant to section 10(a)(1)(A) of the Endangered Species Act. All sightings and any incidental take will be reported to the USFWS immediately by telephone and by written letter addressed to the Chief, Endangered Species Division, within one working day.

CB-31 Clearing will be confined to the minimal area necessary to facilitate construction activities.

CB-32 Following completion of construction activities, all temporary fill and construction debris will be removed from the project area and disturbed areas will be restored to pre-project conditions. Commercially available seed mixes containing native grasses and herbs will used during this process.

CB-33 *RT will compensate for project-related temporary impacts to giant garter snake habitat by purchasing the equivalent of 8.44 acres of giant garter snake habitat credits. All temporary effects will be compensated at a 1:1 ratio.*

Nesting Migratory and Special-Status Birds, Including Raptors

Several non-special-status migratory birds, including common raptors, and special-status birds could potentially nest in riparian communities and isolated trees throughout the project area, as well as in

annual grasslands. Adverse impacts to these species will be avoided by conducting pre-construction surveys and implementing the following measures if active nests are found.

CB-34 If construction or tree removal will occur between February and August, pre-construction surveys will be conducted each year of project construction to locate all active nests within 0.25 mile (0.4 km) of the project area. Surveys shall be conducted by a qualified wildlife biologist.

CB-35 Surveys shall be conducted no more than 30 days prior to the initiation of construction activities.

CB-36 Direct disturbance (e.g., removal of nest trees and activities in the immediate vicinity of an active nest), will be avoided during the breeding season, where feasible. No-disturbance buffers will be established around each active nest, to the extent feasible. The project proponent will contact CDFG to determine the need to monitor the nest and/or the size and configuration of buffers, based on existing disturbance levels, topography, sensitivity of the species, and other factors on a case-by-case basis.

CB-37 If necessary, nest trees shall be removed outside of the nesting season (February through August), or after a qualified biologist verifies that the nest is empty and the nest tree is no longer used by the adult and young birds. If tree or shrub removal is required during the breeding season, the project proponent will hire a qualified biologist before removal to conduct surveys for active nests. If active migratory bird, raptor, or special-status bird nests are found in the trees/shrubs proposed for removal, the project proponent will consult with the USFWS and CDFG*, as appropriate,* before removal to develop an MOU.

CB-38 In addition, all natural communities and wetland areas located outside the construction zone that could be affected by construction activities will be temporarily fenced off using high visibility fencing and designated as ESAs to prevent accidental intrusion by workers and equipment. The fencing shall be inspected and maintained on a regular basis throughout the construction process and will only be removed when construction of the project has been completed.

Swainson's Hawk

CB-39 During the year(s) of project construction, a qualified raptor biologist will survey the project area and surrounding area to determine if any active Swainson's hawk nests occur on-site or within a 0.5 mile of the project area. Surveys are to take place during the breeding season of the Swainson's hawk (March-August 15) every year of project construction. If Swainson's hawk nests are discovered, a consultation with CDFG will be necessary to evaluate and prescribe avoidance measures.

Western Burrowing Owl

CB-40 In accordance with the Staff Report on Burrowing Owl Mitigation (CDFG 1995) the following should be considered impacts to the species:

- Disturbance within 160 ft (50 m) of an occupied burrow, which may result in harassment of the owls;
- Destruction of occupied natural and artificial burrows (e.g., culverts, concrete slabs, and debris piles); and
- Destruction and/or degradation of foraging habitat adjacent (within 330 ft [100 m]) of to an occupied burrow(s).

CB-41 To avoid impacts on western burrowing owls, a qualified biologist shall conduct a pre-construction survey for burrows and burrowing owls along the project alignment plus a 100 m

(330 ft) buffer on each side of the construction area. If western burrowing owls are observed in the project area, the following measures will be implemented.

CB-42 If active burrows are located on or immediately adjacent to the project area, a no-disturbance buffer will be established around each active burrow. The size of the buffer will be determined through coordination with CDFG. The Staff Report on Burrowing Owl Mitigation (CDFG 1995) recommends a buffer zone with a radius of 160 ft (50 m) during the non-breeding season (September 1 through January 31) and 250 ft (75 m) during the breeding season (February 1 through August 31). Avoidance also requires that a minimum of 6.5 acres of foraging habitat be permanently preserved contiguous with occupied burrow sites for each pair of breeding burrowing owls (with or without dependent young) or single unpaired resident bird. The configuration of the protected habitat should be approved by CDFG.

CB-43 If adverse effects to occupied burrows (direct removal or construction within the buffer zone) are unavoidable, the owls shall be passively relocated using techniques approved by CDFG (install one-way doors on burrows) to avoid the loss of any individual owls. However, occupied burrows are not to be disturbed during the nesting season unless a qualified biologist approved by CDFG verifies through non-invasive methods that either: the birds have not begun egg-laying and incubation; or that juveniles from the occupied burrows are foraging independently and are capable of independent survival. To offset the loss of foraging and burrow habitat on the project site, a minimum of 6.5 acres of foraging habitat per pair or unpaired resident bird, should be acquired and permanently protected (CDFG 1995). The amount of foraging habitat to be acquired and protected will be determined through coordination with CDFG. The protected lands should be adjacent to occupied burrowing owl habitat and at a location acceptable to CDFG (CDFG 1995).

5.2.5 Cultural Resources

As described in Section 4.5, Cultural Resources, no archaeological or historic architectural resources have been identified in the project Area of Potential Effects (APE). Section 4.5 addresses the potential for previously unidentified cultural resources to exist in portions of the APE that are covered over with pavement or other obstructions.

5.2.5.1 MITIGATION MEASURES

CC-1 It is not anticipated that construction activities associated with either the TSM or LPAP2 alternative would disturb buried cultural materials. If such materials are unearthed during construction, work in the vicinity of the find would be halted until a qualified archaeologist can assess their significance. If human remains are unearthed during construction, State Health and Safety Code Section 7050.5 states that no further disturbance shall occur until the County Coroner has made the necessary findings as to origin and disposition pursuant to Public Resources Code 5097.88. In either instance, RT shall be immediately notified.

CC-2 If unanticipated archaeological resources are encountered during construction, they would be addressed in consultation with the Office of Historic Preservation (OHP)/or in accordance with an archaeological treatment plan to be developed in consultation with OHP.

5.2.6 Employment

Given the size of the Sacramento economy, neither the TSM Alternative nor the LPAP2 Alternative would result in permanent changes to regional socioeconomics beyond currently planned and forecasted growth.

5.2.6.1 METHODOLOGY AND IMPACTS

Table 5.2-5 provides an estimate of the number of positions and level of economic activity created by the expenditure of construction funds for the TSM and LPAP2 alternative. Estimates are based in part on an input/output study of construction activity in Texas by the Federal Highway Administration (Politano and Roadifer, 1989). Funds created in economic output include the multiplier effect of direct construction being re-spent in service or other sectors of the economy. Economic activity generated by the proposed project is anticipated to benefit the Sacramento region and would also follow the labor and material markets for transportation-related construction.

Table 5.2-5: Impacts from Construction Investment in the South Sacramento Corridor Phase 2 Project (Millions of 2005 dollars)*

Alternative	Construction Value*	Regional Economic Output	Total Earnings	Job Creation (Person Years of Employment)	
				On-Site	Total
No-Action Alternative	N/A	N/A	N/A	N/A	N/A
TSM Alternative	*$41.1*	*$52.61*	*$14.83*	*230*	*370*
LPAP2	*$193.7*	*$247.94*	*$69.92*	*1,100*	*1,700*

* Construction impacts are based on preliminary estimates for construction value and exclude purchase of rolling stock, and right-of-way costs, but include administration costs.

N/A = Not Applicable

Sources:

A.L Politano and Carol J. Roadifer, *Regional Economic Impact Model Analysis for Highway Systems (REIMHS)*, Transportation Research Record 1229, Transportation Research Board, Washington, DC, 1989. (Model adjusted to reflect inflation.)

Source: Parsons, *September 2007*.

With respect to job creation, FHWA found nationally in the early 1980s that a one million dollar investment in transportation construction would directly generate 10 on-site, full-time construction jobs (person years of employment [PYE]). This number has been adjusted to 5.*5* PYE positions to reflect inflation through 2005. When off-site, construction-related and service-industry-related jobs and related increases in consumer demand (direct, indirect, and induced effects) are considered, the total number of full time PYE positions created rises to about 8.9, adjusting for inflation, for each one million dollars investment. Data on the impact of bridge construction, adjusted for inflation, have been used as a best approximation for rail construction.

Compared with the No-Action Alternative, the TSM Alternative would invest *$28* million in capital costs for construction, not counting vehicle and right-of-way costs, and would generate *230* on-site full-time construction positions (PYE) and *370* total positions (PYE). The LPAP2 would invest *$*254 million in capital costs for construction, not counting vehicle and right-of-way costs, and would generate *1,100* on-

site full-time construction positions (PYE) and *1,700* total positions (PYE), as compared to the No-Action Alternative. The impact of this direct and indirect employment added to the regional economy would be positive.

5.2.6.2 MITIGATION MEASURES

As the impacts are beneficial, no mitigation is proposed.

5.2.7 Geology, Soils and Seismicity

5.2.7.1 IMPACTS

The impacts identified below could occur under either the TSM or LPAP2 Alternative, except as specifically indicated.

Although no unstable slopes are apparent in creek channel banks in the vicinity of the LPAP2, proposed construction of the LPAP2 may impose additional loads on existing slopes, potentially resulting in slope instability. Slope instability could adversely affect constructed facilities on or adjacent to slopes and off-site properties.

Weak and/or compressible soils may be present at various locations affected by construction of either build alternative, particularly at shallow depth in or along creek channels and possibly in areas of existing fill. Such soils are a potential source of excessive settlement for structures and areas of fill, and in some cases their presence can also adversely affect construction operations.

Soils at and near ground surface along much of the study area are expected to exhibit medium to high expansion potential. For such soils, changes in soil volume and strength are associated with changes in moisture content. The presence of expansive soils can adversely affect the service of pavements and slabs on grade. Where exposed in slopes, such cyclic changes in soil volume and strength are commonly associated with the down-slope creep of near-surface soils and shallow slumping. Such impacts could adversely affect either the TSM or LPaP2 Alternative.

Shallow groundwater would be present at some locations, either as a part of the “water table” or as a local and seasonal “perched” condition. Where present, shallow groundwater would affect earthwork and construction and can adversely affect the service of floor slabs and roadbed/hardscape subjected to traffic load. These impacts could adversely affect either build alternative.

It does not appear likely that dewatering that is extensive in depth, volume and/or duration would be required. Therefore, dewatering activities are not expected to (temporarily or permanently) modify the level of groundwater sufficiently to induce settlement on the LPAP2 LRT alignment or adjacent properties.

Soil exposed at ground surface can be subject to erosion. Soil erosion can damage existing structures and can discharge sediment to waterways. The effects of construction-phase erosion on waterways are addressed in Section 5.2.9.

5.2.7.2 MITIGATION MEASURES

The extent of hazards or other impacts – including slope instability, weak and/or compressible soils, expansive soils, shallow groundwater, and erosion – will be defined by geotechnical studies during final design of either the TSM or LPAP2 Alternative. Design requirements to address seismic hazards are discussed in Section 4.7.3.

CG&S-1 Design requirements to address the above-identified impacts will be incorporated into the final design and construction specifications. Design requirements that would likely be implemented for either build alternative include: excavation and replacement or lime-treatment of weak or expansive soils, and/or the use of synthetic materials to reinforce or partly replace weak soils and deep foundations. Design requirements specific to the LPAP2 are likely to include: modification or re-grading of slopes, increased set-backs and clearance from slopes, vegetation of slopes, lining channels, excavation and replacement or lime-treatment of weak or expansive soils, and/or the use of synthetic materials to reinforce or partly replace weak soils and deep foundations.

5.2.8 Hazardous Wastes

5.2.8.1 IMPACTS

The potential for encountering pre-existing hazardous waste is present during any construction project, particularly within a developed area such as the project corridor. Impacts would occur if construction workers or members of the public were exposed to hazardous materials during grading and construction activities or if the likelihood of hazardous waste migration were increased by construction activities.

For the TSM and LPAP2 alternatives, there is likelihood that hazardous waste may be encountered at the locations identified in Table 4.8-1. Contaminants at these sites may include but are not limited to aerially-deposited lead, lead-based paint, MTBE, and ACMs.

5.2.8.2 MITIGATION MEASURES

Impacts of the TSM Alternative and the LPAP2 will be mitigated by implementing the following measures:

CHW-1 **Walking reconnaissance.** Walk-through site reconnaissance will be conducted for the known hazardous waste site to identify any additional evidence of contamination.

CHW-2 **Confirming the Status of Remediation Activities.** A review will be conducted of the remediation status of the site shown in Table 4.8-1. If remediation activities will be complete before construction of the project, then no further mitigation will be necessary. If remediation would not be completed prior to project construction, then an alternate mitigation plan will be prepared and implemented.

CHW-3 **Site Evaluation**. A Phase 2 site-specific evaluation will be made of any known and suspected contaminated sites that would be disturbed by construction operations before any soil is removed from affected areas for construction, using the following procedure: 1) implementation of a Worker Health and Safety Plan; 2) preparation of a site-specific work plan specifying the proposed location for surface samples or soil borings or trenches; 3) soil boring or trenching and sample collection; 4) laboratory analysis of samples; and 5) preparation of a findings and recommendations report. If the site-specific evaluations determine that contaminants are present, RT will determine the type and extent of contamination and will prepare and implement a remediation plan to avoid risks to public health and safety.

CHW-4 **Worker Health and Safety Plan & Training**. To avoid health effects on construction personnel, all personnel who may come in contact with contaminated soil or groundwater would be trained in accordance with the OSHA Hazardous Waste Operations and Emergency Response (HAZWOPER) standard (29 CFR 1910.120). A site-specific worker health and safety plan defining potential contaminants and, where appropriate, proper personnel protective equipment would be employed. Proper decontamination procedures for workers and equipment would be followed.

When such measures are in place to protect those in closest contact with hazardous substances, impacts to surrounding populations would be avoided.

CHW-5 **Notify Appropriate Regulatory Agencies and Enact Specific Mitigation Plans**. RT will notify the State Department of Toxic Substances Control, Sacramento County Environmental Health Department and the local fire department of any contaminants encountered during construction.

5.2.9 Hydrology, Floodplain, and Water Quality

5.2.9.1 IMPACTS

The impacts identified below could occur with construction of either the TSM Alternative or LPAP2, except as specifically indicated.

Construction activities of either build alternative would increase the sediment load in stormwater during rainfall events. Sediment sources created during construction include soil stockpiles, soil tracked across construction areas, and soil transported by wind.

Either build alternative would disturb one or more acres of land, and therefore a Stormwater Pollution Prevention Plan (SWPPP) will be required, in accordance with Section 402 of the federal Clean Water Act. The purpose of a SWPPP is to reduce the amount of construction-related pollutants that are transported by stormwater runoff to surface waters.

Groundwater is generally 15 feet below ground surface or deeper. Construction excavation for either the TSM or the LPAP2 Alternative is expected to be limited and very localized. Although it is not anticipated that groundwater would be encountered, it cannot be ruled out, particularly in localized areas where deeper excavation is required, such as Meadowview Road under the depressed roadway design option.

The LPAP2 would require modification of the berm of the detention basin in the vicinity of the proposed Franklin Station. This detention basin is on property owned by the Sacramento Regional County Sanitation District (SRCSD), but is operated by the City of Sacramento. This could result in the temporary loss of flood storage during this phase of construction. Long-term effects of the modification of the detention basin are addressed in Section 4.9.2.1.

The following design requirements/best practices and mitigation measures will be implemented for either the TSM or LPaP2 Alternative, except as noted below.

5.2.9.2 MITIGATION MEASURES

The following mitigation measures will be applied for hydrology, floodplain, and water quality impacts due to construction.

CHF&Q-1 The contractor will prepare a SWPPP and will identify construction-period Best Management Practices to reduce water quality impacts. The SWPPP will emphasize standard temporary erosion control measures to reduce sedimentation and turbidity of surface runoff from disturbed areas, and will be submitted to the Regional Water Quality Control Board.

CHF&Q-2 For the LPAP2, RT will coordinate with SRCSD and the City of Sacramento regarding construction-period impacts to the bufferlands detention basin. RT will work with these agencies to ensure that adequate flood storage is maintained during the construction period.

CHF&Q-3 In the event groundwater is encountered during construction, dewatering would be conducted locally. Dewatering effluent would be tested for contamination. Contaminated effluent would be disposed of in accordance with applicable federal, state and local regulations.

5.2.10 Land Use

There would be no construction-related land use effects associated with either the TSM or LPAP2 Alternative. Permanent changes in land use that would occur as a result of the project alternatives are described in Section 4.10.

5.2.11 Mineral and Energy Resources

5.2.11.1 MINERALS

No significant minerals have been identified in the project area. Construction activity is not anticipated, therefore, to adversely affect mineral resources.

5.2.11.2 ENERGY

Various types of equipment would be used to construct transportation improvements. Energy of various forms, but primarily fossil fuels, would be consumed during the operation of this equipment. Energy use would be proportional to the level of construction activity and end when the proposed facilities are completed. Increased energy consumption for equipment operations during the construction phase is therefore a temporary impact.

Materials used in the construction of transportation facilities require energy to manufacture and to deliver to the work site. This “embedded” energy can be substantial for certain materials, for instance steel and other processed materials. If materials are manufactured or assembled before on-site construction begins, the energy for these processes is actually consumed prior to the local construction period. If manufactured or assembled outside the area or region in which the transportation improvements are to be made, the energy requirements do not affect the local or regional energy economy. Materials energy, like construction equipment energy, is also a temporary energy requirement

Because the LPAP2 proposes the most extensive facilities improvements, its construction energy impacts would be greater than those of either the TSM Alternative or the No-Action Alternative. The No-Action Alternative includes improvements contained in the 2002 Metropolitan Transportation Plan. The TSM Alternative would add to those improvements by expanding park-and-ride lots in the SR 99 corridor and adding additional express and feeder routes and extending some existing bus services. The duration of construction for most of the proposed improvements would be short, lasting no more than several weeks or several months. The LPAP2 would take approximately 2½ years to construct and would use energy, often intensively, throughout that period. Nonetheless, construction energy requirements are not considered substantial for the LPAP2 LRT or the other project alternatives. Energy use would represent a small portion of the total energy consumed in the region for the construction of other facilities and for the ongoing operation of commercial, industrial, and residential activities.

5.2.12 Neighborhoods and Businesses

Characteristics of neighborhoods and businesses in the South Sacramento Corridor and long-term impacts of project implementation and operations, including permanent displacement effects, are described in Section 4.13. This section focuses on the short-term temporary effects of project construction activities on neighborhoods and businesses in the study area. In general, these are the indirect effects of construction air and noise emissions, traffic and visual disruptions. These construction impacts are discussed in their own right in their respective subsections of this chapter.

5.2.12.1 IMPACTS OF THE TSM ALTERNATIVE

Traffic in the vicinity of the PNR lot at Cosumnes River College could be temporarily disrupted by construction equipment and vehicles. Grading and paving of this TSM Alternative facility would also result in temporary intrusions of construction noise and vibration, air emissions, and visual changes. These impacts are expected to be very localized and none would have substantial impacts on the ability of neighborhoods to function cohesively or would result in substantial loss of revenue to existing businesses.

5.2.12.2 IMPACTS OF THE LIGHT RAIL TRANSIT ALTERNATIVE

Construction of the LPAP2 LRT alignment, station facilities, PNR lots and the optional shuttle lot would temporarily affect study area neighborhoods due to street closures, rerouting of transit and vehicular traffic, and movements of construction equipment, materials and vehicles. These impacts would occur in different locations along the corridor at different times and would be of relatively short duration in each location. Most likely most if these impacts would occur at night or on weekends. None would be anticipated to have substantial impacts on the ability of neighborhoods to function cohesively, would affect the viability of community facilities or services delivery, or would result in substantial loss of revenue to existing businesses.

The LPAP2 would also result in temporary intrusions of construction noise and vibration, air emissions, and visual changes. These impacts would also be localized, temporary and intermittent; none would be anticipated to substantially affect neighborhood cohesion or viability, or threaten the continued viability of local businesses.

5.2.12.3 MITIGATION MEASURES

CN&B-1 A variety of mitigation measures are proposed to address the direct effects of construction activities – air, noise and vibration emissions, traffic disruptions and visual changes; see their respective subsections of this chapter. Since no substantial adverse impacts to neighborhoods and businesses are anticipated, no additional mitigation is proposed.

5.2.13 Noise and Vibration

5.2.13.1 IMPACTS

Construction noise varies greatly depending on the construction process, type, and condition of equipment used, and layout of the construction site. Many of these factors are traditionally left to the contractor's discretion, which makes it difficult to accurately forecast levels of construction noise. Overall, construction noise levels are governed primarily by the noisiest pieces of equipment. For most construction equipment, the engine, which is usually diesel, is the dominant noise source. This is

particularly true of engines without sufficient muffling. For special activities such as impact pile driving and pavement breaking, noise generated by the actual process dominates.

Temporary noise during construction of the PNR lot associated with the TSM Alternative has the potential to intrude on residents near the PNR site. Most of the construction would consist of site preparation and paving and would occur only during daytime hours.

Temporary noise during construction of demolition, utilities relocation and protection, grading and tracks, LRT systems, stations and PNR lots associated with the LPAP2 also has the potential to intrude on residents near the construction sites. Most of the construction would consist of site preparation and laying new track and would occur only during normal daytime hours. The "worst case" scenario for noise and vibration impacts would occur if construction of the LPAP2 was concurrent with the Cosumnes River Boulevard widening and extension projects.

Construction activities that could cause intrusive vibration under the TSM or LPAP2 alternatives include vibratory compaction, jackhammers, and use of tracked vehicles such as bulldozers. The most serious sources of construction vibration are blasting and pile driving. There will be no blasting for either alternative and only limited, if any, pile driving under the LPAP2.

The TSM and LRAP2 alternatives are subject to the same noise restrictions as any other construction project in the South Sacramento area. The noise ordinances of both the City and County of Sacramento would be applicable to these alternatives. The ordinances have specific property line noise limits; however, construction from 6 am to 8 pm on weekdays and 7 am to 8 pm on Saturday and Sunday is specifically exempted from these limits.

5.2.13.2 MITIGATION MEASURES

In addition to the restrictions in the City and County noise ordinances, the mitigation measures would be applicable to construction of either the TSM or LPA Alternative:

CN&V-1 Include specific residential property line noise limits in construction specifications for this project, and

CN&V-2 Perform noise monitoring during construction to verify compliance with the limits. This approach allows the contractor flexibility to meet the noise limits in the most efficient and cost effective manner.

CN&V-3 Assure that a complaint resolution procedure is in place to rapidly address any problems that may develop.

CN&V-4 Vibration impacts will be mitigated by including numeric limits in the construction specifications, monitoring vibration, and requiring the contractor to follow the specified limits.

5.2.14 Parks and Recreation

5.2.14.1 IMPACTS

TSM Alternative. The construction of a PNR lot for the TSM Alternative would have no impact on park and recreational facilities in the area.

LPAP2. The construction of the LPAP2 could involve temporary detours or street closures in the vicinity of the project. These are expected to have little or no effect on the ability of the public to access local parks and recreational facilities within the study area. Construction of the LPAP2 LRT facilities at the

berm of the northeast corner of the Cosumnes River College Stadium would not affect access to or operations of the recreational facility. Construction detours and road closures are described in Section 5.2.17, Transportation/Traffic.

5.2.14.2 MITIGATION MEASURES

Mitigation measures to minimize effects due to street closures, rerouting of transit and vehicular traffic, noise and vibration intrusion, air emissions, and visual changes as a result of construction are identified in their respective sections in Chapter 5.

5.2.15 Public Services and Facilities

5.2.15.1 IMPACTS

TSM Alternative. The construction of a PNR lot with the TSM Alternative would have no impact on public services and facilities in the area.

LPAP2. The construction of the LPAP2 could involve temporary detours or street closures in the vicinity of the project. These are expected to have little or no effect on the ability to access public services and facilities within the study area. The primary effect would be the need for emergency vehicles to observe any short-term road closures and temporary construction detours. Construction detours and road closures are described in Section 5.2.17, Transportation/Traffic.

5.2.15.2 MITIGATION MEASURES

The following mitigation measures would address impacts on public services and facilities:

CPS-1 RT will coordinate with local emergency service providers in developing detour plans during the project's final design.

CPS-2 Emergency service providers would be provided advance notice of road closures and detour routes during construction.

5.2.16 Safety and Security

5.2.16.1 IMPACTS

The security setting and evaluation of long-term project impacts on the safety and security of corridor residents and workers and LRT patrons are presented in Section 4.16, Safety and Security. This section focuses only on the short-term safety and security impacts of construction activities. Impacts could occur to workers on the job and/or others in the vicinity of construction activities. Also, please see Section 5.2.8, Construction Phase Hazardous Wastes, regarding the use and disposal of hazardous materials during construction.

5.2.16.2 MITIGATION MEASURES

The following mitigation measures would address safety and security impacts.

CS-1 RT will require the contractor submit a safety plan in advance of construction to ensure procedures for the safety of construction workers, local residents, and employees during construction of either the TSM or LPAP2 Alternative.

CS-2 Fencing and lighting of construction and staging areas, and recognized safety practice requirements for the utilization of heavy equipment and the movement of construction materials would be implemented to contain construction activities and avoid accidents.

5.2.17 Transportation Impacts

5.2.17.1 CONSTRUCTION IMPACTS ON RAIL AND BUS TRANSIT

The TSM Alternative and the LPAP2 both include new transit facilities. Construction of a TSM PNR lot would not affect transit service during the construction period. LPAP2 LRT facilities construction would potentially affect transit service temporarily during the construction period.

TSM Alternative. Cosumnes River College would have a new PNR lot under the TSM Alternative. Structures and bus parking areas would be constructed off-street, and their construction would require minimal street closures at nights or weekends for special limited construction operations such as making traffic signal modifications. Because bus service to the park-and-ride lot would begin only after construction was complete, no impacts on transit services are anticipated.

LPAP2.

Haul Routes. *The LPAP2 will have three haul routes that correspond with the three distinct physical areas of the project. A description of these areas and their associated haul routes is shown in Table 5.2-5. These haul routes were evaluated for traffic impacts based on the anticipated frequency of haul trucks. Truck frequency was based on calculated quantity of materials and duration of grading operations for each haul route. Each truck was considered to be equivalent to 4 cars for use in the traffic model for the year of construction 2012. Table 5.2-6 provides the results of the traffic modeling. As shown, there is no level of service degradation of project area intersections and no increase in delay greater than 5 seconds. Therefore it was determined that haul traffic will result in no severe adverse impacts to future traffic.*

Table 5.2-5: LPAP2 Haul Routes

Project Area	*Haul Route*
LRT corridor west of Morrison Creek from Meadowview Road to the crossing of Morrison Creek.	*Meadowview Road to I-5 or Meadowview Road/Mack Road to SR99. Haul vehicles would travel along the LRT corridor and would ingress/egress Meadowview Road at its intersection with the LRT corridor. Depending on what arrangements the contractor has made for disposal and delivery of materials will determine which direction(s) (east and/or west) along Meadowview Road/Mack Road the contractor will use for their haul route.*
LRT corridor east of Morrison Creek crossing the SRCSD buffer lands continuing along the CRB corridor to Bruceville Road.	*CRB to SR99 will be the specified haul route. It is assumed the contractor will utilize SR 99 for disposal and delivery of materials and thus will utilize the CRB corridor. For work in the buffer lands area hauling will occur along the LRT corridor alignment. A temporary easement for a haul road along the toe of LRT embankment across the buffer lands is proposed if needed by the contractor.*
LRT facilities on the CRC Campus.	*Bruceville Road to CRB to SR99 will be the specified haul route.*

Table 5.2-6: Year 2012 Intersection Levels of Service with and without Haul Truck Traffic

Intersection	AM Peak Hour				PM Peak Hour			
	2012 without Haul Trucks		2012 with Haul Trucks		2012 without Haul Trucks		2012 with Haul Trucks	
	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay
Franklin Blvd/Mack Rd	C	32.6	C	32.6	D	39.9	D	39.8
Franklin Blvd/Cosumnes River Blvd	E	65.2	E	68.2	D	44.2	D	46.1
Center Pkwy/Cosumnes River Blvd	D	50.0	D	53.1	E	55.9	E	58.9
Bruceville Rd/Cosumnes River Blvd	D	50.3	D	51.4	D	46.7	D	47.6
Detroit Blvd/Meadowview Rd	B	19.5	B	19.5	C	23.1	C	23.2

Source: DKS Associates, 2008.

Construction of the LPAP2 would potentially affect light rail and bus services. Table 5.2-7 provides a summary of the streets that would be closed for installation of overhead catenary or construction/reconstruction of at-grade crossings of the freight and/or LRT tracks, the number of times and duration that they would be closed, and the transit services and traffic affected.

Rail Service Impacts. The LPAP2 LRT Project would involve connecting existing LRT tracks with new LRT tracks south of the Meadowview Road Station. Construction of these new connections has the potential to affect on-going revenue service. To avoid significant disruption of current LRT operations, construction of the connection to the existing track would be scheduled during non-revenue hours.

Bus Service Impacts. Construction of grade crossing improvements would involve partial or complete closure of individual cross streets at night and/or on weekends, so bus services and street traffic would not be substantially affected. Table 5.2-7 lists the street locations requiring closure. Construction impacts would be minimized wherever possible by working on one grade crossing at a time and implementing traffic control measures, such as flagging and detours.

5.2.17.2 MITIGATION MEASURES

The following mitigation measures would reduce rail and bus transit impacts while constructing the LPAP2:

CT-1 RT will coordinate construction with other major public or private construction projects within a one-mile radius of its project and schedule its construction contracts to minimize combined project impacts to the surrounding community while at the same time trying to reduce the combined schedule for construction activities.

CT-2 Grade-crossing construction that requires street closure will be scheduled so only one crossing in an area is affected at one time; crossings serving as alternate bus travel routes will remain open.

CT-3 RT will provide the public and transit users advance notice of proposed transit reroutes and any other changes in stops and service; Bus route detours will minimize the number of bus stop changes.

Table 5.2-7: Street Closures Due to Construction of the LPAP2

Street	Location (From/To)	Construction Activity	Duration	Impact Area		
				Transit	Traffic	Parking
Meadowview Road	UPRR Crossing	Freight track & New LRT Grade Crossing or Grade Separation	Off-peak including possible night time – est. 8 to 10 hrs per closing.	No	Minimal	
Franklin Boulevard	North of CRB	New LRT Grade Crossing or Flyover	Off-peak including possible night time – est. 8-10 hrs per closing	No	Minimal	
Center Parkway	South of Folsom Blvd.	New LRT Grade Crossing	Off-peak including possible night time – est. 8-10 hrs per closing	No	Minimal	
Cosumnes River Blvd.	East of Center Parkway	New LRT *Flyover*	Off-peak including possible night time – est. 8-10 hrs per closing	No	Minimal	
Cosumnes River Blvd.	West of Bruceville Road	New LRT Flyover	Off-peak including possible night time – est. 8-10 hrs per closing	No	Minimal	

** LRT service on the existing Phase 1 LRT line could be affected by constructing the at-grade junction with the South Line just north of Meadowview Road. Transit impacts otherwise refer to bus services that use the affected street either currently or in the future.

Source: Parsons Corporation, December 2002.

CT-4 Construction of at-grade crossings will take place during non-peak periods whenever possible, including at night. In residential areas, major activity will be limited to normal work hours whenever practicable, to avoid noise and related impacts to the local population.

CT-5 RT will notify local residents and businesses in advance of proposed construction activity using a variety of techniques including signage, electronic media, community newspapers, and other techniques identified in the project's public involvement program.

CT-6 *RT will communicate and coordinate with the CRC and Los Rios Community College District regarding the time of any street closures during construction of the LPAP2, with particular attention to peak student travel periods.*

5.2.17.3 CONSTRUCTION IMPACTS ON VEHICULAR TRAFFIC

Similar to impacts on transit services, the construction of major facilities for the TSM Alternative and the LPAP2 would potentially affect vehicular traffic on adjacent streets.

TSM Alternative. Traffic in the vicinity of the proposed park-and-ride lot at Cosumnes River College could be disrupted by construction equipment and traffic. With proper traffic handling procedures and the scheduling of major traffic generating activities in non-peak periods, the impacts would be minimized.

LPAP2. Traffic in the vicinity of the proposed park-and-ride lots at Franklin, Cosumnes River College, and Calvine/Auberry could be disrupted by construction equipment and traffic. With proper traffic handling procedures and the scheduling of major traffic generating activities in non-peak periods, the impacts would be minimized. Construction of LPAP2 LRT improvements would require night time street closures for 8 to 10 hours at several locations and rerouting of vehicular traffic. Additionally, street closures at similar times may be needed to carry wires over streets at grade crossings or to install falsework or erect bridge elements at flyovers or underpass (an option at Meadowview). This work could be done at night.

Table 5.2-*7* lists the streets along the South Sacramento Phase 2 Corridor that would be closed for the construction or reconstruction of at-grade crossings of the LRT and freight tracks, the number of times and duration they would be closed, and the traffic and transit services potentially affected. As part of the construction contracts, RT would require that the contractor schedule full closures during night-time periods and implement proper traffic handling procedures to minimize construction impacts; some crossings may be constructed by closing only half the crossing at a time, with the work being performed during other off-peak times.

The closures of Cosumnes River Boulevard listed in Table 5.2-*7* presume that this street is widened prior to LPAP2 LRT construction. If the LPAP2 LRT project precedes the widening project, there would be less disruption of Cosumnes River Boulevard because only one crossing of the street would be required instead of two. All street crossings except Bruceville Road have planned or optional flyovers that would require more limited closure than the base-case at-grade crossings.

If Cosumnes River Boulevard is widened prior to the LPAP2 construction, construction of the LRT tracks in the median of Cosumnes River Boulevard between Center Parkway and west of Bruceville Road would require construction barricades and potentially narrowed travel lanes to accommodate the construction activities. Traffic on Cosumnes River Boulevard might be interrupted occasionally to permit access to the construction area in the median.

5.2.17.4 MITIGATION MEASURES

The same mitigation measures for bus transit impacts are proposed to address vehicular traffic impacts with two additions:

CT-7 As part of their contracts, contractors will be required to prepare and implement traffic handling plans approved by the City of Sacramento, the City of Elk Grove, or Sacramento County, as appropriate. Plans will identify detour routes, signing and barricade locations, turnarounds at street closures, and other traffic control elements.

CT-8 As part of their regular project planning meetings with neighboring jurisdictions, RT will coordinate with the City of Sacramento, the City of Elk Grove, and Sacramento County to provide the public advance notice of proposed traffic detours and their duration.

5.2.17.5 CONSTRUCTION IMPACTS ON PARKING

Construction activities for the TSM or LPAP2 Alternative are not expected to have any substantial impact on availability of parking. Construction workers for the TSM PNR lot would be expected to park on-site. The on-site jobs creation potential of the TSM Alternative is estimated at about 90 total jobs. Not all of these workers would be on the site at the same time.

Similarly, the major streets that would be affected by LPAP2 LRT station construction, such as Folsom Boulevard, Center Parkway, Cosumnes River Boulevard, and Bruceville Road, do not provide on-street parking in the vicinity of the proposed LRT crossings. Construction workers would park on-site in designated areas of the right-of-way or proposed station and park-and-ride lot areas. Where the construction site would not accommodate worker parking, there would be some minor temporary inconvenience to local residents from the additional parking demand in their neighborhoods. Total on-site jobs creation potential of the LPAP2 is estimated at 900 person years of employment, but this number would be spread over the 5-mile length of the alignment and almost three years of construction, and not all of these workers would be on site at the same time.

5.2.17.6 MITIGATION MEASURES

CT-9 Provisions will be incorporated into the construction contracts to avoid parking impacts to residential areas or businesses requiring on-street parking.

5.2.18 Utilities

5.2.18.1 IMPACTS

Locations of existing utilities, design treatments and construction procedures are described in Section 4.17, Utilities, and shown on the strip maps of the LPAP2, Figures 2.4-2 through 2.4-17. RT will coordinate with all utility providers during the design phase of the project to identify any additional subsurface and overhead utilities so that design treatments and construction procedures can be developed to avoid adverse impacts to existing utilities and prevent disruptions in service. The potential exists, nonetheless, for construction activities for the TSM or LPAP2 Alternative to encounter unexpected utilities within the project right-of-way. Relocations of affected utilities in the corridor or at LRT station or PNR lot locations will be the responsibility of RT and may require short-term, limited interruptions of service. No interference with existing utility service is anticipated during installations of connections to existing high-voltage power transmission facilities because the utility will put customer loads on alternate feeders during the connection activity.

5.2.18.2 MITIGATION MEASURES

To avoid or minimize disruptions in service and inconvenience to customers, the following mitigation measures will be implemented:

CU-1 RT will continue close coordination with all utility providers during the construction stages of the project to identify any potential conflicts and formulate strategies to overcome potential problems.

CU-2 A set of detailed plans will be submitted to utility providers for their review and comment prior to the onset of any relocation work.

CU-3 Any short-term, limited service interruptions would be scheduled well in advance and appropriate notification provided to users. These interruptions would be discussed and planned at the regular planning meetings between RT and neighboring jurisdictions.

5.2.19 Cumulative Construction

5.2.19.1 CUMULATIVE CONSTRUCTION PHASE IMPACTS

In the event that construction of any or all of the related projects occurs simultaneously with the construction of the TSM or LPAP2 Alternative of the South Sacramento Corridor Phase 2 project, cumulative construction phase impacts could result. Many categories of impact that have been evaluated for the present project have relatively minor construction-period impacts or can be addressed through design requirements, best practices, and mitigation measures. Such categories include aesthetics, agriculture, cultural resources, geology and soils, construction employment, hazardous wastes, water quality, land use, energy, public services and facilities, parks and recreation, safety and security, and utilities. Neighborhoods and businesses may, however, experience cumulative or continuing construction-related effects in the areas of traffic detours, air quality, and noise. Also, there may be cumulative effects of temporary disturbances of habitat areas or increased risk of incidental takes of special status wildlife and plant species with multiple construction projects taking place in the same general area.

For some related projects, advantages to concurrent construction may outweigh the disadvantages of cumulative construction impact. For example, were the CRB Extension and Widening projects and the LPAP2 constructed at the same time, RT and the City of Sacramento would coordinate design and construction decisions, streamlining the construction process along the CRB alignment and ensuring mutually compatible project design. In addition, concurrent construction would decrease the duration of time over which residents of neighborhoods along CRB would experience the inconvenience of traffic detours and noise and vibration impacts caused by construction in the CRB right-of-way. Also, impacts to the SRCSD bufferlands would be limited to a one-time construction period for the simultaneous construction of the CRB and LPAP2 LRT extensions along the bufferlands, and thus the bufferlands would not be subject to repeated disturbance by sequential construction projects.

Concurrent or closely coordinated construction of the Sacramento Streams Project with the LPAP2 in the Union House Creek segment would facilitate construction of combined flood/sound walls, if this approach is confirmed during preliminary and final design of both projects.

RT will continue to coordinate with the proponents of the related projects to identify the potential for concurrent construction benefits and impacts. Particular attention will be paid to potential traffic operations impacts of simultaneous construction on contiguous projects or projects affecting related parts

of the transportation network. Temporary detours and notifications to emergency service providers and the traveling public will be worked out in coordination with all other projects in the vicinity.

Coordinated implementation of air quality and noise mitigation measures as identified in Sections 5.2.3 and 5.2.13 will reduce impacts of the South Corridor and related projects. It is anticipated that all of the related projects will also implement mitigation measures to reduce the impacts experienced by people living, working, traveling, or attending school in the vicinity. It is also anticipated that each project with potential to affect habitat areas during construction will implement measures – such as pre-construction surveys, identification of environmentally sensitive areas (ESAs), biological monitoring, and worker training – to minimize harm to special status wildlife and plants. RT will continue to work with SRCSD bufferlands staff and City staff to identify opportunities for coordinated surveys and/or monitoring.

The LPAP2 and TSM alternatives would each require the relocation of various utilities, as identified in Section 4.17. Some related projects would also need to relocate utilities, as is the case with the Cosumnes River Boulevard widening and extension and Bruceville Road widening projects. The Cosumnes River Boulevard Extension project and the College Square Marketplace development would involve the extension of utilities to new areas. RT is committed to working with the affected utility companies to minimize any interruptions in service. This is standard practice for construction projects, and each of the related project proponents can be expected to make a similar commitment.

5.2.19.2 MITIGATION MEASURES

The following mitigation measures will address cumulative construction phase impacts: If construction of the TSM or LPAP2 Alternative occurs concurrently with construction of related projects, RT will coordinate with the other project proponents, as necessary to:

CCP-1 Develop traffic handling plans to minimize impacts to the traveling public.

CCP-2 Develop traffic handling plans and detour routes in coordination with emergency service providers to prevent adverse impacts to emergency service delivery.

CCP-3 Coordinate with other project proponents, as necessary, in the development of public information messages regarding the timing and location of construction activities, temporary detours, and specific measures to be undertaken to reduce construction impacts.

CCP-4 Continue to coordinate with all utility providers during the construction stages of the project to identify any potential conflicts and formulate strategies to overcome potential problems.

CCP-5 Submit a set of detailed plans to utility providers for their review and comment prior to the onset of any relocation work.

CCP-6 Schedule any short-term, limited service interruptions well in advance and with provision of appropriate notification to users.

CCP-7 Apply mitigation measures for fugitive dust and PM_{10}, listed in Section 5.2.3.3, in overlapping or adjacent construction areas.

CCP-8 Apply mitigation measures for construction noise and vibration, listed in Section 5.2.14.2, in overlapping or adjacent construction areas.

CHAPTER 6: CEQA CONSIDERATIONS AND FINDINGS OF SIGNIFICANCE

This chapter describes those environmental effects identified in Chapters 4 and 5 that would be considered significant under the California Environmental Quality Act (CEQA) and considers the potential for the project to stimulate unplanned growth.

This combined environmental document complies with National Environmental Policy Act (NEPA) requirements for the preparation of a Supplemental *Final* Environmental Impact Statement (*SFEIS*), and with CEQA requirements for a Subsequent *Final* Environmental Impact Report (S*F*EIR). Use of the term "significant" differs under these two laws. While CEQA requires that a determination of significant impacts be stated in an EIR, the National Environmental Policy Act (NEPA) does not require such a determination in an EIS. Under NEPA, significance is used to determine whether an EIS or some other level of documentation is required, and once a decision to prepare an EIS is made, the EIS reports all impacts and proposes mitigation wherever it is feasible to do so. For this reason, CEQA significance criteria and the determination of significant impacts have not been included in every section of this combined NEPA/CEQA S*F*EIS/S*F*EIR. Instead, those criteria and determinations have been grouped in this chapter.

It should be noted that although the presence of mitigation creates a presumption of significant impacts under CEQA, NEPA anticipates that mitigation will be provided for the impacts of a project where it is feasible to do so. For this reason, some mitigation measures described in this document and in this section are wholly appropriate under NEPA, although the impacts they address may not be considered significant under CEQA.

6.1 SIGNIFICANCE CRITERIA

CEQA requires that an EIR identify the significant environmental effects of the project (CEQA Guidelines Section 15126), but does not promulgate specific thresholds for significance. Instead, CEQA Guidelines Section 15064(b) states that "the determination . . . calls for careful judgment on the part of the public agency involved . . ." and that "an ironclad definition of significant effect is not possible because the significance of an activity may vary with the setting." CEQA encourages lead agencies to develop and publish their own thresholds of significance for the purpose of determining the significant effects of their projects. The fundamental definition of significant effect under CEQA is "a substantial adverse change in physical conditions." This criterion underlies the evaluation of environmental impacts for most of the impact issues identified in the CEQA Environmental Checklist Form (Guidelines Appendix G).

Some impact categories lend themselves to scientific or mathematical analysis, and therefore to quantification. Some categories have significance thresholds established by regulatory agencies, such as the California Department of Conservation or the regional air quality management district. For other impact categories that are more qualitative or are entirely dependent on the immediate setting, a hard-and-fast threshold is not generally feasible, and the "substantial adverse change in physical conditions" is applied as the significance criterion. In the current analysis, RT has given careful consideration to the issue of significance and has applied the significance criteria shown in Table 6.1-1 to evaluate the significance of the effects of the South Sacramento Corridor Phase 2 Project under CEQA.

The types of improvements proposed under the TSM or LPAP2 Alternatives do not create new demand for water supplies, stormwater or wastewater transport or treatment, or solid waste disposal capacity or facilities. Therefore, there are no impacts that would exceed CEQA thresholds of significance as described in Table 6.1-1.

CEQA does not require a discussion of socioeconomic effects except where they would result in physical changes, and states that social or economic effects shall not be treated as significant effects (see CEQA Guidelines Sections 15064(f) and 15131). Given also that the project alternatives will not have socioeconomic effects that either cause or result from physical changes, socioeconomic impact categories are not included in Table 6.1-1.

Table 6.1-1: CEQA Significance Threshold for Selected Environmental Impact Categories

SFEIS/ SFEIR Sec. Nos.	Impact Category	Explanation of CEQA Significance Threshold	Source(s)
4.1	Aesthetics	The project would have a significant effect on the environment if it would (a) have a substantial adverse effect on a scenic vista; (b) substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway; (c) substantially degrade the existing visual character or quality of the site and its surroundings; or (d) create a new source of substantial light or glare that would adversely affect day or nighttime views in the area.	State CEQA Guidelines, Appendix G Checklist
4.2	Agriculture	A significant impact would occur if the project would (a) convert to nonagricultural use substantial amounts of farmland Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency; (b) Convert to nonagricultural use substantial amounts of land zoned for agricultural use, or a Williamson Act contract; (c) Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland to nonagricultural use.	State CEQA Guidelines, Appendix G Checklist

Table 6.1-1: CEQA Significance Threshold for Selected Environmental Impact Categories

SFEIS/ SFEIR Sec. Nos.	Impact Category	Explanation of CEQA Significance Threshold	Source(s)
4.3	Air Quality	A significant impact would occur if the project would result in the long-term violation of any ambient air quality standard (NAAQS or CAAQS); increase the number or frequency of violations; contribute substantially to an existing or projected air quality violation; conflict with or obstruct implementation of the applicable air quality plan; result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable ambient air quality standard; expose sensitive receptors to substantial pollutant concentrations; or create objectionable odors affecting a substantial number of people.	State CEQA Guidelines, Appendix G Checklist; US EPA; SMAQMD
4.4	Biological Resources	A significant impact would occur if the project would (a) have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies or regulations or by the California Department of Fish and Game (CDFG) or the U.S. Fish and Wildlife Service (USFWS); b) have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies or regulations or by CDFG or USFWS; (c) have a substantial adverse effect on federally-protected wetlands as defined by Section 404 of the Clean Water Act; (d) interfere substantially with the movement of native resident or migratory fish or wildlife species, wildlife corridors, or wildlife nursery sites; (e) conflict with local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance; (f) conflict with the provisions of an approved local, regional, or state habitat conservation plan.	State CEQA Guidelines, Appendix G Checklist

Table 6.1-1: CEQA Significance Threshold for Selected Environmental Impact Categories

SFEIS/ SFEIR Sec. Nos.	Impact Category	Explanation of CEQA Significance Threshold	Source(s)
4.5	Cultural and Historic Resources	A significant impact would occur if the project would cause a substantial adverse change in the significance of a historical or archaeological resource as defined in Public Resources Code Section 16064.6; directly or indirectly destroy a unique paleontological resource or site or unique geologic feature; or disturb any human remains, including those interred outside of formal cemeteries. No quantitative threshold exists.	State CEQA Guidelines, Appendix G Checklist, and CEQA Sec. 21084.1.
4.6	Electromagnetic Fields and Electromagnetic Interference	A significant impact would occur if the project would expose people to sustained high levels of (man-made) electromagnetic radiation.	Sacramento Regional Transit District
4.7	Geology/ Seismicity	A significant impact would occur if the project would (a) expose people or structures to potential substantial adverse effects, including the risk of loss, injury or death involving (i) rupture of a known earthquake fault; (ii) strong seismic ground shaking; (iii) seismic-related ground failure, including liquefaction; (iv) landslides; (b) result in substantial soil erosion or loss of topsoil; (c) be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse; or (d) be located on expansive soil as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial risks to life or property.	State CEQA Guidelines, Appendix G Checklist

Table 6.1-1: CEQA Significance Threshold for Selected Environmental Impact Categories

SFEIS/ SFEIR Sec. Nos.	Impact Category	Explanation of CEQA Significance Threshold	Source(s)
4.8	Hazards and Hazardous Materials	A significant impact would occur if the project would (a) create a significant hazard to the public or the environment through the routine transport, use or disposal or hazardous materials; (b) create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment; (c) emit hazardous emissions or handle hazardous or acutely hazardous materials, substances or waste within one-quarter mile of an existing or proposed school; (d) be located on a site that is included on a list of hazardous materials sites compiled pursuant to Government Code Section 66962.6 and, as a result, created significant hazard to the public or the environment; (e) result in a safety hazard for people residing or working in the project vicinity; (f) impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan; (g) expose people or structures to a significant risk of loss, injury or death involving wildland fires.	Derived from State CEQA Guidelines, Appendix G Checklist
4.9	Hydrology, Floodplain, Water Quality	A significant impact would (a) violate any water quality standards or waste discharge requirements; (b) substantially deplete groundwater supplies or interfere substantially with groundwater recharge; (c) substantially alter the existing drainage pattern of the site or area in a manner which would result in substantial erosion or siltation on- or off-site; (d) substantially increase the rate or amount of surface runoff in a manner that would result in flooding on- or off-site; (e) create or contribute runoff water that would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff; or (f) otherwise substantially degrade water quality.	State CEQA Guidelines, Appendix G Checklist

Table 6.1-1: CEQA Significance Threshold for Selected Environmental Impact Categories

SFEIS/ SFEIR Sec. Nos.	Impact Category	Explanation of CEQA Significance Threshold	Source(s)
4.10	Land Use and Planning	A significant impact would occur if the project would (a) physically divide an established community; (b) conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project; or (c) conflict with any applicable habitat conservation plan or natural community conservation plan.	State CEQA Guidelines Appendix G Checklist
4.11	Mineral and Energy Resources	A significant impact would occur if the project would (a) result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state; or (b) result in the loss of availability of a locally-important mineral resource recover site delineated on a local general plan, specific plan, or other land use plan. A significant impact would occur if the project would result in a substantial increase in energy consumption to the extent that energy generation capacity is exceeded, based on currently available projections or unacceptable demands are placed on energy supply and distribution systems.	State CEQA Guidelines, Appendix G Checklist
4.12	Noise and Vibration	A significant noise impact would occur if the project would result in (a) exposure of persons to or generation of noise levels in excess of standards established in local general plans or noise ordinances; (b) exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels (vibration of 76 VdB is generally considered intrusive for residential uses); (c) a substantial permanent increase in ambient noise in the project vicinity (an increase of 10 db, perceived as a doubling of noise, is generally considered substantial); (d) a substantial temporary or periodic increase in ambient noise levels in the project vicinity.	State CEQA Guidelines, Appendix G Checklist, FTA Noise and Vibration Criteria

Table 6.1-1: CEQA Significance Threshold for Selected Environmental Impact Categories			
***SFEIS/ SFEIR* Sec. Nos.**	**Impact Category**	**Explanation of CEQA Significance Threshold**	**Source(s)**
4.13	Population and Housing	A significant impact would occur if the project would (a) induce substantial population growth in an area, either directly or indirectly; (b) displace substantial numbers of existing housing units or people, necessitating the construction of replacement housing elsewhere.	State CEQA Guidelines, Appendix G Checklist
4.14	Public Services and Facilities;	A significant impact would occur if the project would result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for any of the public services: fire protection, police protection, schools, parks, or other public facilities.	State CEQA Guidelines Appendix G Checklist
4.15	Recreation	A significant impact would occur if the project would (a) increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated; (b) include recreational facilities or require the construction or expansion of recreational facilities that might have an adverse physical effect on the environment.	State CEQA Guidelines Appendix G Checklist

Table 6.1-1: CEQA Significance Threshold for Selected Environmental Impact Categories			
SFEIS/ SFEIR Sec. Nos.	**Impact Category**	**Explanation of CEQA Significance Threshold**	**Source(s)**
4.16	Safety and Security	A significant impact would occur if the project were to result in any of the following: (a) in locations where pedestrian and/or bicycle safety is determined to be at risk and signals and gated crossings and safety barriers are not part of the project; (b) deviation from PUC safety design standards, such as clearances to boarding platforms, emergency walkways, crossings of public streets and railroads, installation of safety barriers, curbs, and fences; (c) park and ride lots are designed with features that are not amenable to crime deterrence, such as tall vegetation in outlying areas, inadequate lighting, secluded passageways, etc.; and (d) extension of facilities requiring police patrol and surveillance beyond the capacity of existing staffing and increased staffing is not included in project cost estimates.	RT and PUC Safety Design Standards and Practices
Chapter 3	Transportation/ Traffic	A significant impact would occur if the project would (a) cause an increase in traffic which is substantial in relation to the existing traffic load and capacity of the street system; (b) exceed, either individually or cumulatively, a level of service standard established by the local county congestion management agency; (c) substantially increase hazards due to a design feature; (d) result in inadequate emergency access; (e) result in inadequate parking capacity; (f) conflict with adopted policies, plans, or programs supporting alternative transportation.	State CEQA Guidelines Appendix G Checklist.

Table 6.1-1: CEQA Significance Threshold for Selected Environmental Impact Categories			
***SFEIS/ SFEIR* Sec. Nos.**	**Impact Category**	**Explanation of CEQA Significance Threshold**	**Source(s)**
4.17	Utilities and Service Systems	A significant impact would occur if the project would (a) exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board, (b) require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities or expansion of existing facilities, the construction of which could cause significant environmental effects, (c) require or result in the construction of new storm water drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects, (d) require new or expanded entitlements to have sufficient water supplies available to serve the project, (e) result in a determination by the wastewater treatment provider that serves or may serve the project that it has inadequate capacity to serve the project's projected demand in addition to existing commitments, (f) be served by a landfill with insufficient permitted capacity to accommodate the project's solid waste disposal needs, and (g) not comply with federal, state, and local statutes and regulations related to solid waste.	State CEQA Guidelines Appendix G Checklist.

Table 6.1-1: CEQA Significance Threshold for Selected Environmental Impact Categories			
***SFEIS/ SFEIR* Sec. Nos.**	**Impact Category**	**Explanation of CEQA Significance Threshold**	**Source(s)**
Chapter 5	Temporary Construction Period Effects	Construction phase impacts on traffic, transit, noise, air quality, and the visual environment would generally not be considered significant since construction-related changes are by their nature temporary. A significant impact would occur only if temporary effects substantially affected accessibility to an area for a long period of time, caused the loss or relocation of substantial numbers of businesses or residences, or posed a severe health or safety threat.	Derived from State CEQA Guidelines, Section 16382
Source: Parsons and other sources as noted, September 2002.			

6.2 REFINEMENTS TO THE PROJECT AND EIS/EIR

Refinements have been made to the Project and EIS/EIR since the Draft EIS/EIR was published. These refinement include

- ***Movement of the light rail alignment off of the Morrison Creek Levee.*** *In its comment letter on the SDEIS/SDEIR, the City of Sacramento Utilities Department, which maintains the Morrison Creek levee, stated that the light rail alignment should not be located on the levee. After meetings with the Utilities Department, the light rail alignment was moved to the west of the prior alignment shown in the SDEIS/SDEIR. The new alignment is on a new embankment that actually increases the size of the levee – called a "super levee." This new alignment moves the light rail off the existing levee but does require the acquisition of two homes and a portion of the back yard of a third home.*

- ***Addition of a Grade Separation (light rail flyover) over Cosumnes River Boulevard.*** *In its comment letter on the SDEIS/SDEIR, the California Public Utilities Commission requested that a grade separation be provided for the light rail line over Cosumnes River Boulevard. The requested grade separation is included as part of the project in this SFEIS/SFEIR.*

- ***Updating of traffic data.*** *In its comment letter on the SDEIS/SDEIR, the City of Sacramento stated that the data used to evaluate traffic should be more recent than what is contained in the SDEIS/SDEIR. In response, Year 2007 traffic counts were taken, and the traffic analysis in Chapter 3, Volume I, has been revised using this more current traffic information.*

- ***Supplemental Air Emissions Assessment.*** *In its comment letter on the SDEIS/SDEIR, the Sacramento Metropolitan Air Quality Management District requested that its new construction emissions model be applied to the project. In addition, the City of Sacramento requested in its comment letter on the SDEIS/SDEIR that the traffic information/counts be updated. Section 4.3, Air Quality and 5.2.3 – Air Quality (Construction) – have been updated to reflect the results of*

the new emissions model and the air emissions associated with the new traffic levels.

- ***Supplemental Noise/Vibration Assessment.*** *In its letter regarding the SDEIS/SDEIR, the U.S. EPA noted that the Federal Transit Administration (FTA) has more recent noise/vibration criteria than those used for the SDEIS/SDIR. The noise/vibration analysis has been updated to reflect these criteria. Based on this new analysis, the extent and height of noise wall barriers required to mitigate the impacts has been reduced. The new locations and heights of the noise walls identified in this SFEIS/SFEIR still fully mitigate the noise impacts to below the FTA criteria and below RT's more stringent criteria.*

- ***Refinements/updates to Construction Schedule.*** *The Construction schedule has been revised to reflect the current status of the proposed project – See Chapter 5, Volume I.*

- ***Revised Project Capital Costs.*** *The capital costs for the TSM and LPAP2 alternatives have been revised to reflect more recent unit costs, the current status of the project design, and the revised construction schedule. The refined costs have been assigned to the anticipated year of expenditure under the revised construction schedule, and inflation rates have been applied, providing a year-of-expenditure cost estimate for the TSM and the LPAP2.*

- ***Revisions to the SEIS/SEIR in Response to Public Comments on the SDEIS/SDEIR.*** *Other revisions/refinements have been made in this Final EIS/EIR in response to public comments received on the SDEIS/SDEIR. Volume II of this SFEIS/SFEIR contains the comments given on the SDEIS/SDEIR and responses to these comments. As indicated in Volume II, responses at times led to revision to sections of the SFEIS/SFEIR. All refinements and revisions to the SDEIS/SDEIR are identified in this SFEIS/SFEIR in italics.*

These refinements do not create new significant impacts for the LPAP2, and no unavoidable significant impacts remain for the project after mitigation. CEQA guidelines Section 15088.5: "Recirculation of an EIR Prior to Certification," provide guidance for when recirculation of an EIR is necessary prior to certification. As stated:

> *"New information added to an EIR is not 'significant' unless the EIR is changed in a way that deprives the public of a meaningful opportunity to comment upon a substantial adverse environmental effect of the project or a feasible way to mitigate or avoid such an effect (including a feasible project alternative) that the project's proponents have declined to implement. "Significant new information" requiring recirculation include, for example, a disclosure showing that:"*
>
> *"(1) A new significant environmental impact would result from the project or from a new mitigation measure proposed to be implemented."*
>
> *"(2) A substantial increase in the severity of an environmental impact would result unless mitigation measures are adopted that reduce the impact to a level of insignificance."*
>
> *"(3) A feasible project alternative or mitigation measure considerably different from others previously analyzed would clearly lessen the environmental impacts of the project, but the project's proponents decline to adopt it."*
>
> *"(4) The draft EIR was so fundamentally and basically inadequate and conclusory in nature that meaningful public review and comment were precluded. (Mountain Lion Coalition v. Fish and Game Com. (1989) 214 Cal.App.3d 1043)"*

The refinements to the LPAP2 and EIS/EIR do not introduce substantial adverse environmental effects, and feasible mitigation measures are included for the refined LPAP2 Project to mitigate adverse effects to levels of insignificance, as noted in Section 6.3 below.

6.3 UNAVOIDABLE SIGNIFICANT ADVERSE EFFECTS UNDER CEQA

This section summarizes project impacts and identifies the unavoidable significant effects of each alternative. There would be no unavoidable long-term significant effects of the TSM or LPAP2 Alternatives after proposed mitigation is applied. The evaluation of impacts before and after mitigation took into account the potential impacts of the proposed mitigation measures themselves. There were no instances where proposed mitigation measures would result in impacts that would require mitigation.

Table 6.3-1 contains a summary of impacts, along with an explanation of which impacts are considered significant under CEQA before mitigation. When reviewing this table, it is important to remember that NEPA anticipates that mitigation to reduce project effects will be proposed where it is feasible. Therefore, the presence of mitigation does not create a presumption of significant effect under NEPA, as it would in a CEQA-only document. The mitigation measures proposed herein are consistent with the mitigation measures identified in the 1997 SEIS/SEIR for Phase 1 of the South Corridor project and with the actions proposed to address impacts of the project as set forth in the RT Board resolution certifying the 1995 EIR. For a more complete description of the impacts and mitigation measures summarized in Table 6.2-1, please refer to Chapters 3, 4 and 5.

Many impacts of the TSM or LPAP2 Alternatives would be addressed through design requirements and practices that are required by current standards and guidelines or are typically part of existing construction management procedures documented in contract specifications and special provisions. These design requirements/best management practices are described in Chapters 3, 4, and 5, and are summarized in Table S-1. They are not reiterated in Table 6.3-1.

With the mitigation measures identified in Chapters 3, 4 and 5 of this document, no unavoidable significant impact would result from the TSM Alternative *or* the LPAP2.

Table 6.*3*-1: Summary of Impacts and Proposed Mitigation for the TSM and LPAP2 Alternatives

Impact	Significance	Mitigation	Significance After Mitigation
3. TRANSPORTATION			
3.3.5.1 TSM Alternative Freeway/ Arterial Impacts • Some trips would be shifted from auto to transit; some lessening of congestion – but no substantial effect.	B	• No mitigation is indicated.	B
3.3.5.2 TSM Alternative Intersection Impacts • Bruceville Road/Cosumnes River College (City of Sacramento) -- *during the PM peak hour, the intersection operating condition deteriorates from LOS C to LOS D and the average delay increases from 33.6 seconds to 41.3 seconds.*	S	*TT-1 Add a second eastbound left turn lane and add a shared through–right turn lane so the eastbound approach has two left turn lanes, one through-right turn lane and one dedicated right turn lane. This will improve the LOS at the intersection from D to C in the PM peak hour.*	LS
3.3.6.1 LPAP2 Freeway/Arterial Impacts • Measurable reduction of traffic on some roadways, marginal increases of traffic on others.	B	• No mitigation is indicated.	B
3.3.6.2 LPAP2 Intersection Impacts 20*30* impacts on the following City of Sacramento intersections: Center Parkway and CRB:	S	*T-1* Center Parkway and CRB: add a second southbound left turn lane *and provide overlap for all right turn phases.* With this modification, the intersection would operate at LOS *D,* and the impact would be reduced to below the thresholds. This mitigation would require widening the bridge over Union House Creek (the cost of which is included in the project costs).	LS

Table 6.3-1: Summary of Impacts and Proposed Mitigation for the TSM and LPAP2 Alternatives

Impact	Significance	Mitigation		Significance After Mitigation
Franklin Boulevard and Cosumnes River Boulevard	S	T-2	Franklin Boulevard and Cosumnes River Boulevard: provide overlap for all right turn phases. This would improve LOS to D in the AM and PM peak hours.	LS
Bruceville Road and Consumes River College:	S	T-3	Bruceville Road and Cosumnes River College: Add a second eastbound left turn land and add a shared through-right turn lane so the eastbound approach has two left turn lanes, one through-right turn lane and one dedicated right turn lane. This will improve the LOS at the intersection from D to C in the PM peak hour.	LS
Bruceville Road and Old Calvine Road:	S	T-4	Bruceville Road and Old Calvine Road: provide overlap signal phasing on the right turn to improve LOS at the intersection to C in the PM peak hour.	LS
CRC New South Access and Old Calvine Road:	S	T-5	Cosumnes River College New South Access and Old Calvine Road: Signalize the intersection. This would improve LOS at the intersection to C or better in the AM and PM peak hour.	LS
Auberry Drive and Calvine Road	S	T-6	Auberry Drive and Calvine Road: provide protected phasing for the northbound and southbound approaches, which would improve LOS at the intersection to D in the AM peak hour.	LS

Table 6.3-1: Summary of Impacts and Proposed Mitigation for the TSM and LPAP2 Alternatives

Impact	Significance	Mitigation	Significance After Mitigation
3.3.7 LPAP2 Traffic Delays at Grade Crossings • At at-grade crossings, vehicular traffic on the cross streets would be delayed while crossing gates block the intersections. • Moderate queues are projected at LPAP2 LRT crossing locations along Meadowview Road and Cosumnes River Boulevard. • Intersection efficiency is reduced due to at-grade crossings at the following intersections: Franklin Boulevard/Cosumnes River Boulevard, Center and Parkway/Cosumnes River Boulevard.	PS PS PS	*T-7* For at-grade crossings adjacent to LPAP2 LRT stations, RT will implement crossing signal control measures to minimize the amount of time gates are down when trains must stop to load and unload passengers before they cross the roadway. A timed delay mechanism will be installed that activates the crossing gates just prior to the train departing the station platform. *T-8 RT will implement "near side" crossing signal control measures at the intersections of Center Parkway and CRB, Franklin Boulevard and CRB, and Bruceville Road and CRC to provide additional safety.* *T-9* Express trains not stopping at a near side station would have equipment to bypass the timed delay.	LS LS LS
3.3.8.2 TSM Alternative: Circulation Impacts at PNR Lot • Local circulation would be adversely affected by increased auto traffic on station access roadways.	PS	Impacts at one intersection (identified in Section 3.3.5.2) were addressed by mitigation in Section 3.3.9.1, above.	LS
3.3.8.3 Circulation Impacts at Stations: LPAP2 • Local circulation would be affected by increased auto traffic on station access roadways.	PS	Impacts at the two intersections (identified in Section 3.3.6.2) were addressed by mitigation in Section 3.3.9.2, above.	LS

Table 6.3-1: Summary of Impacts and Proposed Mitigation for the TSM and LPAP2 Alternatives

Impact	Significance	Mitigation	Significance After Mitigation
3.4.1 2012 Opening Day Arterial and Intersection Impacts			
2012 impacts on the following City of Sacramento intersections:			
Franklin Boulevard & CRB	*S*	*T-10 Center Parkway & Cosumnes River Boulevard: add a second southbound left turn lane and provide overlap for all right turn phases and restripe the eastbound approach to one left, one through and one through right.*	*LS*
Center Parkway & CRB	*S*		*LS*
Bruceville Road & CRB	*S*	*T-11 Bruceville Road & Cosumnes River Boulevard: provide overlap for all right turn phases.*	*LS*
Bruceville Road & Sheldon Road	*S*	*T-12 Bruceville Road & Sheldon Road: provide overlap for all right turn phases.*	*LS*
3.4.2 Parking Impacts: TSM Alternative			
• Transit improvements would include PNR lot with adequate spaces to match demands.	PS	• No mitigation is indicated.	LS
• Reduces parking demand in Downtown Sacramento.	B	• No mitigation is indicated.	B
3.4.3 Parking Impacts: LPAP2			
• Because Center Parkway Station is designated for walk-in access and has no PNR lot, RT patrons may use on-street parking and adversely affect neighborhood parking.	PS	• On-street parking along and in the vicinity of Center Parkway will be monitored to determine whether an adverse impact develops. If it does, an on-street parking permit program would be proposed.	LS
• Transit improvements would include PNR lots with adequate spaces to match demands.	PS	• No mitigation is indicated.	LS
• Reduces parking demand in Downtown Sacramento.	B	• No mitigation is indicated.	B

Table 6.3-1: Summary of Impacts and Proposed Mitigation for the TSM and LPAP2 Alternatives

Impact	Significance	Mitigation	Significance After Mitigation
4.1 Aesthetic Impacts TSM Alternative • Cosumnes River College PNR lot. No substantial degradation of scenic views; no new visual elements substantially out of character with existing and proposed land uses.	LS	TSM: *V&A-2* RT will incorporate landscaping into the final design to soften views of PNR lots. *V&A-3* RT will control potential light and glare by directing lighting associated with proposed PNR lots, onto the premises of each facility and away from surrounding land uses.	LS
LPAP2 • LPAP2 LRT alignment: residents would have limited views of the corridor including the tops of catenary poles and overhead wires. Proposed noise barriers (Section 4.12.6) and existing privacy walls would provide visual screening and block views from the LRT vehicles of residences and yards. Visual changes with proposed sound walls include added bulk on the elevated structures and increased shading of residential properties.	LS	LPAP2: *V&A-1* RT will invite public participation regarding station and noise wall design during the final design phase of the project. *V&A-2* RT will incorporate landscaping into the final design to soften views of LPAP2 LRT stations, PNR lots, substations and the optional shuttle lot. *V&A-3* RT will control light and glare by directing lighting associated with LRT facilities onto the premises of each facility and away from surrounding land uses.	LS
• Meadowview Road crossing options: For the flyover option fences and landscaping would generally block views of the structure. The depressed Meadowview Road option would eliminate long range views for motorists for a limited distance along Meadowview Road, while views from residences would be limited to the tops of catenary facilities. For the at-grade crossing option views from residences would be limited to the tops of catenary poles and wires.	LS		LS
• UPRR/Union House Creek Bridge: Views from homes would be partially obscured by the backyard fences and	LS		LS

Table 6.3-1: Summary of Impacts and Proposed Mitigation for the TSM and LPAP2 Alternatives

Impact	Significance	Mitigation	Significance After Mitigation
landscaping, but some second story windows may have views of the LPAP2 LRT facilities. The planned Cosumnes River Boulevard extension (by others) would also cross over the UPRR corridor on a separation structure just to the south of the LRT/UPRR separation structure.			
• Morrison Creek LRT Station: Some residences would have long-range views of the LRT Station, PNR lot and rail alignment. These changes would not substantially degrade a scenic vista or be out of character with existing and planned land uses, including the proposed future extensions of Cosumnes River and Detroit Boulevards. These and other planned future land uses would also result in visual changes.	LS		LS
• Franklin Boulevard LRT Station: Except for residences with visual screening, views of the station and PNR lot (with lighting in foreground) would replace views of vacant land. This would not substantially degrade scenic views or introduce obtrusive visual elements substantially out of character with existing and proposed land uses.	LS		*LS*
• Franklin Boulevard crossing options: The flyover option structure would be viewed by Franklin and Cosumnes River boulevard motorists, and some residential areas to the north, but visual changes are not substantially inconsistent with the existing intersection and the proposed future Cosumnes River Boulevard extension.	LS		*LS*
The at-grade crossing option LPAP2 LRT facilities would result in visual changes, but would not detract from the existing visual character of the intersection.	LS		*LS*
• Center Parkway Station and pedestrian overcrossing: Facilities would be visually consistent with the widened Cosumnes River Boulevard. Views from residences			

Table 6.3-1: Summary of Impacts and Proposed Mitigation for the TSM and LPAP2 Alternatives

Impact	Significance	Mitigation	Significance After Mitigation
would be blocked by existing walls. The pedestrian overcrossing would be visible to Cosumnes River Boulevard motorists, but would not be substantially out of character with the roadway nor obscure scenic views. The pedestrian overcrossing and lighting facilities would be visible from some backyards or second-story windows.	LS		*LS*
• Bruceville Road flyover: Although visually apparent to motorists on Cosumnes River Boulevard and Bruceville Road, the flyover structure would not be inconsistent with the existing roadway intersection, traffic signals and utility poles. The flyover option would be more visible from the residential area north of Cosumnes River Boulevard. Existing privacy walls partially block views of this intersection. The design will seek to accentuate the architectural character of the college gateway.	LS		*LS*
• Cosumnes River College Station: Station features and catenary poles would interrupt long-range views of vacant land from the college entrance and parking areas, but would be consistent with the existing and proposed land uses. No scenic views would be obscured. At night the immediate area would be lighter due to 24-hour security lighting.	LS		*LS*
• Optional Shuttle Lot at Calvine/Auberry: Most residential properties are walled-off from the existing roadway and are located a considerable distance away. Visual elements of the optional shuttle lot would include bus shelters and lighting associated with the new facility. At night the immediate area would be lighter due to 24-hour security lighting.	LS		*LS*

Table 6.*3*-1: Summary of Impacts and Proposed Mitigation for the TSM and LPAP2 Alternatives

Impact	Significance	Mitigation	Significance After Mitigation
4.2.2 Agricultural Impacts			
• The LPAP2 would require approximately *5.6* total acres of farmland. Approximately 3.6 acres of farmland would be required for the LPAP2 LRT alignment *and* 2.0 acres for the Morrison Creek Station and PNR lot. *(Additionally, 19.1 acres of SRCSD Bufferlands, currently used for cattle grazing would be affected)* These areas of farmland are not under a Williamson Act contract and are located adjacent to urbanized areas and most of the total farmland area that would be taken for the project is zoned for uses other than agriculture.	LS	No mitigation is indicated.	LS
• Form NRCS-CPA-106 has been submitted to the NRCS. Following their review, a total site farmland assessment criteria score will be determined for the project.	LS		LS
4.3.3.2 AIR QUALITY IMPACTS: TSM ALTERNATIVE			
• Regional criteria pollutant emissions are projected to decrease by *61.8* pounds per day (ppd) for CO, *3.4* ppd for ROG, *13.2* ppd for NO_X, *0.3* ppd for SO_X, and *2.3* ppd for PM_{10}, respectively, when compared to the No-Action Alternative.	B	No mitigation is indicated.	B
• Small localized increases in CO would result, but are not anticipated to exceed the State one- and eight-hour standards, and no impacts to sensitive receptors are expected.	LS		LS
• The PNR lot CO hot spot analysis indicated that automobile use at the PNR lot would not produce emissions that exceed State or federal CO standards.	LS		LS
• The PM_{10} hot spot analysis indicated that PM_{10} emissions from the idling of TSM buses would not exceed State or	LS		LS

Table 6.*3*-1: Summary of Impacts and Proposed Mitigation for the TSM and LPAP2 Alternatives

Impact	Significance	Mitigation	Significance After Mitigation
federal PM_{10} standards. • *Greenhouse gas emissions would decrease when compared to the No-Action Alternative, and no impact to global warming is anticipated.*	*B*		*B*
4.3.3.3 AIR QUALITY IMPACTS: LPAP2 • Regional criteria pollutant emissions would decrease by *134.9* ppd for CO, *5.8* ppd for ROG, *22.4* ppd for NO_X, *0.4* ppd for SO_X, and *3.9* ppd for PM_{10}, when compared to the No-Action Alternative.	B	No mitigation is indicated	B
• Small localized increases in CO would result, but are not anticipated to exceed the State one- and eight-hour standards, and no impacts to sensitive receptors are expected.	LS		LS
• The PNR Lot CO hot spot analysis indicated that automobile use at PNR lots would not produce emissions that would exceed State or federal CO standards.	LS		LS
• The PM_{10} hot spot analysis indicated that emissions from the idling of buses at stations would not exceed State or federal PM_{10} standards.	LS		LS
• *Greenhouse gas emissions would decrease when compared to the No-Action Alternative, and no impact to global warming is anticipated.*	*B*		*B*

Table 6.3-1: Summary of Impacts and Proposed Mitigation for the TSM and LPAP2 Alternatives

Impact	Significance	Mitigation	Significance After Mitigation
4.4 BIOLOGICAL RESOURCES		TSM:	
TSM Alternative			
• No impact to wetlands or other waters of the U.S.	N	*No Mitigation Necessary*	N
• Loss of up to 2.0 acres of suitable habitat for western burrowing owl.	LS	*B-5;B-6* Permanent impacts to western burrowing owl burrows and foraging habitat will be mitigated through purchase of credits at a CDFG-approved mitigation bank.	LS
LPAP2		LPAP2:	
• Loss of 0.311 acres of jurisdictional wetlands.	PS	*B-1* *Compensate for impacts to vernal pool crustacean habitat through purchase of the equivalent of 2.26 acres of preservation credits, and 0.14 acre of creation/restoration credits from a USFWS-approved conservation bank, or combination of banks.*	LS
• Loss of up to 0.14 acres of seasonal wetlands that provides suitable habitat for vernal pool fairy shrimp, midvalley fairy shrimp, vernal pool tadpole shrimp, and California linderiella.	S		LS
		B-2 *Transplant directly affected elderberry shrubs and purchase the appropriate number of beetle habitat credits at a USFWS-approved conservation bank prior to ground breaking.*	
• Loss of up to 0.04 acre of habitat suitable for western pond turtle and giant garter snake.	S	*B-3* *Purchase equivalent of 9.823 acres of giant garter snake habitat credits from a USFWS-approved conservation bank.*	LS
• Disturbance of between 0.70 to 63.34 acres of nesting and foraging habitat for 13 special-status bird species.	PS	*B-4* Consult with SRCSD Bufferlands manager to explore opportunities to compensate for impacts to nesting and foraging habitat for special-status bird species.	LS

Table 6.*3*-1: Summary of Impacts and Proposed Mitigation for the TSM and LPAP2 Alternatives

Impact	Significance	Mitigation	Significance After Mitigation
• *Possible loss of Valley oaks (Quercus lobata), interior live oak (Quercus wislizenii), and blue oak (Quercus douglasii) from SRCSD Bufferlands. Trees planted in 1995 as part of the Trail of Trees effort.*		*B-5; B-6* Permanent impacts to western burrowing owl burrows and foraging habitat and Swainson's hawk foraging habitat will be mitigated through the purchase of credits at a CDFG-approved mitigation bank. *B-7* *Provide a qualified arborist to survey potentially affected trees. To extent possible, avoid removal of native oaks, mature native riparian trees, and any other protected trees. Develop and implement a mitigation plan, in accordance with the applicable City ordinances, to compensate for removal of protected trees. Compensate for loss of protected trees pursuant to the City of Sacramento Heritage Tree Ordinance* *B-8* *Will obtain all necessary permits pertaining to affected waters of the U.S. The permitting process would also require compensation for project-related impacts.* *B-9* Purchase mitigation credits in an agency-approved wetland mitigation bank or an in lieu fee.	
4.5 IMPACT TO ARCHAEOLOGICAL RESOURCES TSM Alternative No impact.	PS	TSM and LPAP2: *H&C-1* During construction in identified areas, monitoring will be conducted by a qualified professional archaeologist and/or a member of the local Native American community. The monitor(s) will have the ability to	

Table 6.3-1: Summary of Impacts and Proposed Mitigation for the TSM and LPAP2 Alternatives

Impact	Significance	Mitigation	Significance After Mitigation
LPAP2 Pavement and other obstructions made it impossible to conclude with absolute certainty that no unrecorded cultural remains exist in: • Areas of San Joaquin silt-loam soils that could not be surveyed because of pavement or other obstructions, including Cosumnes River Boulevard between Center Parkway and Bruceville Road, and the optional shuttle lot location at Calvine/Auberry; • Densely-vegetated natural stream crossings and stream-side terraces (areas of higher archaeological sensitivity) along Morrison, Union House, and Strawberry creeks; and • The anomalies within the densely-vegetated Bufferlands identified by Tremaine and Associates.	N	temporarily stop any work in an area where archaeological materials or human remains are uncovered long enough to assess the finds and, in the case of human remains, to follow the stipulations set out in the State Health and Safety Code (Section 7050.5.). Such provisions will be in the construction contracts. *H&C-2* If unanticipated archaeological resources are encountered during construction, they would be addressed in consultation with the Office of Historic Preservation (OHP) or in accordance with an archaeological treatment plan to be developed in consultation with OHP. Such provisions will be in the construction contracts.	LS N
4.5.4.2 Impacts to Historic Architectural Resources • No impact under either build alternative.	N	No mitigation is indicated.	N
4.6.1.2 ELECTRICAL AND MAGNETIC FIELD (EMF) IMPACTS • No impacts under the TSM Alternative • At present, the evidence is that any increased health risks from EMF exposures attributable to light rail improvements would be very small.	N LS	No mitigation is indicated.	N LS
4.6.2 ELECTRICAL AND MAGNETIC INTERFERENCE (EMI) IMPACTS • No impacts under the TSM Alternative.	N	No mitigation is indicated.	N

Table 6.3-1: Summary of Impacts and Proposed Mitigation for the TSM and LPAP2 Alternatives

Impact	Significance	Mitigation	Significance After Mitigation
• The LPAP2 would generate EMF, which could interfere with the effective performance of electronics and electrical equipment. EMI effects would be minimized as part of project design. This may be done by ensuring that all electronic equipment is operated with a good electrical ground and that proper shielding is provided for electronic system cords, cables, and peripherals. Specialized components, such as filters, capacitors and inductors, can also reduce EMI susceptibility of certain systems. The design of the system will consider and incorporate, where practicable, the latest standards relevant to (minimizing) EMI.	LS	*EMF-1* The potential for EMI effects can be minimized by ensuring that all electronic equipment is operated with a good electrical ground and that proper shielding is provided for electronic system cords, cables, and peripherals. *EMF-2* Specialized components, such as filters, capacitors and inductors that can also reduce EMI susceptibility of certain systems will be installed, as appropriate.	LS
4.7.2 Geological and Soils Impacts For either the TSM or LPAP2 Alternative: • The risk of an actual fault rupture in the project area appears very low. The proposed facilities would, however, be exposed to a risk of substantial ground shaking, which can impose loads on structures and earth embankments. Some soils (most likely those associated with basin deposits) may be susceptible to seismically induced liquefaction and settlement, which could affect design and service of the alternatives.	PS	TSM and LPAP 2: All geologic hazard impacts will be fully addressed by design requirements. Therefore no mitigation is indicated.	LS
4.8.2 Hazardous Waste Impacts Either the TSM or LPAP2 Alternative • Construction activities may be affected by releases of hazardous materials from known or previously unidentified hazardous waste sites. Construction activities such as clearing and grubbing and excavation may expose or encounter hazardous materials.	PS	*Either the TSM or* LPAP2 *Alternative*: *HW-3* Contractors will incorporate procedures into a construction management plan describing how they will monitor for subsurface contamination.	LS

Table 6.3-1: Summary of Impacts and Proposed Mitigation for the TSM and LPAP2 Alternatives

Impact	Significance	Mitigation	Significance After Mitigation
LPAP2 Only • Contaminated groundwater may be encountered and affect underground structures associated with the LPAP2 LRT corridor or maintenance yards – such as foundations, vaults or manholes. • Dewatering during trenching or excavating may change or amplify local hydraulic gradients and draw groundwater contamination into the trench or excavation. • New tracks and passenger LRT service would be introduced into a segment of the existing UPRR corridor with existing freight rail service. Safety issues associated with any hazardous materials transport on freight trains would not increase or decrease as a result of the LPAP2 and would remain the responsibility of the UPRR. Purchase agreements for property acquired along the alignment will address the characterization, remediation, and liability for existing hazardous environmental conditions.	PS PS LS	*HW-4* Prepare and implement a contingency plan for handling and disposing of contaminated soil and groundwater. *HW-6* Perform Phase 2 site investigations where indicated. *HW-8* Remediation and/or disposal of all materials deemed to be hazardous. *LPAP2 Only* *HW-1* Exposed soil in the median or on the shoulder of highways and primary traffic corridors that are more than 20 years old will be tested for lead prior to beginning construction. *HW-2* *The three* buildings subject to demolition will be inspected (and tested as necessary) for asbestos containing materials and lead based paints. *HW-4* *Prepare and implement a contingency plan for handling/disposing of contaminated soil and groundwater.* *HW-5* Additional site specific information will be collected regarding hazardous material/waste for those properties that would be required. *HW-7* All contaminated materials encountered will be evaluated in the content of applicable local state, and federal regulations and/or guidelines governing hazardous wastes.	*LS* *LS* *LS* LS LS LS *LS*

Table 6.3-1: Summary of Impacts and Proposed Mitigation for the TSM and LPAP2 Alternatives

Impact	Significance	Mitigation	Significance After Mitigation
			LS
4.9.2 HYDROLOGY/FLOODPLAIN/WATER QUALITY IMPACTS			
TSM Alternative		TSM:	
• No long-term groundwater impacts are anticipated. • Runoff from the PNR lot would be directed to the storm water systems, and eventually to receiving waters.	N	*WQ-4* Parking lot pavement, catch basins, and storm drains will be cleaned regularly.	N
LPAP2		LPAP2	
• From Morrison Creek to Union House Creek, and from Franklin Boulevard to Center Parkway, a planned (2005) flood control project (by others) will eliminate 100-year flood hazards.	LS	*WQ-1* Develop final floodplain mitigation plan in consultation with ACOE*, the Central Valley Flood Protection Board,* and SAFCA.	LS
• From Union House Creek to Franklin Blvd., the LPAP2 LRT line would be constructed on a fill embankment above the 100-year flood elevation. Culverts through the embankment would convey runoff/flood flows.	N	*WQ-2 In the unlikely event the SSCS project is delayed and floodplain protection is not in place, mitigation measures will be incorporated into the LPAP2 design to minimize impacts due to potential flooding.*	N
• The Franklin PNR lot would be constructed above the 100-year floodplain. • The south berm of a large detention basin at Franklin Sta. would be modified. Flood storage reduction would be avoided.	LS	*WQ-3 For fill in 100-year floodplain either (1) excavate compensating floodplain storage equal to the amount removed, or (2) pay a mitigation fee to SAFCA.*	LS
• On a regional basis, considering the urban area, the existing highway and local street network, and other paved surfaces such as structures and parking lots, runoff from the LPAP2 would be negligible.	LS	*WQ-4* Parking lot pavements, catch basins, and storm drains will be cleaned regularly. Solid waste will be collected from facilities on a regular basis.	LS

Table 6.3-1: Summary of Impacts and Proposed Mitigation for the TSM and LPAP2 Alternatives

Impact	Significance	Mitigation	Significance After Mitigation
4.10 LAND USE AND PLANNING			
TSM Alternative			
• Consistent with local and regional plan goals that promote transit use. Acquisition of approximately 16.7 acres of land to construct one bus PNR lot.	LS	No mitigation is indicated.	LS
LPAP2			
• Consistent with the land use and development objectives of local development plans and policy: to promote a transit system that influences growth into efficient and coherent patterns to improve the region's economy, land use, air, and quality of life. The South Sacramento Corridor Phase 2 Project is included in the California State Transportation Improvement Program, SACOG's Metropolitan Transportation Plan, Sacramento County General Plan, City of Sacramento General Plan, Airport-Meadowview Community Plan, and the South Sacramento Community Plan, all of which promote preservation of rights-of-way for future LRT use and land use policy decisions that support the extension of the light rail system. Supportive land use planning would encourage compact development around station locations and promote maximum compatibility and coordination with the light rail system and area land uses. An estimated *54.4* acres would be required for construction of the LPAP2 alignment, stations, and PNR lots.	B	No mitigation is indicated.	B
• Approximately *6.3* acres of CRC property *and 11.4* acres of SRCSD bufferlands would be converted to public right-of-way. An additional 8.9 acres would come from the UPPR.	LS		LS

Table 6.3-1: Summary of Impacts and Proposed Mitigation for the TSM and LPAP2 Alternatives

Impact	Significance	Mitigation	Significance After Mitigation
4.11 MINERALS AND ENERGY Minerals • No precious or scarce minerals would be mined or consumed in significant quantities to support the construction and operation of the alternatives under consideration.	LS		LS
Energy Impacts Although transit vehicle miles of travel (VMT) would increase with the TSM or LPAP2 Alternative, these increases are more than offset by a corresponding decrease in auto/truck VMT as travelers shift to transit and drive less. Net energy consumption for vehicle operations (i.e., direct energy consumption) is lowest for the LPAP2. The TSM Alternative is second lowest. Direct energy consumption would be highest for the No-Action Alternative.	B	No mitigation is indicated.	B
When total system energy is considered, both the TSM Alternative and the LPAP2 show lower energy consumption than the No-Action Alternative.	B		B
4.12.4 NOISE IMPACTS TSM Alternative • No noise impacts for the TSM Alternative	N	TSM: No mitigation is indicated.	N
LPAP2 • Noise impacts along the LPAP2 LRT alignment would vary depending on the design options selected. Noise impacts along the LPAP2 LRT alignment would vary from *348* (*57* "*Moderate*" and *291* "Severe") to *378* (*53* "*Moderate*" and *325* "Severe	S	LPAP2: *N&V-1 Noise barriers will be constructed to mitigate noise impacts in compliance with FTA and RT criteria.* *N&V-2 Sound insulation could be considered for*	LS

Table 6.3-1: Summary of Impacts and Proposed Mitigation for the TSM and LPAP2 Alternatives

Impact	Significance	Mitigation	Significance After Mitigation
		residences near the Meadowview Road At-Grade Option and N. Laguna Drive, south of CRB. *N&V-3 RT will coordinate mitigation with SAFCA, ACOE, and City of Sacramento to address barrier needs of South Sacramento Corridor Phase 2, flood control, and CRB Widening and Extension projects.* *N&V-4 Other potential mitigation measures include minimizing the wheel impacts at crossovers and various approaches, implementing an ongoing rail grinding program along with the recommended wheel profile to reduce the incidence of wheel squeal.* *N&V-5 Bell sound levels at rail/roadway crossings will be set to minimum sounds levels allowed by the CPUC. RT will specify that bells with easily adjustable volumes and adjustable ring rates be installed. Calibration of bell sounds will be performed prior to initiation of revenue service. If approved by the CPUC, shrouds will be installed on bells to direct the sound towards the grade crossings.*	
4.12.5 VIBRATION IMPACTS TSM Alternative • No vibration impacts LPAP2 • Vibration impacts along the *full* LPAP2 alignment would	N S	TSM: No mitigation is indicated. LPAP2:	N LS

Table 6.3-1: Summary of Impacts and Proposed Mitigation for the TSM and LPAP2 Alternatives

Impact	Significance	Mitigation	Significance After Mitigation
be the same for all design options selected, with the number of homes affected being 29.		N&V- 6 Ballast mats in areas where potential for impact has been identified (near Meadowview and super levee).	
4.13 POPULATION, HOUSING, AND ENVIRONMENTAL JUSTICE			
TSM Alternative		TSM:	
• No displacements of residential	N	No mitigation is indicated.	N
• Additional bus services would improve local and regional linkages among neighborhoods, businesses and community facilities.	B		B
• There would be no disproportionate distribution of improved bus service and the new bus PNR lot to low-income and minority populations.	N		N
• There would be no disproportionate distribution of adverse impacts to low-income or minority populations.	N		N
LPAP2		LPAP2:	
• Two single-family homes would be acquired in the Morrison Creek area.		No mitigation is indicated.	LS
• One residential property (unit) would require relocation for the LPAP2 if the optional Center Parkway Pedestrian Overcrossing Option were constructed.	LS		LS
• Extended LRT service would improve local and regional linkages among neighborhoods, businesses and community facilities with improved travel times in comparison with the No-Action and TSM Alternatives.	B		B
• Access to employment, education, medical, and retail centers would be improved. There would not be a disproportionate distribution of these benefits to low-income and minority populations	B		B
• There would be no adverse impacts or disproportionate	N		N

Table 6.3-1: Summary of Impacts and Proposed Mitigation for the TSM and LPAP2 Alternatives

Impact	Significance	Mitigation	Significance After Mitigation
distribution of adverse impacts to low-income or minority groups.			
4.14 PUBLIC SERVICES AND FACILITIES TSM Alternative • Ten community facilities (including recreation facilities) would realize direct benefits of improved bus service.	B	No mitigation is indicated.	B
LPAP2 • Ten community facilities (including recreation facilities) would realize direct benefits of improved transit access as a result of the LPAP2. Extending LRT service would also improve accessibility to community facilities in downtown Sacramento and other regional activity centers.	B		B
4.15 PARKS AND RECREATION IMPACTS TSM Alternative • Four park and recreational facilities would realize direct benefits of improved bus service.	B	No mitigation is indicated.	B
LPAP2 • Four park and recreational facilities would realize direct benefits of improved transit access. Extending LRT service would also improve accessibility to park and recreational facilities in downtown Sacramento and other regional activity centers.	B		B
• Design options for the Cosumnes River Boulevard-Bruceville Road transition would differ in their effects to the berm at the northeast corner of the Cosumnes River College stadium. The at-grade option would cut through a portion of the berm, and a new retaining wall would be	LS		LS

Table 6.3-1: Summary of Impacts and Proposed Mitigation for the TSM and LPAP2 Alternatives

Impact	Significance	Mitigation	Significance After Mitigation
required along the western portion of the trackway to support the stadium embankment. The flyover option would incorporate part of the berm in the flyover's abutment. There would be no adverse effect on access to or operations or use of the stadium under either the at-grade or flyover options. Visual effects are described in Section 4.1.			
4.16 SAFETY AND SECURITY TSM Alternative • Increased bus services would require increased security. • The alternative would not expose children to disproportionate environmental health or safety risk. LPAP2 • Stations, parking lot areas, and maintenance facility would require the same level of security services as existing facilities. • New rail stations would create activity centers with increased pedestrian activity, auto/bus drop-offs/loadings, and PNR lot traffic, and would create the potential for safety and/or security incidents. • Large parking areas would increase the risk of vandalism to vehicles. • Circulation of autos and pedestrians in PNR lots would create the potential for auto-pedestrian conflicts, primarily during peak periods. • Safety and security of LRT passengers at station facilities would be a concern, with peak periods and late evenings typically requiring additional oversight. • The reduction of corridor auto traffic is expected to have	PS LS PS PS PS PS PS	TSM: *TS-1* RT security services would be extended to the increased bus services. LPAP2: *S-1* During preliminary engineering for the LPAP2, RT has coordinated with security representatives from RT's internal security and the Sacramento City Fire Department to review appropriate security and emergency access provisions at the LRT stations. RT will also: *S-1* Continue to coordinate during final design with security representatives from RT's internal security and the Sacramento City Fire Department to review appropriate security and emergency access provisions at the LRT stations. *S-2* Increase security services and assigned law enforcement personnel for the LPAP2,	LS LS LS LS LS LS LS

Table 6.3-1: Summary of Impacts and Proposed Mitigation for the TSM and LPAP2 Alternatives

Impact	Significance	Mitigation	Significance After Mitigation
a beneficial effect on motor vehicle accident rates and resulting injuries.	B	consistent with its security practices.	B
• The LPAP2 LRT tracks and stations would be adjacent to an active freight railroad and would traverse high volume roadways that require crossings by pedestrians and vehicular traffic, increasing the potential for accidents.	PS	*S-3* Expand fire safety and emergency response training to include fire districts in the South Sacramento Corridor that will be responsible for providing these services.	LS
• The alternative would not expose children to disproportionate environmental health or safety risk. Short-term construction effects would be mitigated with the measures described in Section 5.2. At-grade rail crossings would be signalized and would comply with Public Utilities Commission regulations.	LS	*S-4* Invite public participation regarding station design details during the final design phase of the project to identify and address safety and security concerns.	LS
4.17 UTILITIES			
TSM Alternative		TSM:	
• The PNR lot may require minor utility relocations or new utility services, potentially affecting existing and planned utilities. Affected utilities would be relocated only following consultation with their owners. It is anticipated that any required utility relocations could be managed with only short-term disruptions to utility service.	LS	No mitigation is indicated.	LS
LPAP2		LPAP2:	
• Construction could affect underground and above-ground utilities throughout the alignment. RT will continue to plan and coordinate with utility providers during the preliminary engineering and final design to minimize or eliminate interruption in utility service to customers. A set of detailed plans will be submitted to utility providers for review and comment prior to any relocation work.	PS LS	No mitigation is indicated.	LS LS

Table 6.3-1: Summary of Impacts and Proposed Mitigation for the TSM and LPAP2 Alternatives

Impact	Significance	Mitigation	Significance After Mitigation
• Some utilities may be moved to the edges of the LPAP2 LRT right-of-way. Where space within the right-of-way is not available, some utilities would be relocated to easements in adjacent properties. Underground gas, water and sanitary sewer utilities crossing the trackway would be provided with additional protection including minimum depth of ground cover and possibly steel casings in accordance with state and federal pipeline safety laws.			
5.2.1 CONSTRUCTION PHASE AESTHETICS IMPACTS TSM or LPAP2 Alternative • Construction activities and equipment would introduce visual signs of construction to the area, including stockpiling of soils and materials and the use of heavy equipment.	LS	TSM or LPAP2: *CA-1* RT will require the contractor to maintain the site in an orderly manner, removing trash, waste, and securing equipment and vehicles at the close of each day's operation. *CA-2* To reduce glare from lighting used during nighttime construction activities, RT will require the contractor to direct lighting onto the immediate area under construction only, and to avoid shining lights toward residences and traffic lanes. Nighttime construction would possibly occur only for those activities involving street closures for mitigating impacts to the traveling public such as grading and installation of tracks across roadway, installing of grade crossing safety devices and utility relocations. *CA-3* To reduce dust the contractor would be	LS

Table 6.3-1: Summary of Impacts and Proposed Mitigation for the TSM and LPAP2 Alternatives

Impact	Significance	Mitigation	Significance After Mitigation
		required to use water trucks during grading to keep the ground moist.	
5.2.2 CONSTRUCTION PHASE AGRICULTURE IMPACTS TSM or LPAP2 Alternative It is not anticipated that construction activities would disturb agricultural land, crops or soils. Construction access roads, staging and equipment laydown areas would be delimited to avoid agricultural property. Provisions will be incorporated into the construction contracts to avoid parking impacts to agricultural land. Construction-phase mitigation measures for air and water quality, traffic and hazardous materials, as described in their respective sections, would also minimize temporary effects on agricultural land.	N	TSM or LPAP2: Construction access roads, staging and equipment laydown areas would be delineated to avoid agricultural property. Provisions will be incorporated into the construction contracts to designate areas for construction worker parking to avoid impacts to agricultural land. No mitigation is required.	N
5.2.3 Construction Phase Air Quality Impacts TSM or LPAP2 Alternative • Construction activities would generate short-term emissions of dust, fumes, equipment exhaust, pollutants, and other air contaminants. Construction impacts were evaluated based on a "worst-case" scenario in which all project facilities would be constructed at the same time—which is unlikely. Under this assumption, *construction* emissions are *not* anticipated to exceed the SMAQMD and federal thresholds. *However, mitigation measures are recommended to reduce construction-related emissions.*	*LS*	Fugitive Dust/PM10 Mitigation Mitigation Measures for NO_X (either build alternative) *CAQ-1 Construction area and vicinity will be swept and watered at least twice daily.* *CAQ-2 Unpaved roads, parking and staging areas will be watered at least once every two hours of active operations.* *CAQ-3 Site access points will be swept/washed within 30 minutes of visible dirt deposition.* *CAQ-4 On-site stockpiles of debris or dirt will be enclosed, covered or watered at least twice daily.* *CAQ-5 All haul trucks hauling materials will be covered and will maintain at least two*	*LS*

Table 6.3-1: Summary of Impacts and Proposed Mitigation for the TSM and LPAP2 Alternatives

Impact	Significance	Mitigation	Significance After Mitigation
		feet of freeboard. CAQ-6 Haul trucks will have the capacity of no less than 12.75 cubic yards. CAQ-7 At least 80 percent of inactive disturbed surface areas will be watered on a daily basis when there is evidence of wind-driven fugitive dust. CAQ-8 Operations on any unpaved surfaces will be suspended when winds exceed 25 mph. CAQ-9 Traffic speeds on unpaved roads will be limited to 15 miles per hour. CAQ-10 Operations on any unpaved surfaces will be suspended during first and second stage smog alerts. CAQ-11 Truck loading zones will be maintained in the construction area. CAQ-12 Temporary traffic control will be provided during all phases of construction activities to improve traffic flow. CAQ-13 Best efforts will be used to limit truck idling to no more than two minutes. CAQ-14 Non-toxic soil stabilizers (according to manufacturers' specifications) will be applied to all inactive construction areas. CAQ-15 A plan subject to approval by the SMAQMD will be prepared to show that heavy-duty off-road vehicles used during	

Table 6.3-1: Summary of Impacts and Proposed Mitigation for the TSM and LPAP2 Alternatives

Impact	Significance	Mitigation	Significance After Mitigation
		construction would achieve a project-wide fleet-average reduction of approximately 20 percent for NO_x and approximately 45 percent for PM_{10} when compared to most recent CARB fleet average at time of construction. *CAQ-16* *A comprehensive inventory of all off-road construction equipment, equal to or greater than 50 horsepower, that would be used an aggregate of 40 or more hours during any portion of the construction phase will be submitted to the SMAQMD.* *CAQ-17* *Emissions from all off-road diesel-powered equipment used during construction will not exceed 40 percent opacity for more than three minutes in any one hour.*	
5.2.4 CONSTRUCTION IMPACTS ON BIOLOGICAL RESOURCES TSM Alternative • Construction of PNR lots may disturb non-native grassland that provide suitable habitat for the western burrowing owl. • No wetland areas would be affected. • Natural resources may be adversely affected by construction dust, construction equipment emissions, increased runoff and soil erosion, and construction noise.	PS N LS	TSM or LPAP2: *CB-17* *Where possible, protect by a 50-foot buffer zone (ESA) with exclusionary fencing habitat for vernal pool fairy shrimp, Midvalley fairy shrimp, vernal pool tadpole shrimp, and California linderiella.*	LS N LS LS

Table 6.3-1: Summary of Impacts and Proposed Mitigation for the TSM and LPAP2 Alternatives

Impact	Significance	Mitigation	Significance After Mitigation
LPAP2 • Approximately 0.15 acre of wetlands/waters would be temporarily disturbed at Morrison Creek and 0.05 acre of wetlands/waters at Morrison Creek/Union House Creek. • Construction activities and related impacts may disturb vernal pool, riparian and non-native grassland natural communities that provide suitable habitat for up to 19 special-status species including four invertebrates, two reptiles and 13 bird species. • There is no confirmed evidence that any or all of these species are present in the project area or would be present at the time of construction. All sensitive habitat and wetland areas would be identified for avoidance during project design. • *Possible loss of Valley oaks (Quercus lobata), interior live oak (Quercus wislizenii), and blue oak (Quercus douglasii) from SRCSD Bufferlands. Trees planted in 1995 as part of the Trail of Trees effort.*	PS PS PS *PS*	*CB-23* *Pre-construction survey of all project affected aquatic habitat no more than 24 hours prior to instream construction or disturbance of riparian vegetation. If western pond turtles are found, on-site monitoring and possible relocation shall be implemented.* *CB-24* *Construction in GGS habitat is preferably from May 1 to October 1. If between October 2 and April 30 USFWS may require additional measures.* *CB-25* *Where possible, protect giant garter snake (GGS) habitat by a 200-foot buffer zone (ESA) with exclusionary fencing.* *CB-26* *Best management practices for water quality shall be implemented.* *CB-28* *Survey for GGS 24 hours prior to construction.* *CB-30* *A qualified, USFWS-approved biological monitor shall be present during construction within suitable habitat. If a snake is encountered, all construction activities in the immediate area shall be halted until appropriate corrective measures are implemented.* *CB-41* *Survey for western burrowing owls and burrows within 330 feet no more than two*	LS LS *LS*

Table 6.3-1: Summary of Impacts and Proposed Mitigation for the TSM and LPAP2 Alternatives

Impact	Significance	Mitigation	Significance After Mitigation
		weeks before construction. *CB-42* *If active burrows are located, a no-disturbance buffer will be established around each active burrow. The size of the buffer will be determined through CDFG.* *CB-43* *If adverse effects to occupied burrows are unavoidable, the owls shall be passively relocated using techniques approved by CDFG.* *LPAP2 Only:* *CB-1* *Include a copy of the Biological Opinion within solicitations for design and construction, making the primary contractor responsible for implementation.* *CB-2* *Implement measures consistent with Best Management Practices (BMPs), including Storm Water Pollution Prevention Plan (SWPPP) and Water Pollution Control Program (WPCP) to minimize effects to giant garter snake and prevent pollution of streams, waterways, and other bodies of water during construction, to prevent sedimentation from entering Environmentally Sensitive Areas (ESAs), and to reduce erosion, dust, noise, and other deleterious aspects of construction related activities. BMPs may include, but*	

Table 6.3-1: Summary of Impacts and Proposed Mitigation for the TSM and LPAP2 Alternatives

Impact	Significance	Mitigation		Significance After Mitigation
			are not limited to, silt fencing, temporary berms, restrictions on cleaning equipment in or near ESAs, installation of vegetative strips, and temporary sediment disposal. Runoff from dust control and hazardous materials will be retained on the construction site and prevented from flowing into the ESAs.	
		CB-3	*Clearing and grubbing procedures that specify that only trees and plants designated for removal shall be removed.*	
		CB-4	*Excavation techniques would ensure stability of subsurface materials as well as the retention of excavated materials within the construction areas.*	
		CB-5	*Construction within wetlands would be avoided during the rainy season.*	
		CB-6	*Materials and fluids generated by construction activities would be placed at least 100 feet from wetland areas or drainages until they could be disposed of at a permitted site.*	
		CB-7	*Post-construction, remove all temporary fill/ debris. Restore disturbed areas to pre-project conditions, using native grass seed mixes.*	
		CB-8,9	*Install high visibility fencing around habitats of federally listed species to identify and protect designated ESAs.*	

Table 6.3-1: Summary of Impacts and Proposed Mitigation for the TSM and LPAP2 Alternatives

Impact	Significance	Mitigation	Significance After Mitigation
		CB-10 *A qualified, USFWS-approved biological monitor shall be present during construction within suitable habitat. If a snake is encountered, all construction activities in the immediate area shall be halted until appropriate corrective measures are implemented.* *CB-11* *Implement a Worker Environmental Awareness Training Program for construction personnel to be conducted by the USFWS-approved biologist.* *CB-12* *The number and size of access roads and staging areas, and the total area of project activities will be restricted to the minimum necessary for the duration of construction activities.* *CB-13* *All food-related trash items must be disposed of in closed containers and removed at the end of each work day.* *CB-14* *A post-construction walkthrough will be conducted to assess whether any damage occurred to vegetation within buffer areas. Damage may include accidental cutting of vegetation or visible physical damage to roots, stems, and leaves. If damage is observed, vegetation within the buffer areas will be restored with appropriate native plant species.*	

Table 6.3-1: Summary of Impacts and Proposed Mitigation for the TSM and LPAP2 Alternatives

Impact	Significance	Mitigation	Significance After Mitigation
		CB-15 *RT will maintain and monitor the project site for one (1) year following the completion of construction and restoration activities.* *CB-16* *Measures will be taken by the contractor to avoid the introduction of new noxious weeds and the spread of weeds previously documented at the project area.* *CB-18* *Prior to construction, RT shall conduct a survey to assess the status of existing elderberry shrubs within the project site.* *CB-19* *Construction shall be prohibited within 100 ft. of elderberry plants during beetle emergence and mating period.* *CB-20* *No application of herbicides, insecticides, and/or other chemical agents shall occur within 100 feet of elderberry plants or where they might drift of wash into the area of elderberry plants.* *CB-21* *Protective fencing shall be established around all shrubs that are not removed prior to initiating and construction activities on the site.* *CB-22* *Post-construction walkthrough will be conducted to assess whether any damage occurred to vegetation within the buffer areas.*	

Table 6.3-1: Summary of Impacts and Proposed Mitigation for the TSM and LPAP2 Alternatives

Impact	Significance	Mitigation	Significance After Mitigation
		CB-27 Any dewatered GGS habitat shall remain dry for at least 15 consecutive days after April 15 and prior to excavating or filling. CB-29 Appropriate netting will be used for erosion control and other purposes to ensure that the giant garter snake does not get trapped or CB-31 Clearing will be confined to the minimal area necessary to facilitate construction activities. CB-32 Following completion of construction, all temporary fill and construction debris will be removed from the project and disturbed areas will be restored to pre-project conditions. CB-33 RT will compensate for project-related temporary impacts to giant garter snake habitat by purchasing the equivalent of 8.44 acres of giant garter snake habitat credits. All temporary effects will be compensated at a 1:1 ratio.become entangled. CB-34 If construction or tree removal will occur between February and August, preconstruction surveys for migratory bird, raptor, or special-status birds nests will be conducted within 0.25 mile of the project area.	

Table 6.3-1: Summary of Impacts and Proposed Mitigation for the TSM and LPAP2 Alternatives

Impact	Significance	Mitigation	Significance After Mitigation
		CB-35 *Surveys shall be conducted no more than 30 days prior to the initiation of construction activities.* *CB-36* *If active nests are found, consult with USFWS and CDFG to develop avoidance/minimization measures.* *CB-37* *Raptor or migratory bird nest trees shall be removed outside of the nesting season (February through August), or after nest is empty and adult and young birds leave the tree.* *CB-38* *All natural communities and wetland areas outside the construction zone that could be affected will be temporarily fenced off using high visibility fencing and designated as ESAs.* *CB-39* *Annual survey for Swainson's hawk nests from March-August 15. If nests are discovered, consult with CDFG.* *CB-40* *In accordance with the Staff Report on Burrowing Owl Mitigation the following should be considered impacts; disturbance within 160 ft of an occupied burrow, destruction of occupied natural and artificial burrows, and destruction and/or degradation of foraging habitat adjacent (within 330 ft) of to an occupied burrow(s).*	

Table 6.3-1: Summary of Impacts and Proposed Mitigation for the TSM and LPAP2 Alternatives

Impact	Significance	Mitigation	Significance After Mitigation
		CB-41 *Pre-construction survey for western burrowing owls and burrows within 330 feet no more than two weeks before construction.* *CB-42* *If active burrows are located, a no-disturbance buffer will be established around each active burrow. The size of the buffer will be determined through CDFG.* *CB-43* *If adverse effects to occupied burrows are unavoidable, the owls shall be passively relocated using techniques approved by CDFG.*	
5.2.5 CONSTRUCTION EFFECTS ON CULTURAL RESOURCES TSM or LPAP2 Alternative • Although not anticipated, construction activities could result in the loss or degradation of previously undiscovered cultural resources.	PS	TSM or LPAP2: *CC-1* *If cultural materials are unearthed during construction, work in the vicinity would be halted until a qualified archaeologist can assess their significance.* *CC-2* If unanticipated archaeological resources are encountered during construction, they would be addressed in consultation with the Office of Historic Preservation (OHP)/or in accordance with an archaeological treatment plan to be developed in consultation with OHP.	LS

Table 6.3-1: Summary of Impacts and Proposed Mitigation for the TSM and LPAP2 Alternatives

Impact	Significance	Mitigation	Significance After Mitigation
5.2.6 CONSTRUCTION EMPLOYMENT TSM Alternative • *230* on-site full-time construction positions (PYE) and *370* total positions (PYE) would be generated.	B	No mitigation is required.	B
LPAP2 • *1,100* on-site full-time construction positions (PYE) and from *1,700* total positions (PYE) would be generated.	B		B
5.2.7 CONSTRUCTION-PERIOD GEOLOGICAL AND SOILS IMPACTS AND MITIGATION TSM or LPAP2 Alternative (except as indicated) Additional loads may be imposed on existing slopes, potentially resulting in slope instability. Slope instability could adversely affect constructed facilities on or adjacent to slopes and off-site properties. Weak and/or compressible soils may be present, particularly at shallow depth in or along creek channels and possibly in areas of existing fill. Such soils are a potential source of excessive settlement for structures and areas of fill, and in some cases their presence can also adversely affect construction operations.	PS	TSM or LPAP2: *CG&S-1* Design requirements that would likely be implemented for either build alternative include: excavation and replacement or lime-treatment of weak or expansive soils, and/or the use of synthetic materials to reinforce or partly replace weak soils and deep foundations.	LS
• Some soils at and near ground surface are expected to exhibit medium to high expansion potential. For such soils, changes in soil volume and strength are associated with changes in moisture content. The presence of expansive soils can adversely affect the service of pavements and slabs on grade. Where exposed in slopes, such cyclic changes in soil volume and strength are commonly associated with the down-slope creep of near-surface soils and shallow slumping.	PS	LPAP2: *CG&S-1* Design requirements specific to the LPAP2 are likely to include: modification or re-grading of slopes, increased set-backs and clearance from slopes, vegetation of slopes, lining channels, excavation and replacement or lime-treatment of weak or expansive soils, and/or the use of synthetic materials to reinforce or partly replace weak soils and deep foundations.	LS

Table 6.3-1: Summary of Impacts and Proposed Mitigation for the TSM and LPAP2 Alternatives

Impact	Significance	Mitigation	Significance After Mitigation
• In some locations shallow groundwater would be present and could affect earthwork, construction, and the service of floor slabs and roadbed/hardscape subjected to traffic load.	PS		LS
• Dewatering that is extensive in depth, volume and/or duration is not likely to be required, and dewatering activities are not expected to modify groundwater levels sufficiently to induce settlement.	PS		LS
5.2.8 Temporary Effects Due to Hazardous Materials TSM or LPAP2 Alternative • There is likelihood that hazardous waste may be encountered at the locations identified in Table 4.8-1. Contaminants at these sites may include but are not limited to aerially deposited lead, lead-based paint, MTBE and ACMs.	PS	TSM or LPAP2: *CHW-1* Walk-through site reconnaissance will be conducted for each of the site areas to identify any additional evidence of contamination. *CHW-2* A review will be conducted of the remediation status of the sites listed in Table 4.8-1. If remediation activities will be complete before construction of the project, then no further mitigation will be necessary. If remediation would not be completed prior to project construction, then an alternate mitigation plan will be prepared and implemented. *CHW-3* A site specific evaluation will be made of any known and suspected contaminated sites that would be distributed by construction operations before any soil is removed from affected areas for construction, using the following procedure:	LS

Table 6.3-1: Summary of Impacts and Proposed Mitigation for the TSM and LPAP2 Alternatives

Impact	Significance	Mitigation	Significance After Mitigation
		1) implementation of a Worker Health and Safety Plan; 2) preparation of a site specific work plan specifying the proposed location for surface samples or soil borings or trenches; 3) soil boring or trenching and sample collection; 4) laboratory analysis of samples; and 5) preparation of a findings and recommendations report. If the site-specific evaluations determine that contaminants are present, RT will determine the type and extent of contamination and will prepare and implement a remediation plan to avoid risks to public health and safety. *CHW-4* *If the site-specific evaluations determine that contaminants are present, RT will determine the type and extent of contamination and will prepare and implement a remediation plan to avoid risks to public health and safety.* *CHW-5* RT will notify the State Department of Toxic Substances Control, Sacramento County Environmental Health Department and the local fire department of any contaminants encountered during construction.	

Table 6.3-1: Summary of Impacts and Proposed Mitigation for the TSM and LPAP2 Alternatives

Impact	Significance	Mitigation	Significance After Mitigation
5.2.8 Construction Activity Effects on Hydrology, Floodplain and Water Quality TSM or LPAP2 Alternative (except as indicated)		TSM or LPAP2:	
• Construction activities would increase the sediment load in stormwater during rainfall events. Sediment sources created during construction include soil stockpiles, soil tracked across construction areas, and soil transported by wind.	LS	*CHF&Q-1* The contractor will prepare a SWPPP and will identify construction-period Best Management Practices to reduce water quality impacts. The SWPPP will emphasize standard temporary erosion control measures to reduce sedimentation and turbidity of surface runoff from disturbed areas, and will be submitted to the Regional Water Quality Control Board.	LS
• One or more acres of land would be disturbed, and therefore a Stormwater Pollution Prevention Plan (SWPPP) will be required, in accordance with Section 402 of the federal Clean Water Act. The purpose of a SWPPP is to reduce the amount of construction-related pollutants that are transported by stormwater runoff to surface waters.	LS		LS
• Groundwater is generally 15 feet below ground surface or deeper. Construction excavation is generally expected to be limited and very localized. It is not anticipated that groundwater would be encountered, however, it cannot be ruled out, particularly in localized areas where deeper excavation is required, such as Meadowview Road under the depressed roadway design option.	LS	*CHF&Q-2* For the LPAP2, RT will coordinate with SRCSD and the City of Sacramento regarding construction-period impacts to the bufferlands detention basin. RT will work with these agencies to ensure that adequate flood storage is maintained during the construction period.	LS
• The LPAP2 would require modification of the berm of a detention basin in the vicinity of the proposed Franklin Station. This could result in the temporary loss of flood storage during this phase of construction.	PS	*CHF&Q-3* In the event groundwater is encountered during construction, dewatering would be conducted locally. Dewatering effluent would be tested for contamination. Contaminated effluent would be disposed of in accordance with applicable federal, state and local regulations.	LS

Table 6.3-1: Summary of Impacts and Proposed Mitigation for the TSM and LPAP2 Alternatives

Impact	Significance	Mitigation	Significance After Mitigation
5.2.10 Construction Impacts on Land Use • No impacts would result under either the TSM or LPAP2 Alternative.	N	No mitigation is indicated.	N
5.2.11.1 Construction Impacts on Mineral Resources • No significant minerals have been identified in the project area. Construction activity is not anticipated, therefore, to adversely affect mineral resources.	N	No mitigation is indicated.	N
5.2.11.2 Construction Impacts on Energy Resources • Construction energy requirements are not considered significant for either the TSM or LPAP2 Alternative. Energy use would represent a small portion of the total energy consumed in the region for the construction of other facilities and for the ongoing operation of commercial, industrial, and residential activities.	LS	No mitigation is indicated.	LS
5.2.12 Temporary Effects on Neighborhoods and Businesses TSM Alternative • Construction equipment and vehicles could disrupt traffic near the PNR lot. Grading and paving would also result in intrusions of construction noise and vibration, air emissions, and visual changes. These impacts are expected to be very localized and would not have substantial impacts on neighborhoods or businesses. LPAP2 • Construction of the LPAP2 LRT alignment, station facilities, PNR lots and optional shuttle lot would temporarily affect study area neighborhoods due to street closures, rerouting of transit and vehicular traffic, and movements of construction equipment, materials and	LS LS	TSM or LPAP2: *CN&B-1* A variety of mitigation measures are proposed to address the direct effects of construction activities – air, noise and vibration emissions, traffic disruptions and visual changes; see their respective subsections of this chapter. Since no substantial adverse impacts to neighborhoods and businesses are anticipated, no additional mitigation is proposed.	LS LS

Table 6.3-1: Summary of Impacts and Proposed Mitigation for the TSM and LPAP2 Alternatives

Impact	Significance	Mitigation	Significance After Mitigation
vehicles. None would be anticipated to have substantial impacts on the neighborhoods or businesses • There would be temporary intrusions of construction noise and vibration, air emissions, and visual changes. These impacts would also be localized, temporary and intermittent; none would be anticipated to substantially affect neighborhoods or local businesses.	LS		LS
5.2.13 Construction-Period Noise and Vibration TSM or LPAP2 Alternative (except as indicated) • Temporary noise during construction of park-and-ride (PNR) lots has the potential to intrude on residents near the three PNR sites. Most of the construction would consist of site preparation and paving, and would only occur during daytime hours. • Temporary noise during construction of new tracks and stations associated with the LPAP2 also has the potential to intrude on residents near the construction sites. Most of the construction would consist of site preparation and laying new track, and would only occur during daytime hours. • Construction activities that could cause intrusive vibration under either build alternative include vibratory compaction, jackhammers, and use of tracked vehicles such as bulldozers. The most serious sources of construction vibration are blasting and pile driving. There will be no blasting for either alternative and only limited, if any, pile driving under the LPAP2.	LS LS LS	TSM or LPAP2: In addition to the restrictions in the City and County noise ordinances, the mitigation measures would be applicable to construction of either the TSM or LPA Alternative: *CN&V-1* Include specific residential property line noise limits in construction specifications for this project, and *CN&V-2* Perform noise monitoring during construction to verify compliance with the limits. This approach allows the contractor flexibility to meet the noise limits in the most efficient and cost effective manner. *CN&V-3* Assure that a complaint resolution procedure is in place to rapidly address any problems that may develop.	LS LS LS

Table 6.3-1: Summary of Impacts and Proposed Mitigation for the TSM and LPAP2 Alternatives

Impact	Significance	Mitigation	Significance After Mitigation
• The build alternatives are subject to the noise ordinance of the County of Sacramento (Chapter 6.68, Noise Control). The ordinance has specific property line noise limits; however, construction from 6 am to 8 pm on weekdays and 7 am to 8 pm on Saturday and Sunday is specifically exempted from these limits.	LS	*CN&V-4* Vibration impacts will be mitigated by including numeric limits in the construction specifications, monitoring vibration, and requiring the contractor to follow the specified limits	LS
5.2.14 Construction Effects on Parks and Recreation TSM Alternative • No impact on parks or recreation facilities in the area. LPAP2 • Construction could involve temporary detours or street closures in the vicinity of the project. These are expected to have little or no effect on the ability of the public to access local parks and recreational facilities within the study area. Construction of the LPAP2 LRT facilities at the berm of the northeast corner of the Cosumnes River College Stadium would not affect access to or operations of the recreational facility. Construction detours and road closures are described in Section 5.2.17, Transportation/Traffic.	N LS	TSM: No mitigation is indicated. LPAP2: No mitigation is indicated.	N LS
5.2.15 Construction Effects on Public Services and Facilities TSM Alternative • No impact on public services and facilities in the area. LPAP2 • Construction could involve temporary detours or street closures in the vicinity of the project, which are expected to have little or no effect on the ability to access public	N LS	TSM: No mitigation is indicated. LPAP2: *CPS-1* RT will coordinate with local emergency service providers in developing detour plans.	N LS

Table 6.3-1: Summary of Impacts and Proposed Mitigation for the TSM and LPAP2 Alternatives

Impact	Significance	Mitigation	Significance After Mitigation
services and facilities within the study area. The primary effect would be the need for emergency vehicles to observe any short-term road closures and temporary construction detours.		*CPS-2* Emergency service providers would be provided advance notice of road closures and detour routes.	
5.2.16 Construction Period Safety and Security TSM or LPAP2 Alternative • Construction activities could expose construction workers, local residents, and employees to potential hazards.	LS	TSM or LPAP2: *CS-1* RT will require the contractor submit a safety plan in advance of construction to ensure procedures for the safety of construction workers, local residents, and employees during construction of either the TSM or LPAP2 Alternative. *CS-2* Fencing and lighting of construction and staging areas, and recognized safety practice requirements for the utilization of heavy equipment and the movement of construction materials would be implemented to contain construction activities and avoid accidents.	LS
5.2.17 Construction Effects on Transportation and Traffic TSM Alternative • No construction impacts on rail and bus transit services are anticipated • Traffic in the vicinity of the proposed PNR lots could be disrupted by construction equipment and traffic. • Construction activities are not expected to have any substantial impact on availability of parking. Construction workers would be expected to park on-site.	N LS LS	TSM: *CT-3,8* *RT will coordinate with the City or County to provide advance public notice of traffic detours.* *CT-7* *Contractors will prepare and implement traffic handling plans.*	N LS

Table 6.3-1: Summary of Impacts and Proposed Mitigation for the TSM and LPAP2 Alternatives

Impact	Significance	Mitigation	Significance After Mitigation
LPAP2 • Construction of the connections of existing LRT tracks with new LPAP2 LRT tracks could affect on-going revenue LRT service. • Construction at grade crossings would involve closure of individual cross streets for periods of 24 to 48 hours and would disrupt bus services. Affected bus services would need to be temporarily rerouted. Shorter periods of street closures could be done at night. • Traffic in the vicinity of the proposed PNR lots could be disrupted by construction equipment and traffic. Construction of LPAP2 LRT improvements would require street closures for 24 to 48 hours at several locations and rerouting of vehicular traffic. • Construction activities are not expected to have any substantial impact on availability of parking. Construction workers lots would be expected to park on-site.	LS LS LS LS	LPAP2: *CT-1* RT will coordinate construction with other major public or private construction projects within a one-mile radius of its project and schedule its construction contracts to minimize combined project impacts to the surrounding community while at the same time trying to reduce the combined schedule for construction activities. *CT-2* Grade-crossing construction that requires street closure will be scheduled so only one crossing in an area is affected at one time; crossings serving as alternate bus travel routes will remain open. *CT-3* RT will provide the public and transit users advance notice of proposed transit reroutes and any other changes in stops and service; Bus route detours will minimize the number of bus stop changes. *CT-4* Construction of at-grade crossings will take place during non-peak periods whenever possible, including at night. In residential areas, major activity will be limited to normal work hours whenever practicable, to avoid noise and related impacts to the local population.	LS LS

Table 6.3-1: Summary of Impacts and Proposed Mitigation for the TSM and LPAP2 Alternatives

Impact	Significance	Mitigation	Significance After Mitigation
		CT-5 RT will notify local residents and businesses in advance of proposed construction activity using a variety of techniques including signage, electronic media, community newspapers, and other techniques identified in the project's public involvement program. *CT-6* *RT will communicate and coordinate with the CRC and Los Rios Community College District regarding the time of any street closures during construction of the LPAP2, with particular attention to peak student travel periods.* The same mitigation measures for bus transit impacts are proposed to address vehicular traffic impacts with two additions: *CT-7* As part of their contracts, contractors will be required to prepare and implement traffic handling plans approved by the City of Sacramento, the City of Elk Grove, or Sacramento County, as appropriate. Plans will identify detour routes, signing and barricade locations, turnarounds at street closures, and other traffic control elements. *CT-8* As part of their regular project planning meetings with neighboring jurisdictions, RT will coordinate with the City of Sacramento, the City of Elk Grove, and Sacramento County to provide the public	

Table 6.3-1: Summary of Impacts and Proposed Mitigation for the TSM and LPAP2 Alternatives

Impact	Significance	Mitigation	Significance After Mitigation
		advance notice of proposed traffic detours and their duration. *CT-9* Provisions will be incorporated into the construction contacts to avoid parking impacts to residential areas or businesses requiring on-street parking.	
5.2.18 Temporary Effects on Utilities TSM or LPAP2 Alternative • The potential exists for construction activities to encounter unexpected utilities within the project right-of-way. Relocations of affected utilities in the corridor or at LPAP2 LRT stations or PNR lots will be the responsibility of RT and may require short-term, limited interruptions of service. No interference with existing utility service is anticipated during installations of connections to existing high-voltage power transmission facilities because the utility will put customer loads on alternate feeders during the connection activity.	PS	TSM or LPAP2: *CU-1* RT will continue close coordination with all utility providers during the construction stages of the project to identify any potential conflicts and formulate strategies to overcome potential problems. *CU-2* A set of detailed plans will be submitted to utility providers for their review and comment prior to the onset of any relocation work. *CU-3* Any short-term, limited service interruptions would be scheduled well in advance and appropriate notification provided to users. These interruptions would be discussed and planned at the regular planning meetings between RT and neighboring jurisdictions.	LS

B=Benefit, N=Neutral, LS=Less than Significant, PS=Potentially Significant, S=Significant, SU=Significant Unmitigable

Source: Parsons, 2002

6.3.1 Impacts with CEQA Baseline (Current) Conditions

CEQA requires that impacts of the alternatives be evaluated against CEQA baseline conditions, i.e., current conditions (as of the time of the CEQA Notice of Preparation). For nearly all analysis subject areas, the impact evaluation in Chapters 3, 4, and 5 uses existing conditions as the baseline for comparison. The following discussion – organized by impact evaluation subject area – notes where current conditions (the CEQA baseline) for the basis for the impact evaluations. Additional information is also provided below for those subject areas where impacts from the existence and operation of a TSM or LPAP2 in operation today would be different than the impacts evaluation provided in Chapters 3, 4, or 5.

Aesthetics – The evaluation in Chapter 4, Section 4.1 makes use of the current visual settings and conditions for review of impacts that would occur for both the TSM and the LPAP2. Visual simulations are presented using existing conditions.

Agriculture – Current conditions are used as the basis for determining the possible loss of agricultural land from the TSM and LPA as described in Chapter 4, Section 4.2.

Air Quality – The transportation model used to produce ridership projections and to generate other transportation statistics and analyses was not run for the LPAP2 assuming current conditions, given that the LRT extension (the LPAP2) would not be in operation until approximately 2012. In addition, the FTA requires that a consistent and uniform set of demographics – specifically those developed for the region by SACOG -- be used to evaluate the impacts for all alternatives.

It is clear, however, that if the TSM or the LRT extension in the South Sacramento Corridor were in operation today, the ridership for these alternatives would be lower than the levels projected for the horizon year of 2025 (as presented in Chapter 3, Section 3.2.4.1), given that the employment and housing would not have grown to the anticipated 2025 future levels. Moreover, congestion levels on the roadways are not as severe today as is project for 2025.

Thus the level of air quality benefits for the TSM and LPAP2, if they were in operation today, would be lower than the levels projected for the future 2025 horizon year, as presented in Chapter 4, Section 4.3.

In addition, localized air emissions (e.g., CO emissions) would be more severe, given that individual vehicular emission rates would not be as improved as is assumed in the horizon year of 2025.

Biological impacts – Current reference materials and recent field reviews were used as the basis for determining possible impacts to biological resources from the TSM and LPAP2 as presented in Chapter 4, Section 4.4.

Historical and Cultural Resources – A review of current reference materials and recent field reviews were used as the basis for determining possible impacts to historic and cultural resources, as presented in Chapter 4, Section 4.5.

EMF/EMI – Current data sources and recently measured interference and field levels were used to determine possible EMF/EMI impacts of the alternatives in Chapter 4, Section 4.6.

Geology, Soils, and Seismicity – Current geologic and soil conditions and current reference materials regarding historic earthquake activities were used to evaluate possible geologic, soils, and seismicity impacts of the TSM and LPA, as presented in Chapter 4, Section 4.7.

Hydrology, Floodplain, and Water Quality – Chapter 4, Section 4.9 notes that the *South Sacramento County Streams (SSCS) Project* would provide additional flood projection and mitigation in the LPAP2 corridor area as compared to current conditions. Without these improvements, portions of the LRT alignment would be located below the 100 year flood levels. Thus, if the LRT extension were in operation today, portions of the alignment, as currently designed, would be below the 100-year flood levels. These areas include the LRT alignment as it leaves the UPRR corridor leading to the Morrison Creek Station, the

Morrison Creek Station itself (including the parking area and platforms), and the alignment immediately to the south of the Morrison Creek Station leading to the bridge structure over the UPRR, Morrison Creek, and Union House Creek.

Land Use and Planning – Chapter 4, Section 4.10 evaluates land use impacts on the basis of the effects that the TSM and LPAP2 would have on both current and future conditions. Maps are provided for current and future land uses, and current planning and zoning documents are reviewed.

Mineral and Energy Sources – The document evaluates mineral and energy on the basis of current conditions, e.g., current energy suppliers and sources, as presented in Chapter 4, Section 4.11.

Noise and Vibration – Chapter 4, Section 4.12 evaluated noise and vibration impacts using current field measurements and current noise and vibration projection techniques, e.g., measurements of current LRT equipment noise levels. Current land uses are identified to determine sensitive receptor locations for both noise and vibration.

Population, Housing, and Environmental Justice – Chapter 4, Section 4.13, identifies both current and projected demographics for the region, sub-regional areas, and the corridor. The environmental justice evaluation makes use of Year 2000 census statistics.

Public Services and Facilities – Chapter 4, Section 4.14) includes an analysis of impacts on existing public service and facilities and notes anticipated future facilities.

Recreational Facilities – Chapter 4, Section 4.15 includes an analysis of impacts on existing recreational facilities and makes note of anticipated future facilities.

Safety and Security – Chapter 4, Section 4.16 evaluates the safety and security impacts on the basis of anticipated services to be provided, noting that current safety and security techniques (fire, life, safety, policing) would be applied for the TSM or LPAP2.

Utilities – Chapter 4, Section 4.17 identifies impacts to existing utilities and references anticipated future utility work.

Transportation – If the TSM or LPAP2 were if operation today, the traffic associated impacts would be different than those described in Chapter 3. Access to the Morrison Creek Station would not be available from the CRB Extension, traffic impacts at intersections near the Center Parkway Station would be more severe given that CRB is not at this point widened to two lanes in each direction, and traffic impacts at the CRB/Bruceville road intersection would be more severe given that the complete set of intersection improvements is still under construction, and traffic impacts at the College Entrance would be more severe given that the planned ultimate widening of Bruceville Road has yet to occur.

Construction Impacts – Construction impacts for the TSM and LPAP2 reviewed in Chapter 5 make use of existing conditions as the basis for the impact evaluation.

6.*3*.2 CEQA Mandatory Findings of Significance

CEQA identifies types of project impacts as mandatory findings of significance, thereby requiring preparation of an EIR, as follows:

a) The project has the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory.

b) The project has potential to achieve short-term environmental goals to the disadvantage of long-term environmental goals.

c) The project has possible environmental impacts that are individually limited, but cumulatively considerable.

d) The project has environmental effects that will cause substantially adverse effects on human beings, either directly or indirectly.

Based on a preliminary assessment that project alternatives evaluated herein could have the potential to generate significant traffic, parking, noise and vibration, wetland/waters, and vernal pool habitat impacts, RT determined to prepare and circulate an EIR for the project. With mitigation measures applied as detailed in Chapters 3, 4, and 5, and summarized in Table 6.3-1, all of the potentially significant impacts of the TSM and LPAP2 alternatives would be reduced to a less than significant level.

6.4 GROWTH INDUCEMENT

CEQA requires a consideration of a project's capacity to induce growth. Growth inducement would occur if the amount of population or employment growth projected to occur as a result of the project would exceed planned levels. Increased development and growth in an area are dependent on a variety of factors, including employment and other opportunities, availability of developable land, and availability of infrastructure, water, and power resources.

A growth inducement evaluation was conducted for the project alternatives, as described in Section 4.13.6. It was determined that none of the proposed project alternatives would induce unplanned growth in the South Sacramento Corridor. The LPAP2 would provide transit facilities that would be supportive of planned growth by influencing development into efficient and coherent patterns. For example, transit oriented development is currently under review by RT and the City of Sacramento for the Morrison Creek Station, and development near the CRC station has been revised to be more transit related. See Section 4.10.2, Local Development Plans and Policies, for supporting discussion.

CHAPTER 7: FINANCIAL ANALYSIS AND EVALUATION

7.1 OVERVIEW

This chapter reviews the financial capacity of RT to build, operate, and maintain the proposed project and presents the evaluation of alternatives. The following sections discuss revenue sources, funding issues and risk analysis, financial conclusions, and evaluation of alternatives.

7.2 FUNDING FOR CONSTRUCTION COSTS

The LPAP2 is estimated to cost *$270* million to construct (in year of expenditure – YOE – dollars). Table 7.2-1 presents a summary of the capital cost estimate by cost category.

Table 7.2-1: LPAP2 Capital Cost Estimate by Cost Category

Element	***Cost Estimate (Year of Expenditure dollars)***
Guideway and Track Elements	*$43,974,000*
Stations, Stops, Terminals, Intermodal	*$44,886,000*
Support Facilities: Yards, Shops, Administration	*$0*
Sitework & Special Conditions	*$61,822,000*
Systems	*$30,044,000*
ROW, Land, Existing Improvements	*$14,929,000*
Vehicles	*$0*
Professional Services	*$42,094,000*
Unallocated Contingency	*$32,171,000*
Finance Charges	*$0*
Total Project Cost	***$269,920,000***

Source: RT Financial Forecasting Model, September 2007.
Notes: Cost estimates include an allocated contingency (as a percent of Base Year Dollars without contingency) of 16.43%. The unallocated contingency (as a percent of Base Year Dollars without Contingency) shown in this table is 15.75%, yielding a total contingency (as a percent of Base Year Dollars without contingency) of 32.18%.

Table 7.2-2 presents a plan for fully funding the project. As shown, funding will come from variety of sources: State Transportation Improvement Program (STIP), Traffic Congestion Relief Program (TCRP), Congestion Mitigation and Air Quality Improvement (CMAQ) Program, community facilities district funds, transit fee district funds, Measure A sales tax / developer fee funds, and FTA Section 5309 New Starts funds. The project is included in the financially constrained SACOG Metropolitan Transportation Plan (MTP).[1] The funding assumptions used for the project and for the RT system as a whole are consistent with the projections in the MTP.

If the LPAP2 were not constructed, and the TSM Alternative were implemented instead, it would be funded entirely from STIP, CMAQ, and local sources.

[1] 2006 Metropolitan Transportation Plan for 2025, March 16, 2006.

Each of these funding sources is described below.

Table 7.2-2: Identified Capital Funding for the LPAP2 Project

Funding Source	Amount (Year of Expenditure dollars)	Percent of Total Funding
CMAQ	$7,100,000	2.6%
Laguna Community Facilities District	*$803,250*	*0.3%*
Vineyard Fee District	*$3,989,286*	*1.5%*
STIP	*$4,307,000*	*1.9%*
Measure A Sales Tax/Developer Fee	*$52,760,464*	*19.5%*
TCRP/STIP	$66,000,000	*24.5%*
Section 5309 New Starts	*$134,960,000*	50.0%
Total	*$269,920,000*	100%

Source: Nancy Whelan Consulting; RT Financial Forecasting Model, *September 2007, updated July 2008*.

7.2.1 Congestion Mitigation and Air Quality Improvement

CMAQ funds are allocated to States on a formula basis. In California the funds are suballocated to regional transportation planning agencies such as the Sacramento Area Council of Governments (SACOG) for programming. RT has received $7.1 million for the design phase of the LPAP2 project.

7.2.2 Laguna Community Facilities District

The Laguna Community Facilities District was formed to finance the acquisition and construction of (or reimbursement for) certain capital public facilities. The Calvine Transit Center is included in the 2001 Laguna Public Facilities Financing Plan for $803,250. In May 2006, RT and the County of Sacramento entered into a joint facilities agreement wherein the County agreed to provide $803,250 for the light rail station / transfer center at Cosumnes River College. The County has indicated that additional funds may be made available in the future based on interest earned on the fund.

7.2.3 Vineyard Fee District

The Vineyard Financing Plan Development Fee Program includes funding for $3,989,286 in capital expenditures for the planned Cosumnes River College light rail station component of the LPAP2 Project. Fees are collected on a per-dwelling unit equivalent for transit capital improvements within the designated area.

7.2.4 State Transportation Improvement Program

The State Regional Improvement Program (RIP) funds are programmed by the California Transportation Commission (CTC) in the State Transportation Improvement Program (STIP) for projects that relieve traffic congestion on state and local roads and highways. These funds are allocated to counties largely on a formula basis. Allocations are comprised of both Federal Highway

Trust Funds and State Gas Tax funds. The Federal matching requirements for these funds have been met within each allocation. SACOG is responsible for programming STIP funds in Sacramento, and has programmed $4,307,000 in 2002 STIP funds for the LPAP2 project.

7.2.5 Measure A Sales Tax / Developer Fees

In November 2004, Sacramento County voters passed the reauthorization of Measure A, the transportation sales tax. The new ordinance includes two sources of transportation funds: sales tax proceeds and a developer fee program entitled "Sacramento Countywide Transportation Mitigation Fee Program." The one half percent sales tax will be collected for 30 years beginning in April 2009. The reauthorization increases RT's share of the sales tax proceeds from *32.50* percent to 38.25 percent. Of this total, 3.75 percent is dedicated to five specific transit capital projects: South Sacramento Corridor Phase 2 (LPAP2), Northeast Corridor Light Rail Improvements, Downtown-Natomas-Airport (DNA) Light Rail extension, Regional Rail Commuter Service and Downtown Intermodal Station. In addition, 20 percent of the new developer fee program revenues are directed toward transit capital improvements. The developer fees are to be assessed at a rate of $1,000 (2004 dollars) per each new single family unit. Fees for other types of development are proportionate to the trip generation rate of the new land use in comparison to the single family unit rate. Local jurisdictions that do not comply with the developer fee program forfeit their streets and roads maintenance funds from the reauthorized sales tax.

The Sacramento County Transportation Expenditure Plan 2009 – 2039 includes $98 million (2004 dollars) in developer fees for the Transit Capital Improvement Program and $118 million (2004 dollars) in sales tax revenues for Rail Transit Improvements. These funds will be directly subvented to Sacramento Regional Transit based on a five-year, annually updated transit capital and operating business plan recommended by Sacramento RT, and approved by the Sacramento Transportation Authority Board. The LPAP2 financial plan includes *$52.8* million drawn from the Measure A program,[2] According to the financial plan schedule, these funds could be from the existing Measure A sales tax, the reauthorized sales tax, or the new developer fee revenues. Depending on the availability of these sources, RT may request an advance of anticipated Measure A funds from the Sacramento Transportation Authority. In its *New Measure A Sales Tax Program Plan of Finance* (July 18, 2006) report, the Sacramento Transportation Authority describes its plan to make the reauthorization sales tax revenues available for projects prior to 2009.

7.2.6 State Traffic Congestion Relief Program

In 2000, the Governor of California signed into law the Traffic Congestion Relief Program (TCRP) that dedicated a portion of the sales tax on gasoline to transportation programs and projects for a period of five years, which was later extended for two years. Among the projects named in the legislation was the LPAP2 project at a funding level of $70 million. Approximately $7 million in TCRP funds have been allocated to the Final Environmental/Preliminary Engineering phase of the project. Although budget shortfalls resulted in the suspension of TCRP allocations in 2003 and 2004, the State budget for FY 2006 provided revenue for TCRP. Beginning in July 2005, TCRP allocations were approved by the California Transportation Commission and will continue until all funds are used. While it is possible that TCRP funds may not be available within the timeframe anticipated in the funding plan, it is highly likely that funds will continue to flow during *the project construction period*.

[2] From Ordinance No. STA 04-01, "An Ordinance Providing for the Continuation of a One-Half of One Percent Retail Transactions and Use Tax by the Sacramento Transportation Authority for Local Transportation Purposes".

7.2.7 Federal Section 5309 New Starts

Federal Section 5309 New Starts funds are discretionary funds authorized every six years and appropriated annually by Congress for fixed guideway transit projects. Under Section 5309, projects are evaluated and rated by the Federal Transit Administration and submitted to Congress for appropriations. The reauthorization of the Transportation Equity Act of the 21st Century, SAFETEA-LU, continues the New Starts program. The LPAP2 financial plan includes 50 percent of its funding from the New Starts program ($135.0 million).

7.3 FUNDING FOR OPERATIONS AND MAINTENANCE COSTS

The system wide operating and maintenance costs under the LPAP2 are estimated to total $275.2 million in 2030 (FY 2007 $). The costs are shown in FY 2007 dollars rather than YOE dollars to make comparisons more easily with the current and near future costs. These costs are $1.03 million lower than the operating and maintenance costs for the TSM Alternative. The TSM scenario utilizes substantially more bus service than the Full Build scenario, and, based on RT's operating data and projections, bus operating costs are increasing at a faster rate than rail operating costs.

These figures compare to RT's 2006 total budgeted operating expenses of $134.8 million.[3]

The primary funding sources for RT's current bus, LRT, paratransit, and regional rail operations include the following:

- Sacramento County Measure A (one-half cent sales tax),
- The Local Transportation Fund component of the State Transportation Development Act (TDA--one-quarter cent of the State's 7.25 percent sales tax),
- State Transit Assistance Program funds,
- Measure A funds from the City of Folsom per a trade of state capital dollars[4],
- City contributions of TDA to pay for RT services,
- Special service (e.g., shuttles, events) revenues,
- Fare revenues,
- Federal Section 5307 formula funds,
- Federal Section 5309 Fixed Guideway funds, and
- Other sources (e.g., advertising, interest earnings).

To fund the operation of the LPAP2 project, RT would use a mix of funds from these sources. RT's financial planning model does not provide cost and revenue projections for operations and maintenance for individual routes. Rather, the model projects the subtotal for operations and maintenance costs by mode throughout the entire RT system, and assigns revenues on a systemwide basis. Thus, distinct revenue sources have not been assigned to the incremental operations and maintenance costs associated with the LPAP2.

[3] Sacramento Regional Transit District, RT Financial Forecasting Model, September 2007.

[4] As stated in RT's 2000 – 2008 Short Range Transit Plan, Financial Plan section, "In an innovative funding arrangement RT has secured an agreement with the City of Folsom to receive $40.4 million of their Measure A funds through the year 2009 in exchange for $32.75 million in Flexible Congestion Relief funds. The funds to be received annually reflect Folsom's portion of the Measure A receipts which can be used by RT to fund expenses."

The financial analysis indicates that RT has the financial capacity to build, operate and maintain the LPAP2, while continuing to operate and maintain the existing system without a new revenue source, based on the assumed growth factors for current revenue sources, including the renewal of the Measure A sales tax. RT anticipates that revenues from the renewal of the Measure A sales tax, passed in November 2004, would partially fund the LPAP2 operations and maintenance costs.

Renewal of Measure A, the current countywide half percent sales tax for transportation, will take effect upon expiration of the existing Measure A beginning in April 2009. Under the current Measure RT receives *32.50%* of the half percent sales tax. The new Measure will increase the amount of revenue to RT by dedicating 38.25% of the half cent sales tax to RT.

7.4 CASH FLOW ANALYSIS

A cash flow analysis is used to determine RT's financial capacity. This analysis projects operating and capital revenues and expenditures that RT is likely to incur in continuing current transit services and by increasing service as included in the 2006 Metropolitan Transportation Plan and RT's current plans for service implementation. To the extent that this analysis does not show a deficit (inadequate revenues to meet projected expenditures) in some future year, the financial capacity of the District to build, operate, and maintain the project is demonstrated.

RT's Financial Forecasting Model is used to analyze capital and operating cash flows through FY 2030. The model relies on a series of assumptions regarding service levels, cost inflation, revenue growth, fare price elasticity, and fleet size.

The RT Financial Forecasting Model used for the cash flow analysis produces a capital statement and operating statement. Given the assumptions applied in the cash flow analysis, the operating statement indicates that revenues are adequate to cover operating expenses over the period. Operating surpluses are transferred to capital. The capital statement indicates that capital revenues are sufficient to cover expenditures *required for the LPAP2 project*.

7.5 RISK ANALYSIS

A risk analysis takes the cash flow analysis one step further by accounting for variations in the key variables. The renewal of Measure A in November 2004 provides the needed funds to operate and maintain RT's existing system and to allow for system expansion. The renewal of the sales tax removes substantial financial risk from implementing the LPAP2.

Although the cash flow analysis shows that RT has the financial capacity to extend light rail and increase bus service over time, the financial plan is not without risk. The financial feasibility of building the LPAP2 project and other planned light rail extensions is dependent upon several significant revenue assumptions:

- The construction cost estimate includes *an allocated contingency (as a percent of Base Year Dollars without contingency) of 16.43% and an unallocated contingency (as a percent of Base Year Dollars without Contingency) of 15.75%, yielding a total contingency (as a percent of Base Year Dollars without contingency) of 32.18%.*
- Should these assumptions prove optimistic, RT will need to identify additional revenues to complete the project. Possible sources could include Measure A revenues.

- The availability of State Traffic Congestion Relief Funds in the years for which they are planned. $70 million in TCRP funds is programmed for the LPAP2 Project, of which $7 million has been allocated to the AA/Final Environmental/Preliminary Engineering phase of the project. After a two-year suspension of TCRP allocations, TCRP funds *were* allocated for FY 2006. While it is possible that TCRP funds may not be available within the timeframe anticipated in the funding plan, it is highly likely that funds will continue to flow *in the future*.
- The availability of Section 5309 New Starts Funds. $*135* million in Section 5309 New Starts funds is planned for the LPAP2 capital project. RT will continue to submit annual New Starts Rating Reports *as required until a Full Funding Grant Agreement is executed for the project*. The project must be rated "recommended" or higher to be eligible for New Starts funding. The New Starts program is a highly competitive nationwide process, with funding requests vastly exceeding availability.
- The availability of a new revenue source to fund operating and capital requirements of the planned system. *T*he Sacramento Transportation Authority *adopted a resolution declaring its intent to pursue a supplemental transportation funding program equivalent in revenue to a one half percent countywide sales tax. Half of the revenue would be used for transit, and half would be used for local streets and roads. The supplemental funding program is planned to take effect no later than FY 2013.* A new revenue source would be required *for RT* to fully fund the planned system.
- Ridership and fare revenues. Fare revenue is projected to provide a significant source of revenue to offset the operations and maintenance costs of the LPAP2 project. Fare revenue estimates are dependent upon both ridership and average fare estimates, and are based on assumptions that reflect RT's historical experience. RT's financial model projects a surplus of sources available for funding operations and maintenance costs. Thus, if the fare revenue estimates are shown to be overstated, other sources could be available to fully fund operations and maintenance of the RT system. Under this circumstance, transfers of surplus operations and maintenance revenues to capital projects would likely be reduced.

Should the above assumptions about operating and capital funding for the project prove optimistic, it would become necessary to re-prioritize the rail extension program, phase the capital program, reconsider systemwide service expansion, and seek other stable funding sources in order to avoid a net deficit. If capital funding commitments to the project are made in years beyond the construction schedule, interim or "bridge" financing may address the cash flow shortfalls.

At this stage in the development of the LPAP2 project, the systemwide funding plan for RT is based on financial projections and governmental actions which are not finalized. More detailed information on the financial plan is presented in RT's LPAP2 Section 5309 New Starts Report to the Federal Transit Administration.

In short, the financial plan has risks, but at this point in time they appear to be manageable risks. Close tracking of the sales tax renewal measure, the State Transportation Improvement Program (STIP) and TCRP programs, and the status of the LPAP2 project as it is reviewed and rated in the New Starts evaluation process will help address these risks and to assess when corrective action *may be* needed.

7.6 CONCLUSIONS

The analyses outlined in this chapter (cash flow and risk) indicate that RT can afford to build, operate and maintain the LPAP2 Project, while continuing to operate and maintain the existing transit

system.[5] This conclusion is not unqualified, however. As with any financial forecast, there is risk in the uncertainty of future economic conditions. Also, there is some risk that the additional operating and capital funding needed to extend the service may not be identified in the near term. Detailed financial modeling results that support these conclusions are presented in a separate technical report that is available from RT's planning office.

7.7 EVALUATION OF ALTERNATIVES

7.7.1 New Starts Evaluation Process

The Section 5309 "New Starts" program is the Federal government's primary program for providing financial support to locally-planned, implemented, and operated fixed guideway transit major capital investments. The New Starts evaluation process is used in conjunction with the evaluation process under the NEPA, for which this FSEIS has been prepared. This section describes how FTA evaluates projects for its New Starts funding recommendations. The South Sacramento Corridor Phase 2 LRT project is seeking New Starts funding and, therefore, is subject to this evaluation and rating process.

Each year FTA submits its Annual Report on New Starts to Congress as a companion document to the annual budget submitted by the President. The report provides recommendations for the allocation of New Starts funds under Section 5309 of Title 49 of the United States Code. As required by the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU), FTA uses the following project justification criteria to evaluate New Starts projects: mobility improvements; environmental benefits; cost effectiveness; operating efficiencies; transit-supportive existing land use policies and future patterns; and other factors. FTA must also consider the local financial commitment for the proposed project. In total, the criteria are intended to measure the overall merits of a project and the sponsor's ability to build and operate it.

FTA reviews the project justification and local financial commitment criteria for each candidate project and assigns a rating for each criterion. For some of the project justification criteria, the proposed project is compared against a New Starts TSM (baseline) alternative." The TSM alternative consists of improvements to the transit system that are relatively low in cost and represent the "best that can be done" to improve transit without major capital investment in new guideway infrastructure (See Chapter 2, Section 2.3 of this SFEIS/SFEIR). As such, it is usually different than the baseline (represented by the no-build condition) against which environmental impacts are measured in the NEPA document.

A candidate project is given an overall rating of "High", "Medium-High", "Medium", "Medium-Low" or "Low", based on ratings assigned by FTA to each of the project justification and local financial commitment criteria described above. These ratings are important, as FTA considers them in its decision to recommend projects for New Starts funding. Specifically, FTA will not recommend funding for projects that are rated "Medium-Low" or "Low." It is important to note, moreover, that a "High", "Medium-High" or "Medium" rating does not automatically translate into a funding recommendation, although the potential for receiving New Starts funding is much greater.

Project evaluation is an on-going process. FTA evaluation and rating occurs annually in support of budget recommendations presented in the Annual Report on New Starts and when projects request FTA approval to enter into preliminary engineering or final design. Consequently, as proposed New

[5] Sacramento Regional Transit District, RT Financial Forecasting Model, *September 2007*.

Starts projects proceed through the project development process, information concerning costs, benefits, and impacts is refined and the ratings are updated to reflect new information.

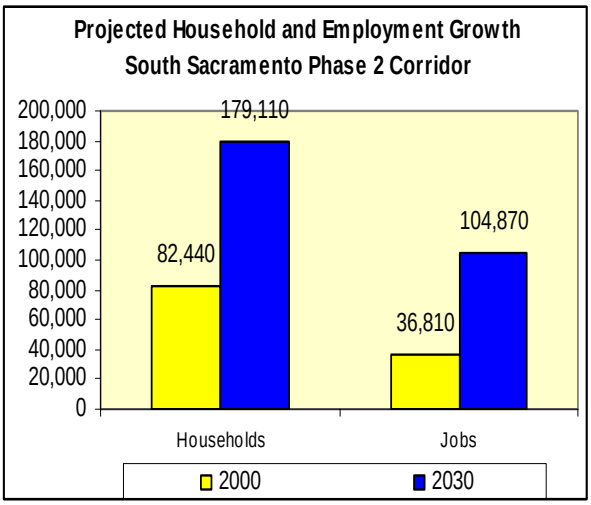
South Sacramento Corridor Phase 2 project currently has an overall FTA rating of medium-high. Individual components of that rating are discussed in the following sections

Mobility Improvements – Rating: *Medium-High*

In its evaluation of the mobility improvements that would be realized by implementation of a proposed project, FTA reviews three measures:

1. *User benefits per project passenger mile;*
2. *Number of current Low Income Households which would be served by the proposed New Starts investment; and*
3. *Number of current Jobs served by the proposed New Starts project.*

User benefits essentially represent all the travel time savings to transit riders in the forecast year that result from the New Starts project as compared to the TSM. They include reductions in walk times, wait times, transfers, and, most importantly, in-vehicle times. In order to rate projects in comparison to other proposed New Starts, this measure is normalized by the annual passenger miles traveled on the New Starts project in the forecast year.



The South Sacramento Phase 2 Corridor is the fastest growing portion of Sacramento County. Elk Grove, at the south end of the corridor, is the fastest growing community in California, and the Sacramento Region is the third fastest growing region in the state. As shown in the graph to the right, total households in the Phase 2 Corridor are projected to more than double from 82,400 in Year 2000 to 179,100 by 2030. Employment is projected to grow even faster, increasing from 36,800 in Year 2000 to over 104,800 by Year 2030.

In addition, employment in Central Business District (CBD) of Sacramento – a primary destination for Phase 2 Corridor residents – is expected to increase by 55 percent (over 30,000 jobs) between 2000 and 2030. This increase in jobs attracts over 156, 000 new person trips to the CBD Core with more than 22 percent produced from the South Corridors.

Meanwhile, City of Sacramento parking policies continue to purposefully restrict the growth of downtown's parking supply as per the Central City Parking Master Plan's specific objective as stated by the City Council; ensuring that parking supply and rates support transit, other alternative modes, and air quality. These policies result in parking demand growth outpacing increases in supplied parking. The anticipated outcomes are parking cost increases and shifts in parking supply from all-day (employee) parking to short-term (business and visitor) parking; both of which serve to make transit more attractive. To illustrate this trend, the City raised parking prices by 25% (from $1.00 to $1.25 per hour) on all Pay-&-Display stations and at all traditional parking meters, and raised parking citation fines by $5.00 as of July 1 2008. The LRT Project helps to alleviate this by reducing the need

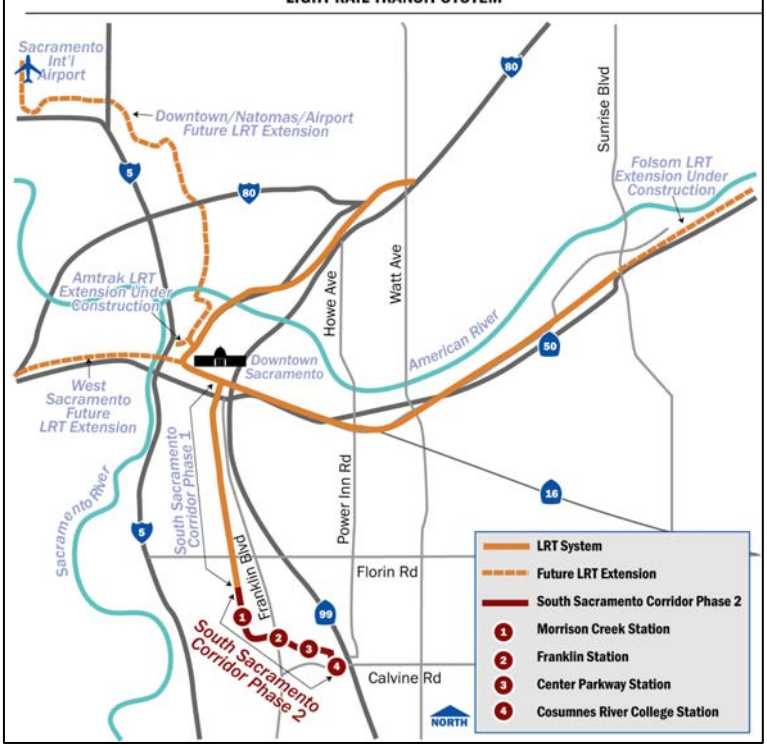
for downtown parking by 1,300 spaces over the No Build alternative and by 900 spaces over the TSM alternative.

Additional development anticipated to the south along Route 99 and Interstate 5, and a high rate of employment growth forecasted for downtown Sacramento, have created the need for additional peak-period transportation capacity between the region's southern communities and its central business district (CBD) – the largest employment center in the region where over 1/5 of the trips are made by transit. By extending LRT service south and providing new park-and-ride opportunities, the LRT Project is intended to provide an attractive alternative to private automobiles for trips destined for downtown and other areas served by the LRT system.

The Project is expected to generate 2,570 new transit trips above the TSM alternative (5,930 more than the No-Build) providing 2,273 hours of user benefit on an average weekday.

Given the planned provision of park-and-ride facilities along the alignment (particularly the 2,000-space parking garage at CRC just off of Route 99, a major parallel facility for travel downtown), a significant level of travel-time benefits are attributable to this market. Approximately 10 percent of travel-time benefits are for trips destined for the corridor itself, with reverse-commute trips ending at CRC representing the largest single corridor market.

FIGURE 1-1: SACRAMENTO REGIONAL TRANSIT DISTRICT LIGHT RAIL TRANSIT SYSTEM



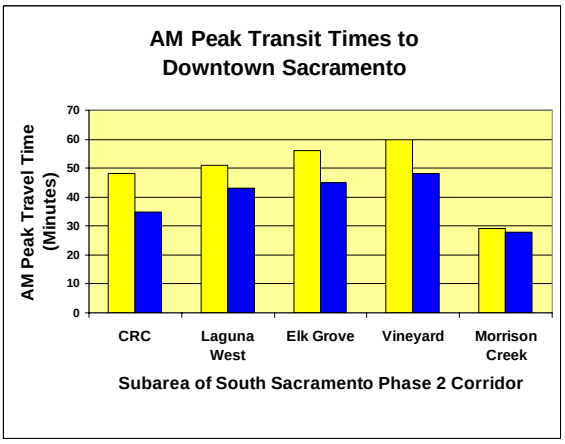
Travel forecasts show that more than half of all travel time benefits generated by the South Corridor LRT Extension project are attributable to commuters destined for downtown Sacramento. Focusing on commute trips from the CRC area to downtown Sacramento, the LRT project provides almost a 20 percent reduction in travel time compared with the drive-alone option and matches the travel time of modes that use the I-5 HOV lanes (e.g. carpool and express bus service).

This high transit percentage for trips Downtown from the Phase 2 Corridor is caused by severe congestion on South Corridor freeways (both SR 99 and I-5 are expected to operate at LOS "F" for three or more hours by 2030). Currently SR 99 HOV lanes are at or near capacity. Express bus services lose any time saving advantage when operating on capacity constrained HOV lanes. To make matters worse, the growth in freeway travel (demand) by far exceeds the increases in freeway capacity throughout the South Sacramento Phase 2 corridor. Vehicular travel is expected to grow over 35% between now and 2030, from 272,000 to 368,300 ADT vehicle trips on the combined I-5 &

SR 99 freeways (estimated at Florin Road). Meanwhile, I-5 HOV lanes and a few SR 99 auxiliary lanes segments are the only freeway capacity improvements programmed for this corridor.

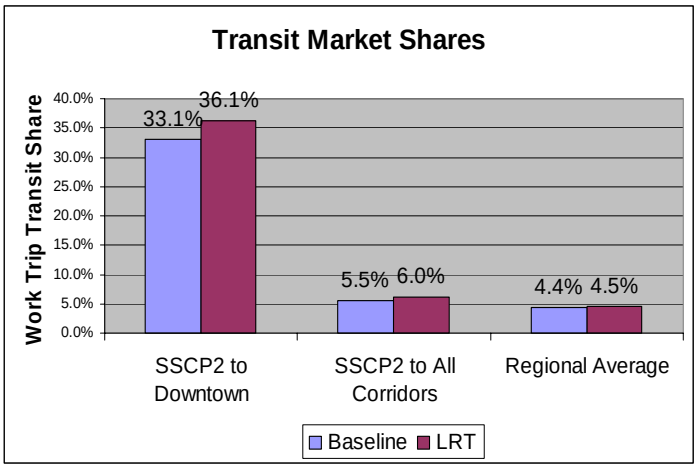
The LRT Project provides excellent access for Phase 2 Corridor residents to RT's existing LRT network. It provides unparalleled access to Downtown Sacramento – the largest transit market and regional employment center – by providing virtually all corridor residents with the option to drive to a station, board LRT, and arrive Downtown without transferring. Downtown Sacramento will provide transfer options to the Capitol Corridor Inter-city rail and Amtrak at the Sacramento Valley Intermodal Station in the city center. Under the LRT Alternative, 15 percent of the corridor residents can walk to a LRT station and arrive at their destination with no-transfer, compared with less than 10 percent for the TSM. The LRT Project also provides access with no transfer to intermediate stops on the Phase 1 LRT line (e.g. Sacramento City College) and the Northeast LRT Corridor, plus same-platform transfer access to the Folsom LRT line and the planned Downtown/Natomas/Airport line. It also provides a direct transit connection from the rest of the region to CRC, with an anticipated near doubling of enrollment to 20,000 in the year 2030. Further, the LRT Project helps mitigate transportation inequities by providing direct access between CRC and lower income neighborhoods north of CRC. This excellent service coverage is possible because the LRT Project is a natural extension of the region's LRT network.

The LRT Project's superior system continuity and operation on a separate guideway rather than on congested streets and freeways provide significant travel time savings over the bus-based TSM Alternative. As shown to the right, compared to the TSM Alternative, the proposed LRT Extension provides transit travel time savings of 3 to 27 percent for trips to Downtown Sacramento from areas in the Phase 2 Corridor. On average, the 2030 LRT AM peak period travel times are forecasted to be 16% faster than TSM alternative and 23% than for transit in the No Build alternative.



Systemwide travel time savings (calculated using FTA's SUMMIT software) show that the total travel time savings relative to the TSM are 2,273 hours per weekday, or 668,262 hours per year.

Ninety-five percent of the time savings accrue to trips beginning in the Phase 2 Corridor. For trip destinations, 74 percent of the time savings accrue to trips ending in Downtown Sacramento; nine percent to trips ending in the Phase 2 Corridor; 10 percent to trips ending in the Phase 1 Corridor; and six percent to trips ending in the Folsom/US 50 Corridor.



The LRT Project provides significantly higher ridership than the TSM Alternative, reflecting the benefits of system continuity and reduced travel time. In total, the LRT Project would generate 756, 450 more transit person trips per year than the TSM Alternative. As shown on the right, for the largest single transit market – from the Phase 2 Corridor to Downtown – the LRT Project would generate a 36.1 percent market share, compared to 33.1 percent for the TSM Alternative. For all Phase 2 Corridor work trips, the LRT Project would generate a six percent market share, significantly higher than the 4.5 percent regional average.

Environmental Benefits -- Rating: *High*

In its evaluation of environmental benefits that would be realized through the implementation of a proposed project, FTA considers the current air quality designation by EPA. This measure is defined for each of the transportation-related pollutants (ozone, CO, and PM-10) as the current air quality designation by EPA for the metropolitan region in which the proposed project is located, indicating the severity of the metropolitan area's noncompliance with the health-based EPA standard (NAAQS) for the pollutant, or its compliance with that standard. New Starts project sponsors also submit information to FTA on the forecast reductions in emissions resulting from the New Starts project for each transportation-related pollutant. FTA has found that information submitted in support of the environmental benefits criterion does not distinguish with any meaning the merits of competing New Starts projects. While FTA reports the information submitted by project sponsors on environmental benefits to Congress and other stakeholders, it does not formally incorporate this measure in its evaluation of New Starts projects.

By attracting more passengers to transit, the LRT Project leads to an improvement in air quality as shown in Table 7.2-3. The LRT Project will reduce criteria pollutants and precursor emissions, as well as greenhouse gases compared to the No Project and TSM Alternative. Reducing air pollution will help the Sacramento region address its severe (ozone) and moderate (PM10) EPA air quality designations. The LRT Project will also reduce energy consumption by 11,542 million BTUs per year.

Table 7.2-3: Tons Per Year Reduction from LRT

Pollutant	Compared to No-Project	Compared to TSM
CO	–12.96	– 8.97
NOx	– 2.43	– 1.68
VOC	– 0.72	– 0.5
PM10	– 0.30	– 0.21
PM2.5	– 0.28	– 0.19
Greenhouse Gases (CO2)	– 6,507.18	– 4,504.97

Operating Efficiencies Rating: *Medium*

FTA measures this criterion by evaluating the change in systemwide operating costs per passenger mile in the forecast year, comparing the Section 5309 New Start investment to the baseline alternative. FTA assigns a rating of "medium" to all projects that have information submitted for this measure. Like the environmental benefits measure, FTA has found that information submitted in support of the operating efficiencies criterion does not distinguish with any meaning the merits of competing New Starts projects. While FTA reports the information submitted by project sponsors on operating efficiencies to Congress and other stakeholders, it does not formally incorporate this measure into its evaluation.

Cost Effectiveness Rating: *Medium-High*

Significant among the project justification criteria is cost effectiveness, which is the annualized capital and operating cost per hour of user benefits for the forecast year. It captures the additional costs of the New Start project compared to the transportation benefits to transit riders. User benefits are defined identical to the measure used in the mobility improvements criterion.

New Starts projects must be rated "Medium" for cost effectiveness, in addition to receiving an overall "Medium" rating, in order to be considered by the Federal Transit Administration for New Starts funding.

Transit-Supportive Land Use Rating: *Medium-Low*

This criterion addresses the extent that transit-oriented development is likely to occur in the New Start project's corridor. The growing trend throughout the Sacramento Region continues to move toward "Smart Growth" Transit Oriented Develoment (TOD) around area transit facilities. Through extensive education by SAGOG and RT, the development community is increasingly embracing this form of mixed use/joint development for their properties. The City and County of Sacramento have begun developing implementation programs for SACOG's preferred scenario of their Blueprint Project that incorporates high density/joint development surrounding transit. The redevelopment of land adjacent to the Meadowview LRT Station (terminus of Phase I/beginning of Phase 2) is moving forward with construction of the 23-acre Hampton Station development – a piece of a larger mixed-use TOD project, . The first move in of residents began towards the close of 2007. Through extensive coordination between the developer, City of Sacramento and RT, the land adjacent to the Morrison Creek Station (Stone-Boswell property) will be designated for transit supportive uses in the City's General Plan and South Area Community Plan currently being updated. The previous plans submitted by a developer, Dunmore Homes, included 1,204 housing units at up to 40 units to the acre as well as neighborhood oriented small-scale retail mixed uses, urban parks (including public art, wide sidewalks, flowering street strees etc.) and open space. As Dunmore Homes is no longer pursuing the development of the site, RT and the City see this as an opportunity to frame policies in the General Plan and the South Area Community Plan that will retain the previously proposed level of intensity of development or higher. All land uses are oriented to provide direct connectivity to the proposed Morrison Creek LRT Station. At the terminus of the proposed SSCP2 extension, located adjacent to the CRC light rail station, the development known as College Square has opened the 65,000 square foot grocery center and an approximately 50,000 square feet of retail and restaurants constructed, with more to come. The residential portion of the project will open in summer 2009. RT has selected a joint-use 2,000 space parking garage on the CRC campus as the preferred alternative, thus opening up an additional 12.7 acres of higner denisty land development across from the LRT Station that was originally proposed for surface parking. Both along the South Line Phase 2 Corridor and around the region, joint development and TOD opportunties continue to be identified and plans created and approved to increase transit viability.

Local Financial Commitment Rating: *Medium-High*

Proposed New Starts projects must be supported by evidence of stable and dependable financing sources to construct, operate and maintain the transit system. The measures FTA uses to evaluate local financial commitment are:

Local Share Rating: *Medium*

FTA examines the proposed share of total project costs from sources other than Section 5309 New Starts, including Federal formula and flexible funds, the local match required by federal law, and any additional capital funding.

Strength of Capital Financing Plan Rating: *Medium-High*

FTA looks at the stability and reliability of the proposed capital financing plan, including the current capital condition of the project sponsor, the level of commitment of capital funds to the project, the financial capacity of the project sponsor to withstand cost overruns or funding shortfalls, and the reliability of the capital cost estimates and planning assumptions.

Strength of Operating Financing Plan Rating: *Medium*

FTA looks at the ability of the sponsoring agency to fund operation and maintenance of the entire system (including existing service) as planned, once the guideway project is built. This includes: an examination of the current operating condition of the project sponsor; the level of commitment of operating funds for the transit system; the financial capacity of the project sponsor to operate and maintain all proposed, existing and planned transit services; and the reliability of the operating cost estimates and planning assumptions.

The remainder of this section addresses project evaluation from the perspective of the environmental review process and the goals and objectives of the South Sacramento Corridor, as defined in the original corridor environmental document. Subsection 7.7.2 presents a comprehensive set of the original goals and objectives from the 1994 *South Sacramento Corridor AA/DEIS/DEIR.* Chapter 1 identifies six major purposes of this project that were derived from these goals and objectives. Refer to Chapter 8 of this document and Chapter 1 of the 1994 *South Sacramento Corridor AA/DEIS/DEIR* for information on public input to the original planning process. The following Subsections 7.7.2 through 7.7.6 compare the alternatives with respect to the original goals and objectives. Table 7.7-1 presents a comparison of the alternatives in the years 2025 and 2030 using a mix of quantitative and qualitative measures for all of the goals and most of the objectives. The comparison of alternatives is a summary evaluation of more detailed information included in the previous chapters or in the project New Starts submissions to FTA. It should be noted that the No-Action Alternative provides the basis for evaluation of TSM and LPAP2 impacts under NEPA and CEQA, while the comparison of the TSM and LPAP2 alternatives provides the basis for the FTA's evaluation of the project's worthiness for federal funding. This evaluation shows that the LPAP2 is generally an improvement over the TSM Alternative in measures of each of the five goals discussed below.

7.7.2 Goals and Objectives

7.7.2.1 TRAVEL AND MOBILITY GOAL

The travel and mobility goal is to provide a transportation system that is safe, efficient, and coordinated, and that provides a balanced set of travel alternatives in the corridor by

- Expanding transit service in South Sacramento;
- Increasing service frequencies, accommodating demand, and by increasing transit safety, comfort, and reliability;
- Minimizing transit travel times, including minimizing transfer time and travel delays;
- Promoting use of carpools and feeder bus service to access stations and park-and-ride lots;

- Improving accessibility for the disabled and senior communities; and
- Minimizing demand for parking facilities downtown and at Sacramento City College.

7.7.2.2 LAND USE GOAL

The land use goal is to ensure compatibility between land use policies and transportation policies so that the need for and amount of travel using automobiles is minimized. Three techniques to achieve this goal will be used by RT and community land use planners during the station area planning effort:

- Encouraging high-density, multi-use development in the proximity of transit stations to increase transit use;
- Encouraging in-fill development and discouraging the trend towards urban sprawl; and
- Developing and implementing transportation policies and services that reinforce local and regional land use plans and policies.

Local governments have embraced these techniques in several policy documents. For example, to encourage in-fill development, the City of Sacramento adopted an *Infill Strategy* in May 2002 which targets areas in the *General Plan* for higher density and TOD around existing and proposed light rail stations. To support development which promotes public transportation and revitalizes urban areas and existing communities, the Sacramento City Council adopted the *Smart Growth Implementation Strategy* into the *General Plan* to address issues of growing traffic congestion, deteriorating air quality and greater losses of open space. Section 4.10.2, Local Development Plans and Policies describes these programs in more detail.

Table 7.7-1: Comparison of Alternatives in *2030* with Measure of Goals and Objectives

Category	No-Action	TSM	LPAP2
TRAVEL AND MOBILITY GOAL			
Expand Transit Service in South Sacramento			
Change in Transit Service (routes added or enhanced)	0	5 bus	2 bus, 1 LRT
Increase Service Frequencies, Accommodate Demand, Increase Transit Safety, Comfort, and Reliability (2030)			
Projected Daily Transit Passenger Boardings in Region	278,570	284,930	285,690
Projected Daily Linked Transit Trips In Region	182,180	185,540	188,110
Projected Daily System Light Rail Boardings	105,180	104,060	111,550
Safety, Comfort, and Reliability	0	+	++
Minimize Transit Travel Times (2030)			
A.M. Peak Period Transit Travel Time [1] (min)			
CRC Area to Downtown Sacramento	52	50	35
Laguna West Area to Downtown Sacramento	72	54	43
Elk Grove Area to Downtown Sacramento	70	60	46
Vineyard Area to Downtown Sacramento	75	65	51
System-wide Travel Time Savings (user benefit hours per weekday) [2]	0	N/A	2,273
Promote Use of Carpools and Feeder Bus Service to Access Stations and Park-and-Ride Lots			
Feeder Routes [3]	6	8	11
Carpool Priority Parking at Park-and-Ride Lots	0	+	++

Table 7.7-1: Comparison of Alternatives in *2030* with Measure of Goals and Objectives

Category	No-Action	TSM	LPAP2
Improve Accessibility for the Disabled and Senior Communities			
Increased Senior Living at College Square	0	0	+
Minimize Demand for Parking Facilities Downtown and at Sacramento City College			
Estimated Reduction in Parking Demand Downtown	0	-900	-1,300
Alleviate Traffic Congestion on Corridor Freeways and Arterials			
ADT on SR-99 (Florin Road To Mack Road)	203,400	202,000	202,000
ADT on SR-99 (Mack Road To Cosumnes River Blvd/ Calvine Rd)	155,700	154,900	153,200
Intersections in City of Sacramento with LOS D or Worse in PM Peak Hour before Mitigation	*5*	*1*	*5*
Intersections in City of Sacramento with LOS D or Worse in AM Peak Hour before Mitigation	*8*	*0*	3
Intersections in Sacramento County and City of Elk Grove with LOS F or Worse in PM Peak Hour before Mitigation	0	0	0
Intersections in Sacramento County and City of Elk Grove with LOS F or Worse in AM Peak Hour before Mitigation	0	0	0
Enhance Regional Connectivity through Expanded, Interconnected LRT Services			
Regional Connectivity	0	+	++
LAND USE GOAL			
Encourage High-density, Multi-use Development in the Proximity of Transit Stations to Increase Transit Use			
Transit-oriented Design Adjacent to Stations	0	0	+
Encouraging In-Fill Development and Discourage the Trend towards Urban Sprawl			
Transit Support of In-Fill and Focused Development	0	+	++
Develop/Implement Transportation Policies and Services that Reinforce Local/Regional Land Use Plans/Policies			
Land Use - Consistent with Objectives of General Plans	0	+	++
FINANCIAL AND ECONOMIC GOAL			
Maximize Transit Operating Efficiency/Return on Investment			
Annual Cost per Hour of User Benefit [2]	0	N/A	$14.*53*
Annual Cost per New Passenger [2]	0	N/A	$1*3.03*
Minimize Capital and Operating Costs			
Estimated Capital Cost (Year of Expenditure FY 2007/2011 $ millions)	0	$52.1	*$270.0*
Estimated Capital Cost (FY 200*7* $ millions)	0	$*53*.1	$20*8.1*
2030 Operating and Maintenance Costs (FY 200*7* $ millions)	$261.3	$2*76.3*	$2*75.2*
Enhance Opportunities for Public/Private Partnerships			
Coordination on Transit-Oriented Development	0	0	++
ENVIRONMENTAL GOAL			
Minimize Air Pollution and Facilitate Attainment of Air Quality Standards			
Noise and Vibration	-	0	+
Minimize Impacts on Resources, Conform To Environmental Regulations			
Biological Resources	0	0	-
Cultural Resources	0	0	0

Table 7.7-1: Comparison of Alternatives in *2030* with Measure of Goals and Objectives

Category	No-Action	TSM	LPAP2
Consider Aesthetics in Transportation Planning			
Visual and Aesthetic Resources	0	0	0
Minimize the Displacement of Homes and Businesses			
Acquisitions and Relocations	0	0	-
Land Use - Consistent with Objectives of General Plans	0	+	++
Minimize and Mitigate Noise Pollution			
Noise and Vibration	-	0	0
Conserve Energy			
Direct Energy Consumption (millions of BTUs per year)	91,140,764	91,121,280	91,103,755
Conserve Land			
Land Acquisition	0	-	--
COMMUNITY CONSIDERATIONS GOAL			
Minimize the Disruption of Neighborhood Cohesiveness and Quality of Life			
Use of Land and Displacements	0	-	--
Maximize the Service to, and Mobility of, the Transit-Dependent and Transportation-Disadvantaged			
Creation of Senior Housing next to Transit Stations	0	+	+
Encourage the Economic Revitalization of Low-Income Areas			
Economic Development - Temporary Construction Jobs	0	+	++
Seek a Fair Distribution of Costs and Benefits			
Equity	0	+	++

Source: DKS Associates, Parsons, Nancy Whelan Consulting, 2006.

Notes:
[1] Drive-access transit times. All data in table are for 2030, e.g., travel times.
[2] FTA New Starts statistic calculated for LPAP2 Alternative with respect to TSM Alternative only.
[3] See Tables 2.3-1 and 2.4-1 for details on LRT feeder routes.

7.7.2.3 FINANCIAL AND ECONOMIC GOAL

The financial and economic goal is to provide a transportation system that makes the most efficient use of limited financial resources by:

- Maximizing transit operating efficiency;
- Minimizing capital and operating costs;
- Developing the transportation system to maximize the return on investment;
- Maintaining or increasing farebox receipts as a percentage of transit revenues to minimize subsidies; and
- Enhancing opportunities for public/private partnerships in the development of transit facilities and services.

7.7.2.4 ENVIRONMENTAL GOAL

The environmental goal is to provide a transportation system that enhances and preserves the physical and natural environment by:

- Minimizing air pollution and facilitating the attainment of air quality standards;

- Minimizing impacts on parks, recreational, historic, archaeological, cultural, biotic, and scenic resources and conforming to all local, state, and federal environmental regulations;
- Considering aesthetics in transportation planning;
- Minimizing flood hazards and water pollution;
- Minimizing the displacement of homes and businesses;
- Minimizing and mitigating noise pollution;
- Conserving energy;
- Conserving land; and
- Minimizing short-term construction impacts.

7.7.2.5 COMMUNITY CONSIDERATIONS GOAL

The community considerations goal is to provide a transportation system that is consistent with the needs and desires of the residents of the corridor, and that thereby maximizes community acceptance and political support. This goal includes the following specific objectives:

- Minimizing the disruption of neighborhood cohesiveness and quality of life;
- Maximizing the service to, and mobility of, the transit-dependent and transportation-disadvantaged;
- Encouraging the economic revitalization of low-income areas; and
- Seeking a fair distribution of costs and benefits among different population groups.

The community considerations goal and its objectives have been developed as part of RT's ongoing community involvement program. In this case, the public involvement has been continuous through all the technical and environmental studies completed on the South Sacramento Corridor (starting with the 1981 studies) as well as general outreach on other RT programs and projects.

7.7.3 Travel and Mobility

Table 7.7-1 lists associated measures and the six objectives for travel and mobility from the original environmental document and. In addition, Table 7.7-1 includes associated measures and two other purposes or objectives on congestion relief and connectivity derived from the original travel and mobility goal during the current environmental process.

7.7.3.1 EXPAND TRANSIT SERVICE IN SOUTH SACRAMENTO

Both the TSM Alternative and the LPAP2 would expand transit service in South Sacramento. Under the TSM Alternative, five bus routes would be extended or enhanced: Routes 50E, 52X, 66X, G, and G2 (see Table 2.3-1 for details). Under the LPAP2, two bus routes and the LRT would be extended (see Table 2.4-1 for details). As described in Section 2.3.2, TSM Alternative Bus Service, and Section 2.4.2, LPAP2 Transit Service, these service expansions are tailored to optimize each alternative. The relative effectiveness of these proposed service expansions is described by the other measures under the travel and mobility.

Route 50E on Stockton Boulevard would include bus priority features such as queue jumps. The bus priority treatment is part of a system-wide effort by RT, which is in the process of implementing bus priority treatments in the Downtown and in limited major transit corridors in Sacramento County.

7.7.3.2 INCREASE SERVICE FREQUENCIES, ACCOMMODATE DEMAND, INCREASE TRANSIT SAFETY, COMFORT, AND RELIABILITY

Service frequencies are held constant across the alternatives to ensure a fair comparison in this evaluation. In practice, service frequencies would be tailored to demand. The measures for accommodating demand displayed in Table 7.7-1 include the daily unlinked and linked transit trips in the region and the daily corridor rail boardings and alightings in 2030. The TSM Alternative is projected to increase daily regional transit ridership in 2030 by about 3,360 trips (linked trips) over the No-Action Alternative, while the LPAP2 is projected to add an additional 2,570 trips over the TSM Alternative. The LPAP2 also would increase RT rail boardings in 2030. Under the LPAP2, the number of daily systemwide rail boardings is 111,550. This is 7,880 more than the No-Action Alternative and 7,260 more than the TSM Alternative.

For the largest single transit market, from the LPAP2 Corridor to Downtown, the LPAP2 would generate a 36.1 percent market share, compared to 33.1 percent for the TSM Alternative. For all LPAP2 Corridor work trips, the LPAP2 would generate a 6.0 percent market share, significantly higher than the 4.5 percent regional average.

Transit safety is considered in the design of both the bus and LRT stops and access. See Section 4.16, Safety and Security, for more information. The alternatives are rated from - - or – (negative) to 0 (neutral) to + or ++ (positive), depending upon their expected relative effect with respect to this objective. Transit priority is being implemented on Route 50E, which will increase bus reliability. LRT on separate right-of-way would inherently be more reliable and safer than buses in mixed traffic, which would be subject to related traffic delays and accident hazards. Likewise, LRT tends to be more comfortable than buses due to a smoother ride.

7.7.3.3 MINIMIZE TRANSIT TRAVEL TIMES

The measure of accessibility in Table 7.7-1 is the projected change in corridor transit travel time in 2030. The drive-access-transit time improvement of the LPAP2 compared with the TSM Alternative would range from 11 to 15 minutes.

The LPAP2's superior system continuity and operation on a separate guideway rather than on congested streets and freeways provide material travel time savings over the bus-based TSM Alternative. Compared to the TSM Alternative, the proposed LRT Extension provides transit travel time savings of 20 to 30 percent for trips to Downtown Sacramento from areas in the LPAP2 Corridor.

System-wide travel time savings (calculated using FTA's SUMMIT software) show that the total travel time savings relative to the TSM are 2,273 hours per weekday, or 668,262 hours per year.

Ninety-six percent of the time savings accrue to trips beginning in the LPAP2 Corridor. For trip destinations, 75 percent of the time savings accrue to trips ending in Downtown Sacramento; nine percent to trips ending in the LPAP2 Corridor; 8 percent to trips ending in the Phase 1 Corridor; and 8 percent to trips ending in the Folsom/ US 50 Corridor.

7.7.3.4 PROMOTE USE OF CARPOOLS AND FEEDER BUS SERVICE TO ACCESS STATIONS AND PARK-AND-RIDE LOTS

The LPAP2 would add four new LRT stations with 2,700 park-and-ride spaces and a major new transit center at the CRC Station near State Route 99. The TSM Alternative would add 1,400 park-and-ride spaces and a new transit center at CRC. All park-and-ride lots would implement priority parking for

carpools. The alternatives are rated from - - or – (negative) to 0 (neutral) to + or ++ (positive), depending upon their expected relative effect with respect to this objective.

7.7.3.5 IMPROVE ACCESSIBILITY FOR THE DISABLED AND SENIOR COMMUNITIES

The alternatives are rated from - - or – (negative) to 0 (neutral) to + or ++ (positive), depending upon their expected relative effect with respect to accessibility for senior communities. The No-Action Alternative would be neutral, while the TSM Alternative and LPAP2 would be positive. The positive rating is the result of senior housing being added to the College Square development at the urging of RT. While the housing addition was predicated upon the new LRT station at CRC, it would also be served by the increased bus service and new CRC transit center planned under the TSM Alternative.

7.7.3.6 MINIMIZE DEMAND FOR PARKING FACILITIES DOWNTOWN AND AT SACRAMENTO CITY COLLEGE

The parking demand reduction measures displayed in Table 7.7-1 indicate that the LPAP2 is expected to be superior to the TSM Alternative in reducing parking demand in downtown Sacramento. The LPAP2 is projected to reduce parking demand by about 1,300 spaces downtown compared with a demand reduction of 900 spaces downtown by the TSM Alternative.

7.7.3.7 ALLEVIATE TRAFFIC CONGESTION ON CORRIDOR FREEWAYS AND ARTERIALS

Severe congestion on South Corridor freeways is expected on by *2030*, with both SR 99 and I-5 expected to operate at LOS "F" for three or more hours. The associated measure shows slight but helpful reductions in daily traffic on the two freeways by the TSM Alternative and the LPAP2. The LPAP2 is likewise expected to be superior to the TSM Alternative in reducing traffic on area freeways. Table 7.7-1 indicates that the LPAP2 would reduce Average Daily Traffic (ADT) by up to 1,700 more vehicles on SR-99 than the TSM Alternative.

Local arterial traffic impacts were evaluated using intersection level of service (LOS) analysis (see Section 3.3 for details). The analysis included the major sources of impacts from the proposed alternatives: traffic generated by new park-and-ride facilities as well as increased bus service frequency and the increase in delay at some intersections due to new at-grade crossings, or increased train frequency at existing at-grade intersections. Traffic impacts were considered to be significant when a project worsens an intersection's LOS from a locality's LOS standard (LOS C in the City of Sacramento, and LOS E in Sacramento County and Elk Grove). Under the TSM Alternative, one intersection would deteriorate from LOS C to LOS D during the AM peak hour in the City of Sacramento. Under the LPAP2, two intersections in the City of Sacramento are projected to go below LOS C during the AM peak hour and one is expected to go below LOS C during the PM peak hour. Neither the TSM Alternative nor the LPAP2 is projected to have adverse impacts on intersections in Sacramento County or the City of Elk Grove in *2030*.

7.7.3.8 ENHANCE REGIONAL CONNECTIVITY

The alternatives are rated from - - or – (negative) to 0 (neutral) to + or ++ (positive), depending upon their expected relative effect with respect to connectivity. The No-Action Alternative would be neutral, while the TSM Alternative and the LPAP2 would be positive. The LPAP2 provides excellent access for LPAP2 Corridor residents to RT's existing LRT network. It provides unparalleled access to

Downtown Sacramento – the largest transit market and regional employment center – by providing virtually all corridor residents with the option to drive to a station, board LRT, and arrive Downtown without transferring Downtown Sacramento will provide transfer options to the Capitol Corridor Inter-city rail and Amtrak, and an intermodal facility is currently under development in the city center. Under the LPAP2, 15 percent of the corridor residents can walk to an LRT station and arrive at their destination with no-transfer, compared with less than 10 percent for the TSM. The LPAP2 also provides no-transfer access to intermediate stops on the Phase 1 LRT line (e.g. Sacramento City College) and the Northeast LRT Corridor, plus same-platform transfer access to the Folsom LRT line and the planned Downtown/Natomas/Airport line. It also provides a direct transit connection from the rest of the region to Cosumnes River College, with an anticipated near doubling of enrollment to 20,000 in the year *2030*. This excellent service coverage is possible because the LPAP2 is a natural extension of the region's LRT network.

In comparison, the best that can be offered under the TSM Alternative is a combination of expanded feeder buses to the Phase 1 LRT terminus at Meadowview (that requires bus-to-rail transfers), plus Downtown express buses operating on increasingly congested freeways and HOV lanes. These express buses do not provide access to intermediate stations in the Phase 1 Corridor and add to congestion in the crowded streets of Downtown Sacramento.

7.7.4 Land Use

A scale is used to evaluate the alternatives with respect to each other. The alternatives are rated from - - or – (negative) to 0 (neutral) to + or ++ (positive), depending upon their expected relative effect. The subsections below discuss the factors considered in the rating for each measure.

7.7.4.1 ENCOURAGE HIGH-DENSITY, MULTI-USE DEVELOPMENT IN THE PROXIMITY OF TRANSIT STATIONS TO INCREASE TRANSIT USE

The City of Sacramento and RT are working together with developers on transit oriented development plans for the Morrison Creek and Cosumnes River College stations. The City of Sacramento is revising planning documents and zoning in the Morrison Creek station area to allow for medium and high-density housing clustered near the LRT station, transitioning back to single family zoning further away. At the CRC Station, the City has recently approved development for a mixed commercial/retail/residential development, with high density housing clustered near the proposed LRT station. Finally, the LRT Project would allow redevelopment of up to two acres of lands currently reserved for parking at the Meadowview Station since less parking would be required there with development of the Phase 2 LRT Project. These actions lead to a positive rating for the LPAP2.

7.7.4.2 ENCOURAGE IN-FILL DEVELOPMENT AND DISCOURAGE THE TREND TOWARDS URBAN SPRAWL

In addition to the actions cited in the previous subsection the region is pursuing a broader transit-friendly policy through the "Blueprint" plan which has been approved by the Sacramento Area Council of Governments (SACOG). This plan will form the framework for SACOG's 2007 metopolitan transportation plan update. The City of Sacramento has also developed an in-fill policy which RT's LRT planning supports. See Subsection 7.7.1.2, Land Use Goal, above for more detail.

The alternatives are rated on their promotion of a transit system that would influence development into efficient and coherent patterns. The long-term land use impacts of the No-Action Alternative would likely support more dispersed patterns of development. The TSM Alternative would better

promote transit as the focus of orderly and sustainable growth, but not to the level offered by the LPAP2. The LPAP2 is rated the highest because of the ability of fixed rail transit to focus and concentrate land use patterns. See Section 7.7.1.2, Land Use Goal, and Section 4.10.2, Local Development Plans and Policies, and section 4.10.4.1, Land Use Impacts at Proposed LPAP2 LRT Station Locations, for more discussion.

7.7.4.3 DEVELOP AND IMPLEMENT TRANSPORTATION POLICIES AND SERVICES THAT REINFORCE LOCAL AND REGIONAL LAND USE PLANS AND POLICIES

The basis for land use evaluation is the level of consistency of the alternatives with the transit objectives of Sacramento City and County General Plans, City of Elk Grove General Plan, South Sacramento Community Plan, Airport Meadowview Community Plan and Sacramento Regional County Sanitation District (SRCSD) Bufferlands Master Plan (Final Draft). The LPAP2 is rated higher because of the ability of fixed rail facilities to provide a more stable, long-term focus of development.

7.7.5 Financial and Economic

The following subsections address four of the five objectives listed in Section 7.7.1 for the Financial and Economic Goal. The objective relating to fare box return, while addressed systemwide by RT, is not rated because it is not a specific feature of the proposed project.

7.7.5.1 MAXIMIZE TRANSIT OPERATING EFFICIENCY / RETURN ON INVESTMENT

The measures for these two objectives are the cost per hour of user benefit and cost per new passenger. Table 7.7-1 list these measures for the LPAP2, which shows substantial benefit compared with the TSM Alternative.

7.7.5.2 MINIMIZE CAPITAL AND OPERATING COSTS

The capital cost of the TSM Alternative (in year of expenditure FY 2009 dollars) is $53.7 million. The capital cost for the LPAP2 is $*270* million (also in YOE dollars FY 2007-2011).

RT's additional annual operating costs above the No-Action Alternative are expected to be $7.1 million for the TSM Alternative and $5.6 million for the LPAP2 (both in FY 2006 dollars). The annual operating cost saving for the LPAP2 compared with the TSM Alternative would be $1.4 million in FY 2006 dollars. The forecasted operating and maintenance costs for the TSM Alternative are slightly higher than that for the LPAP2. This is due to several factors. First, the TSM Alternative utilizes substantially more bus service than the LPAP2, and, based on RT's operating data and projections, bus operating costs are increasing at a faster rate than rail operating costs. This is for several reasons, including:

- Higher pension contributions for bus drivers beginning in FY 2006,
- Increased bus overhead costs related to the formation of a new Community Bus Services Department, and
- Increase in bus indirect costs (e.g., casualty & liability insurance, debt service).

In addition, RT has achieved rail operating cost efficiencies with the opening of the Southline Phase 1 and Folsom extensions, and this trend is expected to continue with the operations of Southline Phase

2. The combined impact of all factors mentioned above results in a shift in total O&M costs, with the TSM Alternative costs forecast to be slightly higher than the LPAP2.

7.7.5.3 ENHANCE OPPORTUNITIES FOR PUBLIC/PRIVATE PARTNERSHIPS

The alternatives are rated from - - or – (negative) to 0 (neutral) to + or ++ (positive), depending upon their expected relative effect. Based on the coordination of RT and the City of Sacramento with private developers regarding transit-oriented development plans for the Morrison Creek and Cosumnes River College stations as discussed in Section 7.7.3, Land Use, the LPAP2 is rated positive for public/private partnerships.

7.7.6 Environmental

For the environmental measures, a scale is used to evaluate the alternatives with respect to each other. The alternatives are rated from - - or – (negative) to 0 (neutral) to + or ++ (positive), depending upon their expected relative effect. The subsections below discuss the factors considered in the rating for each measure. All objectives are rated except the two relating to flood hazards/water quality and short-term construction impacts, which design considerations that are discussed in Section 4.9, Hydrology, Flood Plain, and Water Quality, and Section 5.2, Construction Phase Impacts and Mitigation, respectively.

7.7.6.1 MINIMIZE AIR POLLUTION AND FACILITATE ATTAINMENT OF AIR QUALITY STANDARDS

Effects of the No-Action Alternative on corridor air quality would be considered neutral because although traffic volumes and congestion would continue to increase over time, air emissions per gallon would decrease. Both the TSM Alternative and the LPAP2 would improve air quality slightly by shifting travel to transit modes. By attracting more passengers to transit, the LPAP2 leads to more improvement in air quality as shown in Table *7.2-3*, which compares the LPAP2 with the *No Project and* TSM Alternative*s*. The LPAP2 will reduce criteria pollutants and precursor emissions, as well as greenhouse gases compared to the TSM Alternative. Reducing air pollution will help the Sacramento region address its severe (ozone) and moderate (PM_{10}) EPA air quality designations. See Section 4.3, Air Quality, for more information.

7.7.6.2 MINIMIZE IMPACTS ON RESOURCES, CONFORM TO ENVIRONMENTAL REGULATIONS

Impacts to biological resources would be greater under the LPAP2 than under the TSM Alternative. Avoidance measures have been implemented in project design to minimize harm to special-status species, and mitigation is provided to ensure no net loss of habitat values. Thus, the No-Action and TSM Alternatives are rated neutral and the LPAP2 slightly negative on this measure. See Section 4.4, Biological Resources, for more information.

The project would not have any impact on historic architectural resources as no project area architectural resources were found to appear eligible for listings in the NRHP or CRHR. Also, no archaeological resources were found to appear eligible for the NRHP or CRHR, but there is a possibility of uncovering unanticipated cultural resources. In general, however, the effects of the alternatives on corridor cultural resources would be neutral. See Section 4.5, Historic and Cultural Resources, for more information.

7.7.6.3 CONSIDER AESTHETICS IN TRANSPORTATION PLANNING

Construction of the TSM Alternative and the new LPAP2 LRT facilities would introduce visual changes that would be perceived by motorists, residents and business occupants within the project corridor. However, they would not substantially degrade scenic views or introduce obtrusive visual elements substantially out of character with existing land uses. All three alternatives are rated neutral on this criterion. See Section 4.1, Aesthetics, for more information.

7.7.6.4 MINIMIZE THE DISPLACEMENT OF HOMES AND BUSINESSES

Acquisition and relocation measure a potential displacement associated with the optional pedestrian overcrossing of CRB. The No-Action and TSM alternatives would involve no displacements.

The TSM Alternative would require the acquisition of approximately 16.7 acres of land to construct one bus park-and-ride (PNR) lot within the study area.

The LPAP2 would require an approximate *54.4* acres of land. *Two residential properties would be acquired, and i*f the optional pedestrian overcrossing of CRB were selected, this alternative would require the displacement of one *additional* residential property. Thus the No-Action Alternative and TSM alternatives would have a neutral effect, and the LPAP2 would have a negative effect. See Section 4.13.3, Property Acquisition and Relocation, and Section 4.13.4, Effects on Neighborhoods and Businesses, for more information.

7.7.6.5 MINIMIZE AND MITIGATE NOISE POLLUTION

Effects of the No-Action Alternative on corridor noise levels would be negative as traffic volumes and congestion continued to increase. These impacts would be very slightly lessened under the TSM Alternative, given the shift from motor vehicle to transit use. Noise impacts under the LPAP2 after mitigation would be similar to those under the TSM Alternative. Thus, the No-Action Alternative is rated slightly negative, while the TSM Alternative and the LPAP2 after mitigation would be neutral. See Section 4.12, Noise and Vibration, for more information.

7.7.6.6 CONSERVE ENERGY

The TSM Alternative will reduce direct energy consumption by 19,484 million BTUs per year in comparison to the No-Action Alternative. The LPAP2 will reduce direct energy consumption by an additional 17,525 BTUs per year. See Section 4.11.2, Energy, for additional detail.

7.7.6.7 CONSERVE LAND

Based on the discussion of land acquisition under Subsection 7.7.5.4, Minimize the Displacement of Homes and Businesses, the No-Action and TSM alternatives would have a neutral effect, and the LPAP2 would have a negative effect if the pedestrian overcrossing over CRB design option were selected.

7.7.7 Community Considerations

The alternatives are rated from - - or – (negative) to 0 (neutral) to + or ++ (positive), depending upon their expected relative effect, for each of the objectives listed below.

7.7.7.1 MINIMIZE THE DISRUPTION OF NEIGHBORHOOD COHESIVENESS AND QUALITY OF LIFE

The predominant use of existing rail and highway rights-of-way for the LRT would minimize impacts to neighborhood cohesiveness and quality of life. While there would be no displacements associated with the park-and-ride lots for either the TSM Alternative or the LPAP2, the creation of the lots would still constitute some impact to the adjacent residential neighborhoods. Consequently, both alternatives would be rated slightly negative, with the TSM Alternative having a slightly negative effect, and the LPAP2 having the most negative effect. See Section 4.13.3, Property Acquisition and Relocation, and Section 4.13.4, Effects on Neighborhoods and Businesses, for more information.

7.7.7.2 MAXIMIZE THE SERVICE TO, AND MOBILITY OF, THE TRANSIT-DEPENDENT AND TRANSPORTATION-DISADVANTAGED

To the extent that senior communities may be transit dependent, both alternatives would have a slightly positive effect because of the inclusion of senior housing in the College Square development adjacent to the CRC LRT Station or the CRC Transit Center (under the TSM Alternative). See Section 7.7.2.5, Improve Accessibility for the Disabled and Senior Communities, for explanation.

7.7.7.3 ENCOURAGE THE ECONOMIC REVITALIZATION OF LOW-INCOME AREAS

The proposed project may have some effect on the revitalization of the whole South Sacramento Corridor by virtue of improving access as described above and by creating short-term construction related jobs. Economic revitalization in the corridor is rated by the provision of temporary construction-related jobs. Just under half of the jobs tabulated in Section 5.2.7, Construction Employment, would occur in the corridor, with the rest being drawn from the regional and national markets for construction materials and labor. Because jobs are proportional to the investment, the No-Action Alternative would be neutral, the TSM Alternative would be positive, and the LPAP2 would be the most positive. See Section 5.2.6, Employment, for more information.

7.7.7.4 SEEK A FAIR DISTRIBUTION OF COSTS AND BENEFITS AMONG DIFFERENT POPULATION GROUPS

With the LPAP2 funding sources identified in Section 2.6 above, RT would invest almost $153 million (in year of expenditure dollars) to improve transit service in the South Sacramento Corridor. With the TSM Alternative, RT would invest $33 million (year of expenditure dollars) to improve transit service in the area. By most measures, the study area has higher than average percentages of ethnic minority and low-income populations. The percentage of households below the poverty line is about average for the City of Sacramento, and above average for Sacramento County.

As illustrated in Table 7.7.1, transit travel time would be improved from the area to the Sacramento downtown, measurably increasing the accessibility of area residents to jobs. Improved access to station areas would augment economic development potential in the community. As discussed in Section 5.2.6, Employment, construction spending would also create jobs in the corridor over the construction period, with the LPAP2 creating more jobs than the TSM Alternative.

The project would thus have positive equity implications because it would concentrate benefits achieved through local, state and federal funding in an area with relatively higher than average percentages of low-income households and ethnic minority populations. See Section 4.13.1, Demographic Characteristics, for more information.

CHAPTER 8: CONSULTATION AND COORDINATION

This environmental document was prepared on the basis of consultation and coordination with federal, state, and local agencies, and with organizations, elected officials, community leaders, and other individuals from the neighborhoods and communities within Sacramento, Elk Grove, and the South Sacramento Corridor. Public involvement and coordination were achieved through a variety of means, including individual and group contacts, targeted information meetings, workshops, information flyers and newsletters, circulation of draft documents, and a formal public hearing. The project public participation program is described in more detail in Subsection 8.1, Public Involvement/Public Information Program.

Public participation and agency coordination in developing the South Sacramento Corridor Light Rail Project has continued over several phases. Table 2.2-1, Chapter 2, provides a summary of major program elements. Scoping and public involvement were conducted during the 1993 Major Investment Study and preparation of the 1994 AA/DEIS/DEIR that identified the Locally Preferred Alternative mode and alignment for the South Corridor project. Public comments on the AA/DEIS/DEIR were obtained and responded to prior to the RT Board's March, 1995 adoption of LRT as the Locally Preferred Alternative (LPA) mode and the LRT-Low/UPRR corridor as the LPA alignment for extending LRT into the South Sacramento Corridor. As part of this process, an extensive, multi-lingual public information process was conducted to provide the broader community with information regarding the project. The Citizens' Advisory Committee (CAC) voted unanimously in favor of supporting the light rail alternative in the UPRR alignment. Resolutions of support were passed by the Sacramento City Council and the Sacramento County Board of Supervisors.

Public involvement/information continued with stakeholder briefings, community meetings, scoping meetings, and public hearing meetings during preparation of the Supplemental EIS/Subsequent EIR for the 6.3-mile South Sacramento Corridor Phase 1 LRT Extension from downtown Sacramento to the Meadowview Station, which opened for service in September 2003. Outreach continued during RT's 2001 *Multi-Corridor Study*, which updated the evaluation of multiple corridors for transit initiatives throughout the Sacramento area and re-affirmed the priority of the South Sacramento Corridor Phase 2 and Downtown-Natomas Airport projects.

This chapter focuses on the public involvement/information and agency coordination conducted in preparation of the present Supplemental *Final* EIS/Subsequent *Final* EIR for the LPAP2 LRT extension.

8.1 PUBLIC INVOLVEMENT/PUBLIC INFORMATION PROGRAM

RT is committed to ensure the broadest community understanding and input to environmental and design issues related to the South Sacramento Corridor Phase 2 project. RT has therefore carried out an extensive public participation program during the current phase of the South Sacramento Corridor project. This program has multiple elements, as documented in the Public Participation Methodology Report (January 2002), which is available for review at RT's offices.

Objectives of the Public Participation Program are threefold:

- To establish and carry out meaningful interaction among RT, decision makers, stakeholders, and the general public throughout the environmental process;

- To assist RT in addressing emerging issues and to develop consensus on alignment and design issues. Addressing issues early may help to reduce construction costs by reducing or eliminating design changes. The earlier a design change is implemented, generally, the less it costs; and
- To comply with all applicable NEPA and CEQA requirements.

The primary components of the public participation program are as follows:

- Identification of stakeholders/conduct of stakeholder interviews
- Elected official/government staff and interest group briefings
- Agency staff and neighborhood bus tour and workshop
- Project information line
- Development and maintenance of project mailing lists
- Web page development
- Media Relations
- Fact Sheets/newsletters/brochures
- Small group meetings and presentations
- Public open houses/workshops, and
- Public participation during environmental review: scoping, issues identification, comment period, public hearing.

8.1.1 Public Involvement During Preparation of the Supplemental *Final* EIS/Subsequent *Final* EIR

8.1.1.1 SUMMARY OF PUBLIC OUTREACH EFFORTS

Table 8.1-1 summarizes the public outreach that has occurred during preparation of the Supplemental *Final* EIS/Subsequent *Final* EIR. The table shows the date of major outreach activities, the goals and objectives of the meeting/outreach effort, the topics included, the comments received, and the materials that were distributed. Section 8.2 summarizes the agency coordination that has occurred as part of the EIS/EIR and PE effort.

Date	Meeting / Action	Topics Included/Discussed	Materials Distributed
Jan. 2002	Public Participation Methodology Report	▪ Outreach Objectives ▪ Target Audiences ▪ Issues Identification ▪ Outreach Program Components ▪ Outreach Program Responsibilities ▪ Outreach Schedule	▪ Available for public review in information repositories.
Summer 2002	Newsletter	▪ Project Description – Alignment and Stations ▪ Project Goals ▪ Corridor Issues ▪ Other Corridor Projects ▪ Community Involvement Opportunities ▪ History of LPA Selection ▪ General Project Timeline	▪ Newsletter
Feb, 25, 2002	RT Board Meeting/ Briefing	▪ Anticipated Schedule ▪ LPA Alignment and basic issues ▪ FTA New Start Process ▪ Anticipated Scoping meetings	▪ Power Point presentation ▪ Issue Paper ▪ Meeting televised on local access channel
March 6, 2002	▪ Published Notice of Intent in Federal Register. ▪ Published display advertisements of Scoping Meetings ▪ Sent out Notice of Preparation		▪ Notice of Intent in Federal Register. ▪ Notice of Preparation
March 25 & April 11, 2002	Scoping Meetings	▪ Key Contacts ▪ Scoping Process ▪ Locally Preferred Alternative ▪ LPA Phasing & South Line Phase 1 ▪ Proposed Phase 2 station locations o Cosumnes River Boulevard o Franklin Boulevard o Center Parkway o Cosumnes River College o Power Inn Road o Calvine Auberry ▪ Proposed Alternatives (No-Action, Baseline (TSM), LRT) ▪ Stakeholder Interviews/Meetings held to-date ▪ Preliminary EIS/EIR & Alignment Issues o Raise Morrison and Union House Creek levies o Bridges over Morrison and Union House Creek o Wetlands along UPRR and Morrison Creek	▪ Scoping Notice (Notification) ▪ Rack Card (Notification) ▪ Agenda/ Program ▪ Scoping Booklet ▪ Map of Preliminary EIS/EIR and Alignment Issues ▪ Comment Card including specific questions ▪ PowerPoint Presentation Handout ▪ Summer 2002 Newsletter

Date	Meeting / Action	Topics Included/Discussed	Materials Distributed
		o Planned extension and widening of Cosumnes River Boulevard o Regional treatment plant bufferlands & detention basin o Flyover of Franklin Boulevard o Proximity of proposed Freeport Diversion Pipeline o Coordination with College Square Development o Coordination with Cosumnes River College o Flyover of Highway 99 ▪ Key environmental analyses ▪ Other key issues ▪ FTA new starts process ▪ Overall schedule ▪ Agency and public involvement ▪ How to stay involved	
April 11, 2002	Agency Scoping Meeting	Alignment/Station Conceptual Design Issues ▪ Utility poles between Meadowview and Morrison Creek ▪ Realignment of UPRR ▪ Fiber optic and gas lines along Meadowview Road ▪ High voltage lines along Union Pacific Railroad and Bruceville Road ▪ SMUD substations ▪ UPRR flyover at Morrison Creek ▪ SAFCA flood plain between Morrison Creek and Union House Creek crossings ▪ Regional treatment plant detention basin ▪ Union House Creek flyover ▪ Grade separation at Franklin Boulevard ▪ Crossing at Center Parkway - 84" EBMUD pipeline and 84" x 90" sanitary sewers ▪ Bruceville Road crossing ▪ LRT maintenance facility west of Highway 99 ▪ Highway 99 flyover ▪ Calvine/Auberry station location ▪ Morrison and Union House Creek levees and flyovers ▪ Union Pacific Railroad/Morrison Creek wetlands ▪ Cosumnes River Boulevard extension and widening ▪ New College Square development	▪ Agenda/ Program ▪ Scoping Booklet ▪ Map of Preliminary EIS/EIR and Alignment Issues ▪ Comment Card ▪ PowerPoint Presentation
May 1, 2002	Community meeting - Greater Faith Baptist Church	▪ Topics similar to scoping meetings discussed above.	▪ NOP ▪ Newsletter ▪ Scoping Booklet

Date	Meeting / Action	Topics Included/Discussed	Materials Distributed
May 13, 2002	RT Board Meeting/ Briefing	▪ Summary of scoping meetings ▪ Anticipated Schedule ▪ FTA New Start Process ▪ Anticipated bus tour with agencies ▪ Anticipated LRT ride with stakeholders	▪ Power Point presentation ▪ Issue Paper ▪ Meeting televised on local access channel
May 16, 2002	Agency Bus Tour	Preliminary engineering and corridor issues associated with the SSCP2 project (same as above).	▪ Agenda/ program ▪ Map of preliminary EIS/EIR & alignment issues ▪ Comment Card
March 18, 2002	DECAT	▪ Topics similar to scoping meetings discussed above.	▪ Scoping materials
June 6, 2002	Meadowview Development Committee	▪ Topics similar to scoping meetings discussed above.	▪ Scoping materials
June 6, 2002	Laguna Creek Neighborhood Association	▪ Topics similar to scoping meetings discussed above.	▪ Scoping material
June 27, 2002	Community meeting at Cosumnes River College	▪ Topics similar to scoping meetings discussed above.	▪ Scoping materials
Aug. 12, 2002	RT Board Meeting/ Briefing	▪ Outreach efforts ▪ Maintenance facility site options	▪ Power Point presentation ▪ Issue Paper ▪ Meeting televised on local access channel
Aug. 18, 2003	Advance Ride on South Line Phase 1 for stakeholders	▪ Overview of public outreach to date and upcoming outreach opportunities. ▪ General project components and schedule. ▪ Exhibit Boards	▪ Fact sheet ▪ Exhibit Boards ▪ Letters mailed to over 215 elected officials and community members with follow-up calls placed the week prior.
Sept. 25, 2002	Sacramento Chamber of Commerce - Air Quality Committee	▪ Project status ▪ Anticipated environmental review	▪ Power Point presentation
Oct. 16, 2002	Downtown Sacramento Partnership	▪ Project status ▪ Anticipated environmental review	▪ Power Point presentation

Date	Meeting / Action	Topics Included/Discussed	Materials Distributed
Oct. 28, 2002	RT Board Meeting/ Briefing	▪ Visual simulations of flyovers ▪ Maintenance facility update ▪ Number of lanes for CRB ▪ Overall schedule	▪ Power Point presentation ▪ Issue Paper ▪ Meeting televised on local access channel
Nov. 6, 2002	ECOS Transportation Committee -	▪ Same as scoping meetings above	▪ Power Point presentation
Nov. 12, 2002	Valley High School PTSA Meeting	▪ Same as scoping meetings above	▪ Power Point presentation
Nov. 14, 2002	Sacramento Planning Commission	▪ Same as scoping meetings above	▪ Power Point presentation
Nov. 19, 2002	Bridgeport Condominium Association -	▪ Project status ▪ Project alignment ▪ Center Parkway station options	▪ Power Point presentation
Jan. 28, 2003	Sacramento County Board of Supervisors	▪ Phase 3 options & general evaluation ▪ Phase 2 Alignment & key issues ▪ Public involvement ▪ Overall schedule	▪ Power Point presentation ▪ Meeting televised on local access channel
Jan. 30, 2003	Sacramento City Council meeting	▪ Key contacts ▪ Alignment & key issues ▪ Ridership projections ▪ Parking demands ▪ Visual simulations of flyovers ▪ Maintenance facility options ▪ Number of Lanes on CRB ▪ Public involvement ▪ Scoping meeting responses ▪ FTA process ▪ Overall schedule	▪ Power Point presentation ▪ Meeting televised on local access channel
Feb. 4, April 21, May 14, 2003	Open House Meetings	▪ Project background and description ▪ LPA Phase 1 ▪ LPA Phase 2 project features and status ▪ Proposed Phase 2 alignment and station locations o Franklin Boulevard o Center Parkway o Cosumnes River Boulevard o College Square ▪ RT Ten Year System Expansion Strategy ▪ Related projects and schedules ▪ Proposed alternatives ▪ Station design features ▪ 2025 daily ridership (by station) ▪ Base case cost estimate ▪ Capital costs for options ▪ Parking demand ▪ Phase 3 corridor options ▪ Preliminary EIR/EIR and alignment issues	▪ Postcard/Rack Card Notification ▪ Agenda/Program ▪ Comment Card ▪ PowerPoint Presentation

Date	Meeting / Action	Topics Included/Discussed	Materials Distributed
		o Power lines/pipelines o Morrison and Union House Creek Levees to be raised o Bridge over Morrison Creek o Wetlands along UPRR and Morrison Creek o Bridge over UPRR and Union House Creek o Cosumnes River Boulevard extension o Franklin Boulevard flyover o Freeport Diversion pipeline o Cosumnes River Boulevard utilities and widening o Bruceville Road widening o Coordination with Cosumnes River College o Coordination with College Square Development o Highway 99 flyover o Relationship to future phases ▪ Key environmental issues and preliminary findings ▪ Visual Simulations at key corridor locations ▪ Project funding process ▪ Project approach and overall schedule	
February 24, 2003	RT Board Meeting/ Briefing	▪ Expansion plan for Light Rail Operations and Maintenance facilities to be implemented as the RT system grows.	▪ Power Point presentation ▪ Issue Paper ▪ Meeting televised on local access channel
Feb. 18, 2003	Laguna Creek PAC	▪ Same as open houses	▪ Same as open houses
March 24, 2003	RT Board Meeting/ Briefing	▪ Preliminary capital costs ▪ Design options and preliminary capital costs ▪ Maintenance facility preliminary costs	▪ Power Point presentation ▪ Issue Paper ▪ Meeting televised on local access channel
April 9, 2003	Regional Sanitation Board	▪ Key contacts ▪ Alignment & key issues, including relationship to exiting and planned sewers & effects on bufferlands ▪ Ridership projections ▪ Parking demand ▪ Visual simulations of flyovers ▪ Maintenance facility options ▪ Number of Lanes on CRB ▪ Public involvement ▪ Scoping meeting responses ▪ FTA process ▪ Overall schedule	▪ Power Point presentation ▪ Meeting televised on local access channel

Date	Meeting / Action	Topics Included/Discussed	Materials Distributed
May 21, 2003	Los Rios Community College District Board	▪ Coordination with CRC & Los Rios College District ▪ CRC station options & associated issues ▪ Ridership projections ▪ Parking demand ▪ LRT segment costs ▪ Phase 3 options & general evaluation ▪ Overall schedule	▪ Power Point presentation
	Resource Agency meeting	▪ Preliminary environmental analysis results o Purpose & Need o Traffic / Transportation impacts o Noise / vibration & mitigation o Biology / habitat o Wetlands o Visual o Displacements o Floodplains ▪ CRC station options ▪ Funding / cash flow ▪ Related projects ▪ FTA process ▪ Schedule	
July 16, 2003	Meeting with FTA staff	▪ Project overview ▪ Purpose & Need ▪ Phase 2 alternatives / design options ▪ Activity centers ▪ Related projects ▪ Ridership ▪ Parking demand ▪ Project phasing ▪ RT financial plan ▪ Project capital costs & funding plan ▪ Project operating costs & funding plan ▪ System wide financial plan ▪ Status of FTA reviews ▪ 1994 Alternatives Analysis / 1995 LPA ▪ Baseline Report ▪ Travel Demand Forecasting Report ▪ Summit Results ▪ Detailed Definition of Alternatives ▪ ADEIS/R ▪ Bus & Rail Fleet Management Plan ▪ New Starts Report (templates) ▪ PMP	▪ Power Point presentation ▪ Draft Purpose and Need ▪ Baseline Report ▪ Travel Demand Forecasting Report ▪ Summit Results ▪ Detailed Definition of Alternatives
Aug. 18, 2003	LRT Ride with South Sacramento agency stakeholders -	▪ Alignment and design options ▪ Major issues ▪ Overall schedule ▪ Overall funding	▪ Fact Sheet

Date	Meeting / Action	Topics Included/Discussed	Materials Distributed
Aug. 25, 2003	RT Board Meeting/ Briefing	▪ Elimination of Franklin MOS	▪ Power Point presentation ▪ Issue Paper ▪ Meeting televised on local access channel
Sept. 4, 2003	DECAT Committee	▪ Purpose & Need ▪ Project Alternatives ▪ Ridership ▪ Parking demand ▪ Preliminary capital costs ▪ Design options & preliminary costs ▪ Related projects ▪ FTA process ▪ Overall project schedule	▪ Power Point presentation
April 12, 2004	RT Board Meeting/ Briefing	▪ FTA's project justification criteria & measures ▪ Staff recommendations o Elimination of maintenance facility along south line o Phase 2 terminus at CRC o Add station at Morrison Creek o Eliminate median option for CRB – retain Northern option o Eliminate Northern option at Franklin Station – retain Southern option o Eliminate Median & east design options for CRC – retain West option (on site of CRC)	▪ Power Point presentation ▪ Issue Paper ▪ Meeting televised on local access channel
May 27, 2004.	Paratransit Board of Directors	▪ Review status of project ▪ Review recent RT Board Actions	▪ Power Point presentation
Nov. 15 & Nov. 17, 2004	Open House Meetings	▪ Meeting objectives and guidelines ▪ LPA and South Line Phase 1 ▪ Project needs ▪ Traffic congestion on freeways ▪ Initial alignment and station locations ▪ Reasons for project changes ▪ FTA's project justification criteria and measures ▪ Refined LRT extension ▪ Proposed new Morrison Creek Station ▪ Conceptual drawing of pedestrian access to Morrison Creek Station with cross-section of optional pedestrian access ▪ Gas line relocation from Morrison Creek to Detroit Boulevard ▪ Proposed pedestrian pathway/bridge to Franklin LRT Station ▪ Examples of pedestrian access/bridges to rail stations ▪ Proposed pedestrian pathway/bridge to Center Parkway Station ▪ Cross Section of Cosumnes River Boulevard	▪ Agenda/ Program ▪ Project Fact Sheet and Map ▪ Light Rail Systems and Crime Reduction Fact Sheet ▪ Light Rail Systems and Property Values Fact Sheet ▪ PowerPoint Presentation ▪ Comment Card.

Date	Meeting / Action	Topics Included/Discussed	Materials Distributed
		projects ▪ Elimination of Cosumnes River College Median and East Options ▪ Cosumnes River College terminus ▪ Reasons for College as terminus station ▪ Overall schedule ▪ Northern Cosumnes River Boulevard Option and elimination of Median Design Option Supplemental Exhibits: ▪ Proposed alternatives ▪ Cost estimate – Base Case ▪ Optional Project add-ons – Design options ▪ FTA New Starts process ▪ Stakeholder interviews/Meetings to-date ▪ Key environmental analyses ▪ Preliminary noise barrier locations ▪ RT Ten Year System Expansion Strategy ▪ Related projects and schedules	
January 24, 2005, November 14, 2005	RT Board Meeting/ Briefing	▪ Project Status ▪ Schedule update ▪ Capital cost update ▪ FTA "New Starts" submission summary	▪ Power Point presentation ▪ Issue Paper ▪ Meeting televised on local access channel
February 23, 2006	North Laguna Neighborhood Assoc.	▪ Project Status	
March 2006	Newsletter	▪ Alignment and station locations ▪ Environmental and technical issues relating to the corridor ▪ Availability of and information found in the DSEIS/SEIR ▪ Special insert on how to read an environmental document ▪ How to provide comments	n/a
January 2007	Public Meeting	▪ Presentation of CRC parking garage, ▪ Discussion on how to read an environmental document ▪ How to provide comments	
March 12, 2007	Public Hearing	This Draft Environmental Document was released for formal public review in February 2007. A public hearing is to be held on March 12, 2007 and was noticed via a notice of availability. Comments on the SDEIS/SDEIR have been used to refine the Locally Preferred Alternative and are incorporated into this FSEIS/FEIR.	n/a

Date	Meeting / Action	Topics Included/Discussed	Materials Distributed
December 10, 2007	*RT Board Meeting/ Briefing*	▪ *Project Status* ▪ *Schedule update* ▪ *Project changes in response to public comments* ▪ *"New Starts" status*	▪ *Power Point presentation* ▪ *Issue Paper* ▪ *Meeting televised on local access channel*
Throughout/ Continuously updated	Project Web Site	▪ Project overview o Alignment and stations o Project goals o History o Environmental review process ▪ Alignment/station location map ▪ Public outreach ▪ Frequently asked questions ▪ Project schedule and calendar ▪ News and documents ▪ How to contact us	n/a
Information Line and E-Mail Address		n/a	n/a

8.1.1.2 STAKEHOLDER INTERVIEWS

RT has held over 35 interviews and briefings with local agency officials and staff, city council members, RT board members, community organizations and neighborhood associations, and other stakeholders since project initiation and during engineering studies and preparation of this environmental document. The purpose of these small group meetings has been to inform stakeholders about the project, identify related projects and facilities in the vicinity, respond to needs for targeted (for example, multi-lingual) outreach, and identify project-related issues of concern so that they can be addressed in the engineering and environmental studies. A complete listing of these meetings is reported in Section 8.4, Chronology of Coordination.

8.1.1.3 COMMUNITY MEETINGS

RT has held thirteen community meetings, open houses or briefing presentations to present the project to community members and articulate project issues of concern to corridor residents and particular communities or neighborhoods. These meetings have generally been conducted in response to specific neighborhood or organization requests. It is anticipated that additional community meetings will be held throughout the remainder of the studies and during preliminary engineering and final design. A complete listing of the community meetings is reported in Section 8.4, Chronology of Coordination.

8.1.1.4 SCOPING MEETINGS

RT held two public scoping meetings and one agency scoping meeting at the initiation of the environmental studies for the Phase 2 extension project. Public scoping meetings were held from 5:30 to 8:00 pm on March 25 and April 11, 2002, at Cosumnes River College (8401 Center Parkway) and the Sam Pannell Community Center (2450 Meadowview Road), respectively. Each formal scoping meeting was preceded and followed by an informal open house where participants could

view project displays and ask questions directly of project staff. Sign language and Spanish language interpreters were available at each meeting. Participants were given a Scoping Booklet that described the project on a map of the corridor showing proposed station locations, explained the environmental review process, summarized project issues, and provided the project schedule. The booklet included a Comment Card and instructions about how to provide comments to the project team during the meeting or at other times.

The scoping meetings were announced through paid newspaper display advertisements, pre-meeting newspaper articles, notice cards along RT bus and light rail lines, bus placards, flyers and leaflets distributed at churches, community centers, libraries, and retail shops throughout the corridor, a message on the marquee sign at the Sam Pannell Community Center, and through direct mailings to approximately 5,000 property owners, business owners, agencies, special interest groups, and other parties. The April 11 meeting was rebroadcast on Sacramento's Community Access Cable TV station, Channel 73. Information about how to submit comments was included in this broadcast.

Between 70 and 100 people attended these public scoping meetings and provided comments, which are documented in the Scoping Meeting Summary Report, July 2002, which is available for review at RT offices and incorporated by reference herein.

8.1.1.5 PROJECT MAILING LIST

The goal of establishing and maintaining a project mailing list is to ensure that all interested parties are informed of the proposed project purpose, description, events and decision points. The project team has developed and is continually updating the project mailing list, which now comprises over 5,000 entries, including key stakeholders, property owners, residents, community groups, civic groups, neighborhood associations, business and planning professionals, elected officials, agency officials and staff, and others who request to be included.

8.1.1.6 NEWSLETTERS AND FLYERS

The first issue of the South Line project newsletter, "Regional Transit Heads South," was published in June 2002. It described steps leading up to selection of a locally preferred alternative mode and alignment for the South Line, described the Phase 2 project, presented project goals and corridor issues, discussed the environmental review process, presented the project schedule, and solicited public participation through meetings, the project hotline, postal mail, email, and the RT website. The newsletter was directly mailed to the more than 5,000 parties on the project mailing list and was also placed in government offices, the downtown Sacramento library, and South Sacramento libraries, community centers, including the Pannell Center and churches. Supplies of this newsletter have been replenished as needed.

Additional newsletter issues are planned to announce preliminary findings and the availability of the Supplemental Draft and Final EIS/Subsequent Draft and Final EIR documents for public review, and the identification of the preferred alternative, once it is known.

A flyer was prepared and mailed directly to approximately 5,000 property owners, business owners, agencies, special interest groups, and other parties, to announce the dates and locations of the public scoping meetings. This one-page information item announced the initiation of the environmental studies and invited public participation at the meetings or by mail during the 60-day scoping period, as well as through the completion of the environmental review process. Additional flyers will be prepared and mailed out at appropriate milestones during the preparation of the draft and final environmental documents.

8.1.1.7 CIRCULATION OF THE SUPPLEMENTAL DRAFT EIS/SUBSEQUENT DRAFT EIR, PUBLIC COMMENT PERIOD, AND PUBLIC

The SDEIS/SDEIR *was published and circulated in January 2007 and* RT and FTA solicit*ed* public and agency review comments through advertisements in local publications, direct mailing, a formal Notice of Completion to state agencies, and publication of a Notice of Availability in the Federal Register. Copies of the draft environmental document *were* mailed to appropriate agencies and organizations as identified in the Distribution List presented in Appendix D, and copies *were* available for review at RT's offices, local libraries, and other community centers*.* A public hearing *was* held on March 12, 2007 at the Pannel Meadowview Community Center, 2450 Meadowview Rd., Sacramento.

8.2 AGENCY CONSULTATION AND APPROVALS

Agency coordination during preparation of the SDEIS/SDEIR has four components: informal coordination, formal scoping, formal consultation, and formal review of the draft environmental document.

8.2.1 Informal Agency Coordination

Extensive informal consultation has been conducted with local agencies and jurisdictions and other service providers to assure coordination throughout project development, and to identify project-related issues to be addressed during the studies. The team has met regularly with these parties during the development of the project engineering and the SDEIS/SDEIR to discuss the relationship of other city, county, and regional plans and facilities to the proposed project and to respond to the comments of these other entities. RT has provided targeted project briefings to elected officials and developers of contiguous private projects. This coordination is designed to identify and address issues so as to avoid or reduce project impacts. A complete chronology of these meetings is presented in Section 8.4, Chronology of Coordination.

Agency Bus Tour. On March 16, 2002, RT conducted a bus tour of the proposed LPAP2 LRT alignment and a workshop on project issues for staff representatives of 23 local and resource agencies. This tour and workshop enabled agency staff to view the proposed project alignment in the field, express concerns about the project related to their facilities and services, and learn about other jurisdictions' project-related issues in a peer setting.

8.2.2 Agency Scoping Meeting

A Notice of Preparation (NOP) of an EIR was sent to all appropriate local, state, and federal agencies and other interested parties. A Notice of Intent (NOI) to prepare an EIS was also published in the Federal Register on March 8, 2002. An agency Scoping meeting was held April 11, 2002, from 10:30 am to 12:30 pm in the RT Administration Building auditorium at 1400 29th Street, Sacramento. About 40 agency representatives attended this meeting and gave input to the studies in relation to the facilities, resources, or processes under their jurisdiction. Copies of agency letters received in response to the NOP/NOI are provided in Appendix E.

8.2.3 Agency Consultation and Review of the Supplemental Draft EIS/Subsequent Draft EIR

Consultations under Endangered Species Acts. Consultation with the U.S. Fish and Wildlife Service (USFWS) under Section 7 of the federal Endangered Species Act and with the California Department of Fish and Game (CDFG) under the California Endangered Species Act is required if the project will have impacts to special-status biological species. Consultation *has been* conducted with USFWS regarding potential impacts to vernal pool crustaceans, giant garter snake and foraging and nesting habitat for various special-status bird species. Details regarding these species are provided in Section 4.4.3.2, Special-Status Species. FTA submitted the Preliminary Biological Assessment and proposed mitigation measures to USFWS in October 2006. A copy of the SDEIS/SDEIR was also provided to USFWS for review and comment. The CDFG has also been provided with copies of these documents. *The USFWS issued a Biological Opinion (BO) (81420-2008-F-0285) for the project on April 18, 2008.* It is anticipated that CDFG will review the impact areas with RT in the field and will return its determination that the BA and USFWS biological opinion are consistent with the California Endangered Species Act.

Western States Memorandum of Understanding for Integrated NEPA-404 Processing. Consultations with the U.S. Environmental Protection Agency (EPA), USFWS, National Marine Fisheries Service, and the U.S. Army Corps of Engineers (USACOE) in accordance with the Western States Memorandum of Understanding (MOU) for Integrated Processing of NEPA and Section 404 of the Clean Water Act would apply if the project were to require an individual permit under Section 404 or affect special aquatic sites. Impacts to wetlands/waters of the U.S. that would occur under the build alternatives for this project, as described in Section 4.4.4.3, Impacts to Wetlands and Other Waters of the U.S., are below thresholds requiring an individual Section 404 permit. Therefore, the MOU does not apply to the proposed project. It is anticipated that the project will qualify for a nationwide permit 14 for linear transportation crossings.

Consultations Pursuant to Section 106 of the National Historic Preservation Act. Surveys conducted within the Areas of Potential Effects (APE) for archaeological and architectural resources have identified no resources that are eligible for the National Register of Historic Places or the California Register of Historic Resources. A Historic Properties Survey Report was prepared and submitted to the State Historic Preservation Officer (SHPO) on August 5, 2003. The SHPO concurred in the determination of eligibility on June 21, 2006; a copy of the SHPO's letter is provided in Appendix E. The Native American Heritage Commission (NAHC) was contacted to perform a Sacred Lands file search and contacts provided by NAHC were requested to share information, express concerns, and make recommendations regarding the project. This coordination identified no Sacred Lands in the project vicinity. One Native American contact requested additional information; this information has been provided and coordination is ongoing. SHPO concurrence concludes consultations under Section 106 unless unanticipated cultural materials are discovered during construction. In that case, RT would notify FTA to provide for additional consultation with SHPO and other interested parties as appropriate.

8.2.4 Other Permits and Approvals

It is anticipated that the following permits and approvals would be required for the TSM or LPAP2 alternatives.

Table 8.2-1: Agency Approvals

Agency	TSM Alternative	LPAP2
U.S. Fish and Wildlife Service	Complete consultations and approve Conceptual Mitigation Plan for impacts to threatened, rare and candidate species under Sec. 7, ESA, prior to federal Record of Decision.	Complete consultations and approve Conceptual Mitigation Plan for impacts to threatened, rare and candidate species under Sec. 7, ESA, prior to federal Record of Decision.
Federal Railroad Administration	N/A	Coordination regarding shared track.
U.S. Army Corps of Engineers	N/A	Approve Section 404 Nationwide Permit 14.
California Department of Fish and Game	Determine consistency with California ESA and approve Conceptual Mitigation Plan for impacts to California special-status species prior to certification of Final EIR.	Determine consistency with California ESA and approve Conceptual Mitigation Plan for impacts to California special-status species prior to certification of Final EIR.
California Department of Water Resources The Reclamation Board	N/A	Approve Reclamation Board Encroachment Permit.
Regional Water Quality Control Board	Approve Section 401 Water Quality Certification and Waste Discharge Requirements, if any. Approve National Pollutant Discharge Elimination System (NPDES) or Countywide Non-point Source Permit.	Approve Section 401 Water Quality Certification and Waste Discharge Requirements, if any. Approve National Pollutant Discharge Elimination System (NPDES) or Countywide Non-point Source Permit.

Table 8.2-1: Agency Approvals

Agency	TSM Alternative	LPAP2
California Public Utilities Commission	N/A	Approval of new grade crossings and modifications of existing grade crossings.
State of California	Approve General Construction Stormwater Permit (requires Stormwater Pollution Prevention Plan [SWPPP]).	Approve General Construction Stormwater Permit (requires Stormwater Pollution Prevention Plan [SWPPP]).
City of Sacramento	Verify compliance with Grading, Erosion, and Sediment Control Ordinance (93-068); approve Special Permits for Bus and Transit Terminals (City Zoning).	Review right-of-way acquisition, intersection improvements (city streets); verify compliance with Grading, Erosion, and Sediment Control Ordinance (93-068); approve Special Permits for Bus and Transit Terminals (City Zoning).
County of Sacramento	Verify compliance with Land Grading and Erosion Control Ordinance.	Review right-of-way acquisition, intersection improvements (county roads); verify compliance with Land Grading and Erosion Control Ordinance; approve grade crossing modifications.
Cosumnes River College	Grant easement for park-and-ride lot on college property.	Grant easement for park-and-ride lot on college property.

8.2.5 Agencies Consulted

This environmental document is being distributed to appropriate federal, state, regional and local agencies. A copy of the SDEIS/SDEIR distribution list is provided in Appendix D. RT will consider and respond in writing to any written comments on the project documentation received from agencies during the public comment period prior to identifying a preferred investment strategy in coordination with FTA. RT's responses will be published along with the agency comments in the Supplemental Final EIS/Subsequent Final EIR.

Public agencies formally or informally consulted during the preparation of this environmental document, including those that received a copy of the SDEIS/SDEIR are the following:

FEDERAL AGENCIES

Council of Environmental Quality
Department of Transportation, Office of the Secretary
Federal Emergency Management Administration
Federal Highway Administration
Federal Railroad Administration

General Services Administration
National Transportation Safety Board
Surface Transportation Board
U.S. Army Corps of Engineers
U.S. Department of Commerce
U.S. Department of Energy
U.S. Department of Housing and Urban Development
U.S. Environmental Protection Agency
U.S. Fish and Wildlife Service
U.S. Department of the Interior
U.S. Department of Agriculture
U.S. Senators and Congressional Representatives

STATE AGENCIES

Air Resources Board
California Business, Transportation & Housing
California Environmental Protection Agency
California Native Plant Society
Department of Fish and Game
Department of Housing and Community Development
Department of Parks and Recreation
Department of Transportation, District 3
Department of Transportation, Rail Program
Department of Water Resources
Energy Commission
Office of Planning and Research
Public Utilities Commission
Reclamation Board
State Historic Preservation Officer
State Lands Commission
State Resources Agency
State Senators and Assembly Members
Water Quality Control Board
Water Resources Control Board

LOCAL AND REGIONAL AGENCIES

City of Elk Grove Community Services Department
City of Elk Grove Public Works Department
Cosumnes River College
DECAT
East Bay Municipal Utility District
Elk Grove Unified School District – Facilities Department

Freeport Regional Water Authority
Los Rios Community College District (Cosumnes River College)
Sacramento Area Flood Control Agency
Sacramento Area Council of Governments
Sacramento City Council and Mayor
Sacramento City Department of Public Works
Sacramento City Department of Utilities
Sacramento City Engineering & Transportation Development Department
Sacramento City Environmental Commission
Sacramento City Environmental Services Division
Sacramento City Fire Department
Sacramento City Historic Preservation Officer
Sacramento City Manager
Sacramento City Office of Human Services
Sacramento City Parks and Community Services
Sacramento City Planning Department, Office of Environmental Affairs
Sacramento City Neighborhood Services Department
Sacramento City Police Department
Sacramento Convention and Visitors Bureau
Sacramento County Air Quality Management District
Sacramento County Board of Supervisors
Sacramento County Commission on Aging
Sacramento County Department of Parks and Recreation
Sacramento County Department of Planning
Sacramento County Department of Public Works (incl. Department of Water Resources)
Sacramento County Department of Utilities
Sacramento County Engineering & Transportation Development Department
Sacramento County Environmental Coordinator
Sacramento County Environmental Review and Assessment
Sacramento County Executive
Sacramento County Fire Protection District
Sacramento County Health Department
Sacramento County Policy Planning Commission
Sacramento County Project Planning Commission
Sacramento County Sheriff's Department
Sacramento County Transportation and Operations Division
Sacramento Housing and Redevelopment Agency
Sacramento Metropolitan Area Air Quality Management District
Sacramento Metropolitan Arts Commission
Sacramento Metropolitan Fire District
Sacramento Municipal Utilities District
Sacramento Regional County Sanitation District
Sacramento School District
Sacramento Transportation Authority
Western Area Power Administration

8.3 OTHER INTERESTED PARTIES AND STAKEHOLDERS

Other interested parties and stakeholders consulted during the studies include the following:

Area 2 Neighborhood
Caring Neighbors
College Square Development
Greater Faith Baptist Church
Laguna Creek Neighbors
Meadowview Development Committee
Union Pacific Railroad

8.4 CHRONOLOGY OF AGENCY COORDINATION

Table 8.4-1 summarizes the meeting held with agency stakeholders.

Table 8.4-1: Summary of Agency Meeting Coordination

Agency	Dates		Subjects Discussed
Sacramento Area Flood Control Agency (SAFCA) & U.S. Army Corps of Engineers	▪ January 7, 2002 ▪ March 21, 2002 ▪ December 19, 2002 ▪ April 21, 2003 ▪ May 23, 2003 ▪ June 6, 2003 ▪ *June 20, 2003* ▪ *March 9, 2004* ▪ *August 9, 2004*	▪ January 21, 2005 ▪ April 5, 2005 ▪ May 25, 2005 ▪ *June 7, 2005* ▪ *February 21, 2007* ▪ *March 14, 2007* ▪ *June 21, 2007* ▪ *August 17, 2007* ▪ *October 25, 2007*	▪ Relationship of LRT Project to South Streams Improvement Project ▪ SAFCA/COE need for widening of Union House Creek 18 feet ▪ Coordination of cross section of CRB
Freeport Water Diversion Project	▪ April 9, 2003 ▪ May 23, 2003 ▪ June 6, 2003 ▪ June 9, 2003	▪ June 20, 2003 ▪ March 9, 2004 ▪ April 5, 2005 ▪ May 25, 2005	▪ Effects of LRT on proposed water diversion project ▪ Coordination of cross section of CRB
City of Sacramento Departments	▪ December 20, 2001 ▪ January 11, 2002 ▪ March 6, 2002 ▪ June 21, 2002 ▪ July 15, 2002 ▪ August 1, 2002 ▪ September 5, 2002 ▪ September 6, 2002 ▪ October 3, 2002 ▪ November 7, 2002 ▪ November 26, 2002 ▪ December 5, 2002 ▪ January 2, 2003 ▪ *February 6, 2003* ▪ *April 3, 2003* ▪ *June 6, 2003* ▪ *August 7, 2003*	▪ September 4, 2003 ▪ November 6, 2003 ▪ February 5, 2004 ▪ March 9, 2004 ▪ Nov. 4, 2004 ▪ December 2, 2004 ▪ January 6, 2005 ▪ April 5, 2005 ▪ April 22, 2005 ▪ *May 25, 2005* ▪ *December 21, 2006* ▪ *January 10, 2007* ▪ *January 30, 2007* ▪ *February 21, 2007* ▪ *March 14, 2007* ▪ *May 17,2007* ▪ *October 25, 2007*	▪ Overall project status ▪ Federal new starts process ▪ Coordination of public outreach efforts ▪ Traffic carrying capacity of local & area streets ▪ Conceptual street designs ▪ City land use actions, polices, ordinances, plans ▪ Coordination with related projects, e.g., Bruceville Road widening ▪ Coordination with CRC ▪ *Coordination of cross section of CRB*

Table 8.4-1: Summary of Agency Meeting Coordination

Agency	Dates		Subjects Discussed
Sacramento County Regional Sanitation District	▪ January 18, 2002 ▪ February 15, 2002 ▪ April 9, 2002 ▪ June 27, 2002	▪ June 6, 2003 ▪ January 19, 2005 ▪ January 28, 2005 ▪ May 25, 2005 ▪ *March 14, 2007*	▪ Effects on SCRSD Bufferlands ▪ Potential effects on existing major interceptor sewers ▪ Potential effects on future planned sewers
State Department of Water Resources/ State Reclamation Board.	▪ *August 9, 2004* ▪ *May 25, 2005* ▪ *June 7, 2005*	▪ *February 21, 2007* ▪ *March 14, 2007* ▪ *October 25, 2007*	▪ *Permitting Requirements* ▪ *Design Criteria*
California Public Utilities Commission	▪ July 3, 2003 ▪ *May 9, 2006*	▪ *December 27,2007*	▪ Project overview ▪ LRT grade crossings ▪ General traffic / delay impacts ▪ Preliminary grade separation design options
Union Pacific Railroad	▪ February 27, 2002 ▪ June 25, 2003	▪ April 20, 2005	▪ Relationship of freight tracks to LRT ▪ Cross section in rail corridor
Sacramento Fire Department	▪ June 13, 2005	▪	▪ Overall Project status ▪ Conceptual station designs
SMUD	▪ June 6, 2003 ▪ Nov. 15, 2004	▪ June 28, 2005	▪ Overall Project status ▪ UPRR corridor conceptual design ▪ Access to SMUD facilities
PG&E	▪ June 6, 2003 ▪ July 20, 2004	▪	▪ Overall Project status ▪ Relocation of gas line out of UPRR ROW ▪ *Replacement of electrical transmission tower.*
Cosumnes River College/Los Rios Community College District	▪ January 31, 2002 ▪ March 5, 2002 ▪ May 1, 2002 ▪ August 28, 2002 ▪ March 26, 2003 ▪ May 12, 2003 ▪ February 6, 2004 ▪ October 5, 2004 ▪ November 29, 2004	▪ December 2, 2004 ▪ April 12, 2005 ▪ May 3, 2005 ▪ May 12, 2005 ▪ May 27, 2005 ▪ July 19, 2005 ▪ Nov. 10, 2005 ▪ March 2, 2006 ▪ September 1, 2006	▪ Overall project status ▪ Relationship of LRT station to CRC Master Plan ▪ Options for station platform/parking locations ▪ Anticipated Memorandum of Understanding (MOU)
Sacramento RT Board & Los Rios Community College District Board	▪ *October 22, 2007*		▪ *Joint meeting to sign a preliminary Memorandum of Agreement*
College Square Development representatives	▪ February 15, 2002 ▪ May 1, 2002 ▪ December 2, 2004	▪	▪ Relationship of CRC station/parking to proposed development

Table 8.4-1: Summary of Agency Meeting Coordination		
Agency	**Dates**	**Subjects Discussed**
Sacramento Housing & Redevelopment Agency	▪ February 15, 2002 ▪ June 6, 2003 ▪ December 2, 2004 ▪	▪ Relationship of CRC station, alignment/ parking to SHRA property & proposed development
Sacramento City Councilmember	▪ February 15, 2002 ▪ May 1, 2002 ▪ May 9, 2002 ▪ October 3, 2002 ▪ December 5, 2002 ▪ December 17, 2002 ▪ January 14, 2003 ▪ January 23, 2003 ▪ June 9, 2003 ▪ April 1, 2004 ▪ September 1, 2006	▪ Status of project ▪ Coordination with City department and projects ▪ Public outreach efforts ▪ Project funding / federal process
Sacramento City Planning Department	▪ February 19, 2002 ▪ June 6, 2003 ▪ April 1, 2004 ▪ December 2, 2005 ▪ July 13, 2006 ▪	▪ City land use actions, polices, ordinances, plans ▪ FTA new starts criteria submission
Sacramento County departments	▪ February 21, 2002 ▪ June 6, 2003 ▪	▪ Status of project ▪ Coordination with County department and projects ▪ Public outreach efforts ▪ Project funding / federal process
Sacramento County Planning Department staff.	▪ February 28, 2003 ▪ July 13, 2006 ▪	▪ City land use actions, polices, ordinances, plans ▪ FTA new starts criteria submission
Sacramento County Supervisor	▪ February 25, 2002 ▪ March 1, 2002 ▪ July 19, 2002 ▪ August 12, 2002 ▪ August 13, 2002 ▪ December 12, 2002 ▪	▪ Status of project ▪ Coordination with City department and projects ▪ Public outreach efforts ▪ Project funding / federal process
City of Elk Grove staff	▪ March 18, 2002 ▪ September 6, 2002 ▪ June 6, 2003 ▪ June 30, 2005 ▪	▪ Update of Elk Grove General Plan ▪ Relationship of LPAP2 Project to Phase 3 (in MTP) ▪ Coordination of bus services related to Project Alternatives
Elk Grove Unified School District - Facilities Department	▪ March 28, 2002 ▪ June 6, 2003 ▪	▪ Overall Project status ▪ Relationship of Calvine/Auberry Station to Elk Grove middle/high school
Caltrans	▪ June 6, 2003 ▪	▪ Crossing of SR 99

Table 8.4-1: Summary of Agency Meeting Coordination			
Agency	**Dates**		**Subjects Discussed**
Cosumnes River Boulevard Extension Coordinating Committee	▪ Generally monthly – 2002-2006	▪ *August 17, 2007*	▪ Relationship of CRB Extension to LPAP2 project.
Stone Family Trust and Stone Boswell – Property Owners (adjacent to Morrison Creek Station).	▪ July 31, 2003 ▪ August 11. 2004 ▪ February 23, 2006	▪	▪ Overall Project status ▪ Proposals for Morrison Creek Station ▪ Relationship to planned development of Stone Family Trust property
U.S. Congresswoman Briefing	▪ March 30, 2005	▪	▪ Status of project ▪ Project funding / federal process ▪ Public outreach efforts
Joyce Rose, Majority professional staff member, sub-committee on Highways, Transit & Pipelines, Committee on Transportation & Infrastructure, US House of Representatives.	▪ February 7, 2006	▪ Project Status ▪ Project tour	▪ Briefing materials ▪ Fact Sheets
U.S. Army Corps of Engineers USACOE	▪ Field reviews – March 20, 2006	▪ Jurisdictional Determination – May 23, 2006	▪ Jurisdictional Determination
State Historic Preservation Office (SHPO)	▪ Concurrence letter – (APE and findings) June 21, 2006	▪	▪ Concurrence

APPENDIX A: BIBLIOGRAPHY, NOTES AND REFERENCES

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APPENDIX B: DEFINITIONS AND ABBREVIATIONS

AA/DEIS/DEIR - Alternative Analysis/Draft Environmental Impact Statement/Draft Environmental Impact Report. A draft report that analyzes potential environmental effects of a proposed project in compliance with NEPA and CEQA.

ACA4 - Assembly Constitutional Amendment 4

acre - A unit of measurement of area equivalent to 43,560 square feet.

alluvium - Deposits resulting from the operations of water including floodplains, lakes, rivers and fans at the foot of mountain slopes.

aquifer - A permeable region of rock or soil through which groundwater can move.

aquitard - A material of low permeability that greatly slows the movement of groundwater.

borrow - Earth brought in from another location to be used as fill material.

Btu – British thermal unit - A unit of heat energy defined as the amount of heat required to raise the temperature of one pound of water by one degree Fahrenheit. One Btu equals approximately 778.169 foot pounds, 1.055 056 kilojoules or 0.293 071 watt hour.

candidate species - Any species of fish, wildlife or plant which has been determined to be a candidate for listing under Section 4 of the Endangered Species Act of 1973 (amended).

catenary - A messenger wire that sags between support points (much like a utility transmission line), which supports, by means of intermediate wire hangers, an essentially level contact wire for the overhead contact system (OCS).

CEQA – California Environmental Quality Act – Modeled after NEPA, this California state law encourages the protection of the environment through policies and procedural requirements.

cfs - Cubic feet per second.

cms - Cubic meters per second.

Corps of Engineers - (COE) U.S. Army Corps of Engineers. Federal agency with jurisdiction over Waters of the U.S.

cultural resources - Archaeological and historic resources that could potentially be affected by a given project. Cultural resources include buildings, sites, districts, structures or objects having historical, architectural, archaeological, cultural or scientific importance.

cumulative impact - The impact on the environment that results from the incremental impact of the action when added to other past, present and reasonably foreseeable future actions.

dBA - A sound level in decibels, measured with a sound level meter having metering characteristics and frequency weighting specified in American National Standard Specifications for sound level meters ANSIS1.4-1971. It is common to refer to numerical units of an A-weighted sound level as "dBA."

DEIS/EIR - Draft Environmental Impact Statement/Report. A draft report that analyzes potential environmental effects of a proposed project in compliance with NEPA and CEQA.

EA/DEIR - Environmental Assessment/Draft Environmental Impact Report. A report that determines whether the project will have a significant effect on the environment in accordance with NEPA, and identifies and analyzes environmental effects of project alternatives in accordance with CEQA.

electromagnetic field (EMF) – electromagnetic fields associated with electromagnetic radiation.

electromagnetic interference (EMI) – Electromagnetic interference may include the interruption, obstruction, or other degradation in the effective performance of other electronic devices.

endangered species - Any species of fish, wildlife or plant which has been determined to be endangered under Section 4 of the Endangered Species Act of 1973 (amended). This definition is adopted from the USFWS, Section 7 regulations, 51 FR 19926.

EPA - U.S. Environmental Protection Agency. The federal agency responsible for maintaining environmental quality including air quality, noise and hazardous waste management.

FEIS/EIR - Final Environmental Impact Statement/Report. A report that analyzes potential environmental effects and responds to comments received on the Draft EIS/EIR.

fill - Earth used to create embankments or to raise low-lying areas in order to bring them to grade.

floodplain - The part of the ground surface inundated with water on a recurring basis, usually associated with the one percent recurrence interval (100-year) flow.

FONSI/FEIR - Finding of No Significant Impact/Final Environmental Impact Report. A report that responds to comments received on the EA/DEIR, presents a finding of no significant impact in accordance with NEPA, and identifies and analyzes environmental effects of a preferred project alternative in accordance with CEQA.

g - horizontal ground acceleration

gram - Unit of measurement of mass, metric system.

ha - hectare (10,000 square meters)

HOV - High Occupancy Vehicle. A"carpool," or vehicle occupied by two or more persons.

HOV Lane - High Occupancy Vehicle lane. A system of exclusive lanes signed and striped for use by vehicles with multiple occupants (two or more persons) or ridership. HOV lanes are designed on roadways to reduce traffic congestion, improve safety, reduce fuel consumption and to improve air quality.

IOS - Interim Operating Segment. That portion of the Preferred Investment Strategy that can be constructed with available funding.

Kilo - Prefix used in metric measurement, 1000.

KiloJoule – kJ - A common metric unit of work or energy, comparable to the British thermal unit (Btu). One kiloJoule equals approximately 0.947 817 Btu, 0.277 778 watt hour, or 737.562 foot-pounds.

kiss-and-ride - A passenger loading area where vehicles can pick-up and drop-off passengers.

km - Kilometer.

kmph - Kilometer per hour.

KV - Kilovolt.

Ldn - Day-Night Equivalent Sound Level. A 24-hour equivalent sound level with a 10 dB penalty assessed to noise events occurring at night (10 p.m. to 7 a.m.).

Leq - Equivalent Sound Level. A measure of sound energy over a period of time, or a sound level which, in a stated period of time, would contain the same acoustical energy as the time-varying sound during the same period.

liter - Unit of measurement of volume (metric system).

LOS (Level of Service) - The operating level of an intersection or roadway segment can be described using the term Level of Service. Lever of Service is a qualitative description of operation based on delay and maneuverability. It can range from "A" representing free flow conditions to "F" representing gridlock.

m - Meter.

mG – milliGauss - A unit of magnetic flux density equal to 0.001 Gauss or 0.1 microTesla. The magnetic fields generated by power lines and electronic equipment are often measured in milliGauss.

mT – microTesla - A common unit of magnetic field intensity equal to 10^{-6} Tesla. The unit is widely used to measure the strength of electromagnetic fields generated by powerlines or electronic equipment. By comparison, the strength of the Earth's own magnetic field at the surface is about 50 microTeslas. One microTesla equals 0.01 Gauss.

microPascal - One millionth of a Pascal, which is a measure of force used in measuring vibration. One Pascal is equivalent to 0.0209 pound force per square foot.

mitigation - Measures taken to minimize adverse environmental impacts. Mitigation could reduce the magnitude and extent of an impact from a level of significance to a level of insignificance.

mph - Miles per hour.

National Historic Preservation Act of 1966 - The primary federal law pertaining to protection of cultural resources.

National Register of Historic Places - A federal listing of historic resources protected under the National Historic Preservation Act of 1966.

NEPA - National Environmental Policy Act. The United States' basic national charter for protection of the environment. It establishes policy, sets goals and provides means for carrying out the policy.

nonpoint source - Pertains to the discharge of pollutants into waters or air where the pollutant sources come from an area rather than a single source that can be pinpointed.

NO_X - Nitrogen Oxide.

National Register eligible - Cultural resources eligible for inclusion on the National Register of Historic Places.

O_3 - Ozone.

overhead contact system (OCS) – An overhead system that provides power to electric vehicles. A mainline OCS typically comprises two conductors above each track in a catenary configuration.

Both main wires are energized and are electrically common. Power is supplied from the contact wire to the pantograph.

ozone - A major component of photochemical smog, which is formed in the atmosphere by the chemical reaction between nitrogen dioxide and organic gases in the presence of sunlight. Excessive levels of ozone can cause eye irritation, reduced visibility, vegetation damage and aggravation of respiratory conditions. The biggest source these gases is the automobile.

park-and-ride - A parking area intended for transit riders who arrive at transit stations by car.

pantograph - Mounted on top of an electric vehicles, the pantograph slides under the contact wire and collects the traction current from it.

Pb - Lead.

$PM_{2.5}$ - Particulate matter less than 2.5 microns in diameter, considered to be fine particulate matter. (One micron is equal to one-millionth of a meter.)

PM_{10} - Particulate matter less than 10 microns in diameter. (One micron is equal to one-millionth of a meter.)

ppm - parts per million.

PPV - Peak particle velocity. The maximum instantaneous peak in the velocity of an object's vibratory motion. The PPV is used to define thresholds of potential building damage from vibration.

Preferred Investment Strategy - The lead agency's favored approach or alternative. (Essentially equivalent to the "locally preferred alternative.")

Prime Farmland - Defined by the Soil Conservation Service as land best suited to producing high yield crops for food or fiber due to soil quality, length of growing season and moisture supply.

right-of-way - Land dedicated to the transportation facility.

riparian - An aquatic or terrestrial ecosystem that is associated with bodies of water, such as streams, lakes or wetlands, or is dependent upon the existence of perennial, intermittent or ephemeral surface or subsurface water drainage. Riparian areas are usually characterized by dense vegetation and an abundance and diversity of wildlife.

RMS - Root-mean-square amplitude. The average energy of vibrating measured over a short time interval, usually one second. RMS vibration velocity is considered the best available measure of potential human annoyance from ground-borne vibration.

SDEIS/SDEIR - Supplemental Draft Environmental Impact Statement/Subsequent Draft Environmental Impact Report. A report that discloses new information or circumstances relevant to environmental concerns and that is circulated for public and agency review and comments in compliance with NEPA and CEQA.

SFEIS/SFEIR - Supplemental Final Environmental Impact Statement/Subsequent Final Environmental Impact Report. A report that discloses new information or circumstances relevant to environmental concerns and that is circulated for public and agency review and comments in compliance with NEPA and CEQA.

Section 106 - Section 106 of the National Historic Preservation Act of 1966.

SO_2 - Sulphur Dioxide.

special status species - Any species of fish, wildlife or plant that is officially listed as rare, threatened or endangered or candidate for rare, threatened or endangered species listing under the state or federal Endangered Species Acts.

State Implementation Plan (SIP) - A plan for attaining national ambient air quality standards required by the Clean Air Act.

TDM - Transportation Demand Management. Strategies or techniques to decrease single occupant vehicle traffic on streets by encouraging the use of carpools, transit ridership, bicycle travel and telecommuting.

TSM - Transportation System Management. Strategies or techniques to increase the capacity of a transportation system through relatively low cost improvements.

USFWS - U.S. Fish and Wildlife Service. The federal agency that administers the federal Endangered Species Act and is involved in protection of fish and wildlife habitat including wetland areas.

Vdb - Decibles of vibration velocity. An expression of ground-borne vibrations.

watershed - That part of the earth's surface from which storm water runoff flows to a single point.

wetlands - According to the U.S. Army Corps of Engineers, wetlands are areas that are inundated or saturated by surface water or ground water at a frequency and duration sufficient to support, under normal conditions, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes and similar areas, and are subject to protection under Executive Order 11990 and Section 404 of the Clean Water Act (CWA).

GLOSSARY OF ACRONYMS

AA/DEIS/EIR	Alternative Analysis/Draft Environmental Impact Statement/Report
AB	Assembly Bill
AC	Alternating Current
ACHP	Advisory Council on Historic Preservation
ACOE	Army Corps of Engineers
ADA	Americans with Disabilities Act
ADT	Average Daily Traffic
APE	Area of Potential Effects
APTA	American Public Transit Association
ATS	Automated Train Stop
AWSS	Auxiliary Water Supply System
BTU	British Thermal Unit
CAA	Clean Air Act of 1970
CAAQS	California Ambient Air Quality Standards
CAC	Community Advisory Committee
CALINE4	Computer model used to predict carbon monoxide levels
CALTRANS	California Department of Transportation
CARB	California Air Resources Board
CBD	Central Business District
CCAA	California Clean Air Act
CDFG	California Department of Fish and Game
CEQA	California Environmental Quality Act
CERCLA	Comprehensive Environmental Response Compensation & Liability Act
CERCLIS	Comprehensive Environmental Response, Compensation, and Liability Information System (formerly ERRIS)
CFR	Code of Federal Regulations
CHP	California Highway Patrol
CLUP	Comprehensive Land Use Plan
CM	Construction Management
CMAQ	Congestion Mitigation and Air Quality Improvement Program
CNDDB	California Natural Diversity Data Base
CNPS	California Native Plant Society
CO	Carbon Monoxide
CTC	California Transportation Commission or Centralized Train Control
CPUC	California Public Utilities Commission

CVRWQCB	Central Valley Regional Water Quality Control Board
CY	Cubic yards
DC	Direct current
CFR	Codified Federal Regulations
CZMA	Coastal Zone Management Act
DEIS/EIR	Draft Environmental Impact Statement/Environmental Impact Report
DPT	Department of Parking and Traffic
DPW	Department of Public Works
DWR	Department of Water Resources
EIR	Environmental Impact Report
EIS	Environmental Impact Statement
EMU	Electrical Multiple Unit
EPA	Environmental Protection Agency
FEIS/EIR	Final Environmental Impact Statement/Report
FHWA	Federal Highway Administration
FPPA	Farmland Protection Policy Act
FTA	Federal Transit Administration
FVM	Fare Vending Machine
FY	Fiscal Year
HASR	Historical Architectural Survey Report
HPSR	Historic Property Survey Report
HOV	High Occupancy Vehicle
Hz	Hertz
I-5	Interstate 5
IOS	Interim Operating Segment
ISP	Iron/Steel Pipe
ISTEA	Intermodal Surface Transportation Efficiency Act of 1991
ITIP	Interregional Transportation Improvement Program
JPA	Joint Exercise of Powers Agency
LOS	Level of Service
LPA	Locally Preferred Alternative
LRT	light rail transit
LRV	light rail vehicle
LUST	Leaking Underground Storage Tank
MOA	Memorandum of agreement
MGP	Manufactured Gas Plant
MPO	Metropolitan Planning Organization

MTC	Metropolitan Transportation Commission
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act
NOI	Notice of Intent
NOP	Notice of Preparation
NPDES	National Pollutant Discharge Elimination System
NRHP	National Register of Historic Properties
O&M	Operating and Maintenance
OCS	Overhead Control System
OSHA	Occupational Safety and Health Administration
PAH	Polyaromatic Hydrocarbons
PIS	Preferred Investment Strategy
PPA	Pollution Prevention Act
RIP	Regional Improvement Program
ROD	Record of Decision
RT	Sacramento Regional Transit District
RTP	Regional Transportation Plan
RTIP	Regional Transportation Improvement Program
RWQCB	Regional Water Quality Control Board
SAA	Streambed Alteration Agreement
SACMET	Sacramento Metropolitan
SACOG	Sacramento Area Council of Governments
SAQMA	Sacramento Air Quality Maintenance Area
SCEHMD	Sacramento County Environmental Health Management Division
SDEIS/SDEIR	Supplemental Draft Environmental Impact Statement/Subsequent Draft Environmental Impact Report
SFEIS/SFEIR	Supplemental Final Environmental Impact Statement/Subsequent Final Environmental Impact Report
SHPO	State Historic Preservation Office or Officer
SIP	State Implementation Plan
SMAQMD	Sacramento Metropolitan Air Quality Management District
SMUD	Sacramento Municipal Utility District
SP	Southern Pacific (Railroad)
SPRR	Southern Pacific Railroad
SR 99	State Route 99
SR 160	State Route 160
SRTP	Short Range Transit Plan

STA	State Transit Assistance program
STP	State Transportation Program
STIP	State Transportation Improvement Program
SVAB	Sacramento Valley Air Basin
SWPPP	Storm Water Pollution Prevention Plan
TAC	Technical Advisory Committee
TAZ	Traffic Analysis Zone
TCM	Transportation Control Measure
TCRP	Transportation Congestion Relief Program
TDM	Transportation Demand Management
TEA-21	Transportation Equity Act for the 21st Century
TIP	Transportation Improvement Plan
TIFIA	Transportation Infrastructure Financing and Innovation Act
TRP	Trip Reduction Program
TSM	Transportation Systems Management
UP	Union Pacific (Railroad)
UPRR	Union Pacific Railroad
US 50	U.S. Highway 50
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
UST	Underground Storage Tank
VC	Volume-to-Capacity Ratio
VCP	Vitrified Clay Pipe
VHT	Vehicle Hours of Travel
VMT	Vehicle Miles of Travel

APPENDIX C: List of Preparers

FEDERAL TRANSIT ADMINISTRATION

Joseph Ossi. Office of Planning.
Raymond Sukys. Director of Planning and Program Development.
Sean Libberton, Chief of Planning
Dwayne Weeks. A.I.C.P., Community Planner.
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SACRAMENTO REGIONAL TRANSIT DISTRICT (RT)

Michael Wiley – General Manager *and Chief Executive Officer*
Dr. Beverly A. Scott, Ph.D – *Former* General Manager and Chief Executive Officer.
Diane Nakano – Assistant General Manager for Engineering and Construction.
Taiwo Jaiyeoba – *Project Manager – South Sacramento Corridor Phase 2*
John Segerdell – Prior Assistant General Manager for Engineering and Construction & Project Manager for Sourth Sacramento Corridor Phase 2.
Mark Lonergan. Chief Operating Officer.
Mark Gilbert – Attorney, RT Legal Counsel.
Richard Davis – Former Chief Financial Officer
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David Melko. Former Project Manager, South Sacramento Corridor Phase 2.
Doug Wentworth. Former Director, Planning and Information Services
Cameron Beach – Former Chief Operating Officer.
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Sheryl N. Patterson – Attorney, Former Legal Counsel.

PARSONS

Jeffrey B. Allen, Principal Transportation Planner. Master of City and Regional Planning. Mr. Allen has 22 years of experience in transportation planning. He prepared the energy and electromagnetic radiation (EMF/EMI) sections.

Pat M. Gelb, Planning Manager, Principal Author. M.A., Literature. Ms. Gelb has over 30 years experience in transportation planning and preparation and processing of environmental documents and permitting for FTA, FHWA, Caltrans, and other state and local agencies. She supervised the preparation of technical studies and is responsible for overall document content and preparation of this document.

Theresa M. Larson, P.E., Senior Project Manager. B.S., Civil Engineering. Ms. Larson has over 21 years of experience in project management, civil engineering, and environmental documentation of public works projects. She provided quality assurance for the document sections.

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Dave J. Mansen, Vice President, Consultant Project Manager, Principal Author. M.S., Urban Planning. Mr. Mansen has 28 years of experience managing multi-disciplined transportation, land use and environmental planning projects for FTA, FRA, and State and local agencies. He provided overall project management, supervised the preparation of technical studies, and is responsible for overall document content.

Andrew Nash, P.E., Project Planner. M. Eng. Civil Engineering, M. City Planning. Mr. Nash has over twenty years of experience in transportation, engineering, and planning. He has assisted in revising the second administrative draft.

Karla J. Nicholas, Principal Planner. Nicholas has 24 years of experience in environmental and transportation planning. She prepared the aesthetics, biological resources, environmental justice, growth inducement sections, and supervised preparation of the land use, farmland, socioeconomic, parks and recreation, and public facility sections.

Ljubica B. Osgood, Graphics Designer. B.F.A. Ms. Osgood has over 31 years of experience in the supervision and design of graphics and presentation materials. She prepared the document graphics.

Laura J. Prickett, A.I.C.P., Principal Planner. M.C.P. Ms. Prickett has over eight years of experience conducting environmental, transportation and land use planning analyses, and coordinating public involvement programs. She supervised preparation of technical studies, and prepared the first administrative SDEIS/SDEIR cultural resources, geological and seismic, floodplain/water quality, air quality, noise and vibration, and CEQA sections.

Craig Richey, Assistant Planner. B.A., Literature. Mr. Richey has one year of experience in environmental and transportation planning. He was responsible for the land use, farmlands, socioeconomics, public facilities, recreation and safety, and security sections.

Elia Rouzier, Supervisor of Word Processing. Mrs. Rouzier has over 15 years experience in producing complex environmental documentation. She was responsible for overall document preparation and production.

Gui Shearin, Principal Transportation Planner. Ph.D., Transportation Planning. Mr. Shearin has 23 years of experience in evaluating travel demand, traffic forecasting, and land use/socioeconomic studies. He prepared the Transportation and Purpose and Need sections and supplemented the seismicity section.

Indu Sreedevi, Transportation Planner. M.S., Transportation Engineering. Ms. Sreedevi has three years of experience in transportation, engineering, and planning. She has assisted in revising the second administrative draft.

M. Chukwuma Umolu, P.E., Principal Civil Engineer. M.S., Civil Engineering. Mr. Umolu has 18 years of civil engineering experience on major rail transit projects in California. Responsibilities included preliminary and track engineering for the South Corridor project.

David Wemmer, P.E., Transportation/Rail Transit Manager. B.S., Civil Engineering. Mr. Wemmer has more than 20 years of experience in the railroad industry (freight, commuter and light rail). He supervised preliminary engineering and prepared the construction scenario for the LRT alternative.

Jeanne Hazemoto, Supervisor of Production W.P. Ms. Hazemoto was responsible for document production of the second administrative and circulation SDEIS/SDEIR.

ACANTHUS

Andrea D. Kincaid, Architect. B.A., Architecture. Ms. Kincaid has 25 years of experience in architecture, planning and urban design. Acanthus was responsible for conceptual station design and cost estimation.

DKS ASSOCIATES

John Long, P.E., Principal. M.S., Transportation Engineering. Mr. Long has 26 years of experience in regional transportation planning and corridor studies. He was responsible for travel modeling, travel demand forecasting, operational components of the project alternatives, parking demand, and traffic operations analysis.

Bruce Griesenbeck, Senior Transportation Analyst. M.C.P.; M.S., Civil Engineering. Mr. Griesenbeck has 13 years experience in transportation planning and analysis. He assisted in travel modeling, travel demand forecasting, parking demand, operational features of the project alternatives, and traffic operations analysis.

Mike Mauch, Senior Transportation Planner. Ph.D., Civil Engineering. Mr. Mauch has 20 years experience in transportation analysis, modeling and planning. He assisted in travel demand forecasting, parking demand, operational features of the project alternatives, and project documentation.

Pelle Clarke, Senior Engineer. M.B.A., Transportation Engineering. Mr. Clarke has 13 years of experience in traffic engineering, transportation planning and analysis. He assisted with the operational components of the project alternatives and traffic operations analysis.

Ron West, Senior Planner. M.C.R.P. Mr. West has 16 years of experience in travel demand model development and applications, multi-modal analysis, and transit feasibility studies. He assisted in travel demand forecasting, travel modeling, and parking demand as well as operational components of the project alternatives.

FAR WESTERN ANTHROPOLOGICAL RESEARCH GROUP, INC.

Larry Chiea, Archaeologist/Graphics Artist. B.A., Anthropology. Mr. Chiea has worked on archaeological projects in central and north-central California since 1991. He assisted in the archaeological technical studies and report production.

Allika Ruby, Archaeologist. B.A., Anthropology (with honors). Ms. Ruby has 11 years of field experience in California and Nevada, with an emphasis in central California. She performed archaeological survey work and contributed to the technical report.

Sharon Waechter, Senior Archaeologist. Principal Investigator. M.A., Anthropology and English/Writing. Ms. Waechter has over 20 years experience in archaeological survey, excavation, analysis, research, public interpretation, and Native American consultation in California and Nevada. She supervised the conduct of the archaeological research and field work and preparation of the technical report.

HARRIS MILLER MILLER & HANSON

Lance Meister, Senior Consultant. B.S., Civil Engineering. Mr. Meister has seven years experience in rail related noise and vibration projects. He performed the noise and vibration studies and was responsible for the technical report.

David Towers, P.E., Principal Engineer. M.S., Mechanical Engineering. Mr. Towers has over 25 years experience working on environmental, industrial, and architectural noise and vibration control projects. Mr. Towers supervised the conduct of the noise and vibration studies and preparation of the technical report.

Katherine Baus, Consultant. B.S., Mechanical Engineering. Ms. Baus has two years experience working on environmental noise and vibration control projects. She contributed to the noise and vibration studies and technical report.

JRP HISTORICAL CONSULTING SERVICES

Rebecca Meta Bunse, Project Manager. M.A., Public History. Ms. Bunse is the Senior Historian for this project. Ms. Bunse has over 12 years experience conducting cultural resources management projects, including extensive field recordation of historic properties throughout the state of California. She supervised the conduct of the historical resources research and field work and is responsible for the content of the technical report.

Toni Webb, Architectural Historian. B.F.A., Historic Preservation. Ms. Webb conducted field surveys and prepared the contextual statement, building forms, graphics and evaluations for this report. She has over four years of experience in public history and historic preservation and in field recordation on historic sites in the state of California.

Amanda Blosser, Architectural Historian. M.S., Historic Preservation. Ms. Blosser assisted with field survey, building forms and evaluations. She has over three years of experience in public history and historic preservation.

Eric Johnson, Research Assistant. Masters – pending, Public History. Mr. Johnson assisted in the field survey and in the production of inventory forms, graphics and maps.

MEAD & HUNT

Jack Buckley, Senior Associate. M.S., Civil Engineering. Mr. Buckley has 39 years of experience in flood plain modeling. He was responsible for conducting flood plain mapping and calculating hydraulic impacts for the project.

NANCY WHELAN CONSULTING

Nancy E. Whelan, Principal. M.P.A., Intergovernmental Management. Ms. Whelan has over 20 years experience in public transportation funding, capital planning, project development, policy development, and management. She was responsible for the financial planning and analysis for the project.

Walt Streeter, Senior Associate. M.S., Transportation Engineering / City and Regional Planning. Mr. Streeter has over 10 years of multi-modal transportation planning and funding experience. He assisted in financial planning and analysis for the report.

PSOMAS

Robert Blume, P.E., Project Manager. B.S., Civil Engineering. Mr. Blume has over 20 years of transportation design and construction experience. Psomas provided engineering services as well as local coordination and support in utility and site design.

Larry Johnson, Licensed Land Surveyor, Survey Project Manager. B.S., Civil Engineering. Mr. Johnson has 25 years of experience in land surveying and was responsible for surveying, topographic mapping and providing right of way information.

PUBLIC AFFAIRS MANAGEMENT

Ben Strumwasser, Principal. M.S., Political Science. Mr. Strumwasser has 16 years experience in public outreach, consensus building, and conflict resolution, for land use planning, transportation, water supply, and infrastructure improvements. He was the public outreach team leader and meeting facilitator for the project and responsible for the public participation program and technical report.

Karen Sarlo, Project Manager. B.A., Communication. Ms. Sarlo has over 25 years of experience in community outreach and media management for public and private projects. She developed contact information and mailing lists, providing meeting logistics and support, prepared newsletters, fact sheets, brochures and a Web site, and coordinated media relations. She also contributed to the public participation program and technical report.

Jessica Lewman, Project Coordinator. B.A., International Relations (Spanish-minor). With three years of experience, writing and designing public information, press releases and marketing materials, Ms. Lewman was responsible for meeting logistics and support.

TABER CONSULTANTS

Franklin P. Taber, P.E., Vice President/Senior Geotechnical Engineer. B.S., Civil Engineering. Mr. Taber prepared an initial data review and the Geologic Setting/ Geologic Hazard technical report. He has more than 25 years experience in preparing geotechnical studies for public works projects.

Martin McIlroy, Registered Geologist, Staff Geologist. B.S., Geology. Mr. McIlroy has more then seven years experience in conducting geologic/geotechnical studies throughout the state of California. He gathered geologic and boring data and performed an initial field review. His assignments have included logging test borings and conducting geologic/geotechnical studies.

TERRY A. HAYES ASSOCIATES LLC

Terry A. Hayes, A.I.C.P., Principal. M.C.P. Mr. Hayes has nearly 30 years of experience in urban and environmental planning, specializing in noise and air quality. He was responsible for direction and oversight of the air quality studies and the technical report.

Bob Stark, A.I.C.P., Senior Planner. M.S., City and Regional Planning. Mr. Stark has six years experience in urban and environmental planning, specializing in noise and air quality. He provided expertise in the air quality impact analysis and overall project management.

Teresa Li, Environmental Planner. B.A., Urban Studies and Planning. Ms. Li has over three years experience in urban studies and planning, specializing in noise and air quality. She was responsible for the air quality analyses and technical report.

THE HOYT COMPANY

Wendy J. Hoyt, President. Masters in Transportation Planning. Ms. Hoyt has 23 years experience specializing in the area of transportation solutions. She was responsible for developing stakeholder and decision maker contacts and local liaison.

Kim Pallari, Director Community Relations – B.S. Recreation Administration with a concentration in Special Events Management. Ms Pallari has 12 years of Project Management experience in communications, marketing and Community Relations. She provided strategic counsel related to identification and implementation of key communication tools and activities with sensitive project stakeholders. Ms. Pallair also coordinated and managed several public meetings with the community and local agencies.

Nikole J. Pock, Project Manager - Community Relations. B.A., Journalism and Mass Communication. Ms Pock has seven years experience in conducting community marketing analyses, coordinating community meetings and open houses and overseeing various event logistics. She assisted in coordinating community meetings and open houses and meeting logistics and support. She also provided local stakeholder and agency/association contact information.

ECORP CONSULTING

Adam Ballard, Biologist. B.S., Biological Sciences with an emphasis in Biological Conservation. Mr. Ballard has ten years of professional experience conducting a wide range of biological studies including special-status species assessments and surveys, general biotic inventories, and jurisdictional wetland delineations. He assisted with preparation of the biological resources section.

ATS CONSULTING

Hugh Saurenman, President. Registered Mechanical Engineer in California and a Ph.D. in Mechanical Engineering. Dr. Saurenman has over 35 years experience in noise and vibration control and specializing in rail transit noise and vibration control. He was responsible for the supplemental noise and vibration analysis and recommendation of the noise and vibration mitigation measures.

CONSULTANT CONTRACT AND SUBCONTRACT DOLLAR AMOUNTS

Under Government Code 7550, when the cost to prepare a document is more than $5,000, the document must contain a separate section listing the contracts and subcontracts and their dollar amounts relating to the preparation of the document. This list is provided below.

CONSULTANT	RESPONSIBILITIES	FEE *(000's)*
Parsons Corporation	Project Management; Definition of Alternatives; Capital Cost Estimates; Hydrology and Water Quality; Hazardous Materials; SDEIS/SDEIR Management & Preparation; Construction Scenario/Impacts; Biology; Energy; Socioeconomic; Environmental Justice; Parklands; Section 4(f) Evaluation	$*5,203*
Acanthus	Architecture	*$124*
DKS Associates	Transportation Modeling; Traffic Analysis	*$786*
Far Western Anthropological Research Group	Pre-historic Cultural Resources	*$25*
Harris Miller Miller & Hanson	Noise and Vibration Analysis	*$133*
The Hoyt Company	Land use; Public Outreach	*$359*
Jones & Stokes	Archaeological Data	*$5*
JRP Historical Consulting Services	Historic Cultural Resources	*$47*
Mead & Hunt	Hydraulic Studies	*$17*
Nancy Whelan Consulting Services	Financial Planning Support	*$338*
Psomas	Civil Engineering	*$670*
Public Affairs Management	Public Outreach	*$428*
Taber Consultants	Geology, Soils & Seismicity	*$72*
Terry A. Hayes Associates	Air Quality Analysis/Conformity	*$14*
Parsons Brinckerhoff	Land Use Assessment for New Starts	*$46*
Golder Assoc	Risk Assessment	*$29*
E-Corp Consulting	*Biological Resources*	*$67*
ATS Consulting	*Noise/Vibration Update*	*$70*
	TOTAL – ALL CONSULTANTS	**$*8,433***

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President
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Neighbors of Valley Hi Park
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Vickey L. Scott
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Oleta Lambert
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Tou Lee
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Seven-Up Bottling Company of San Francisco
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Tucker Family Trust
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Sacramento, CA 95822-3636

APPENDIX E: AGENCY CORRESPONDENCE

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
75 Hawthorne Street
San Francisco, CA 94105-3901

REGIONAL TRANSIT
MAY 24 2002
POL/PROGRAM MGR

May 22, 2002

David M. Melko, Policy and Program Manager
Sacramento Regional Transit District
P.O. Box 2110
Sacramento, CA 95816-2110

Dear Mr. Melko:

The U.S. Environmental Protection Agency (EPA) has reviewed the Notice of Intent (NOI) to prepare a Supplemental Environmental Impact Statement (SEIS) on the **South Sacramento Corridor Phase 2 Project**, Sacramento, California. Our comments are provided pursuant to the National Environmental Policy Act (NEPA), the Council on Environmental Quality's NEPA Implementation Regulations at 40 CFR 1500 – 1508, and Section 309 of the Clean Air Act.

The Federal Transit Administration and the Sacramento Regional Transit District propose the extension of the current Sacramento Light Rail system approximately five miles from Meadowview Road to Calvine Road. The SEIS will analyze a No Action Alternative, a Future "New Starts" Baseline Alternative, and a Light Rail Alternative. The Light Rail Alternative is the Locally Preferred Alternative.

We appreciate this opportunity to provide scoping comments. EPA strongly supports projects that improve regional air quality by providing alternatives to driving and looks forward to the successful implementation of this project. To assist in the scoping process, we have identified several issues we would like to draw to your attention in the preparation of the SEIS. Our specific comments are listed below:

Air Quality

EPA recognizes that this project provides significant air quality benefits by providing alternatives to driving. However, the project also has the potential to result in air quality impacts from both operation and construction. The proposed project is located in a nonattainment area for the one hour ozone standard and particulate matter less than 10 microns in diameter (PM10). A thorough air quality analysis is required in the SEIS to demonstrate that the ozone and PM10 standards will not be exceeded, and, in instances where exceedances may occur, appropriate mitigation measures are proposed. In addition, EPA believes that it is important and appropriate that the SEIS address the eight-hour ozone standard and the "fine" particulate matter standard (PM2.5). In its discussion of air quality impacts the SEIS should:

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Affected Environment

- Include a discussion of the eight-hour ozone standard, as well as the PM2.5 standard. To the extent that monitoring data is available on these two criteria pollutants, include that information in the SEIS.

Construction

- Reduce the use of diesel-powered equipment.
- Identify sensitive receptor locations in the project area, such as schools, hospitals, parks, and athletic centers. Schedule construction to minimize impacts in these areas.
- Include mitigation measures that detail how diesel emissions will be minimized for each phase of project construction. For example, require contractors to keep the equipment fine-tuned or use alternative fueled vehicles.
- Include a fugitive dust control plan.
- Address how traffic congestion related to project construction can contribute to increased levels of carbon monoxide, especially at already congested intersections.

Operation

- Since the project area is in a nonattainment area, the project should be included in a conforming Transportation Plan and Transportation Improvement Program before the NEPA process is completed.
- Discuss operational emissions from the various alternatives under consideration.

Water Resources

The proposed project parallels Morrison Creek and Union House Creek. The SEIS should identify whether these waterways support anadromous fisheries and whether these waterways have been listed as impaired or threatened under the Total Daily Maximum Load (TMDL) Program established under Section 303(d) of the Clean Water Act. With respect to sensitive water resources, the SEIS should:

- Describe existing restoration and enhancement efforts.
- Describe direct, indirect, and cumulative impacts.
- Describe how the proposed project will coordinate with on-going protection efforts.
- Describe additional mitigation measures that my be required.

Cumulative Impacts

Well prepared cumulative impacts analyses are of increasing importance to EPA as they describe the threats and benefits to resources as a whole. Understanding these cumulative impacts can illuminate opportunities for minimizing those threats and highlighting benefits. EPA is available to assist the Regional Transit District structure the cumulative impacts analysis for this project. We have the following general recommendations for the cumulative impacts analyses:

- Focus on resources of concern – those resources that are "at risk" and/or are significantly impacted by the proposed project, before mitigation. In the introduction to the Cumulative Impacts section, identify which resources are analyzed, which ones are not, and why.
- Identify *all* other on-going, planned, and reasonably foreseeable projects in the study

area, not just transportation projects, that may contribute to cumulative impacts. Where studies exist on the environmental impacts of these other projects, such as State Environmental Impact Reports, use these studies as a source for quantifying cumulative impacts.

- Include a baseline for the resources with an explanation as to why that baseline was selected.
- Interpret the analysis in terms of impacts to affected resources of concern.
- When cumulative impacts occur, mitigation should be proposed. Clearly state the lead agency's mitigation responsibilities and the mitigation responsibilities of other entities. This will serve to alert agencies or officials who can implement these extra measures, and will encourage them to do so (*CEQ Forty Most Asked Questions*, 19b).

Environmental Justice

Executive Order 12898 requires an analysis of environmental justice issues associated with the proposed project. The SEIS should clearly document the implementation of Executive Order 12898.

Sustainability/Design Features

EPA strongly supports the incorporation of "sustainable" design features in the proposed project and recommends that SEIS explore opportunities to:

- Design pedestrian and bicycle-friendly facilities.
- Coordinate with local government to enhance or create trail access in the project corridor.
- Enhance natural systems within the project study area, especially sensitive areas such as creeks and wetlands.
- Coordinate with local government to encourage transit oriented development around transit stations.
- Commit to designing facilities that will support recycling programs and to implementing recycling at new facilities.
- Where practicable, commit to siting new facilities in already disturbed areas or in low quality habitat areas.
- Design park-and-ride facilities, as well as other station facilities, to include features that reduce non-point source pollution, such as specific landscape designs and techniques that will reduce stormwater runoff and provide on-site treatment.
- Design transportation stations with energy efficient lighting and HVAC systems.
- Obtain EnergyStar for Buildings rating by achieving energy performance that places the facility in the top 25% of similar buildings nationwide. See http://www.energystar.gov.
- Develop and implement a Construction Energy Conservation Plan, such as the one planned for the BART to Oakland International Airport Connector.
- Use sustainable sources of energy to operate the transit system.

Auxiliary Facilities

It is not clear from the NOI whether auxiliary facilities such as storage and maintenance facilities and park-and-ride lots are envisioned as a component of the proposed project. If such facilities are proposed, a thorough alternatives analysis and environmental impact analysis needs to be

performed on these facilities. If park-and-ride lots are planned:

- Minimize the parking lots to the greatest extent possible.
- Charge for parking at the stations to discourage driving.

Recycled Materials, Materials Reuse, and Recycling

The Resource Conservation & Recovery Act (RCRA) Section 6002 requires federal, state, local agencies, and their contractors, that use appropriated federal funds to purchase EPA-designated recycled materials, including EPA-designated transportation, construction, and landscaping products. In addition, EPA supports deconstruction and materials reuse in projects where existing structures are removed.

- Commit to materials reuse, where appropriate and feasible, and include a commitment to the Buy-Recycled requirements. For further details, please see EPA's web site at http://www.epa.gov/cpg.
- Commit to materials reuse, deconstruction, and construction and demolition debris recycling.

Invasive Species

Executive Order 13112 on Invasive Species calls for the restoration of native plant and tree species. To the extent that this project will entail new landscaping, the SEIS should describe how the project will meet the requirements of Executive Order 13112 by using native species.

Thank you for this opportunity to comment. When the Draft SEIS is complete, please send two copies to the address above (mail code: CMD-2). If you have any questions or comments, please feel free to contact me at 415-972-3846 or blazej.nova@epa.gov.

Sincerely,

Nova Blazej
Federal Activities Office

cc: Leslie Rogers, FTA

United States Department of the Interior

FISH AND WILDLIFE SERVICE

Sacramento Fish and Wildlife Office
2800 Cottage Way, Room W2605
Sacramento, California 95825

IN REPLY REFER TO:
1-1-02-SP-3036

August 27, 2002

Ms. Jeannette Owen
Wildlife Biologist
Parsons
2233 Watt Avenue, Suite 330
Sacramento, California 95825

Subject: Species List for Regional Transit South Sacramento Corridor, Sacramento County, California

Dear Ms. Owen:

We are sending the enclosed list in response to your August 22, 2002, request for information about endangered and threatened species (Enclosure A). The list covers the following U.S. Geological Survey 7½ minute quads of Florin and Sacramento East.

Please read *Important Information About Your Species List* (enclosed). It explains how we made the list and describes your responsibilities under the Endangered Species Act. Please contact Justin Ly at (916) 414-6645, if you have any questions about the attached list or your responsibilities under the Endangered Species Act. For the fastest response to species list requests, address them to the attention of Species Lists at this address. You may fax requests to 414-6712 or 414-6713. You may also email them to harry_mossman@fws.gov.

Sincerely,

for Jan C. Knight
Chief, Endangered Species Division

Enclosures

Important Information
About Your Species List

How We Make Species Lists

We store information about endangered and threatened species lists by U.S. Geological Survey 7½ minute *quads*. The United States is divided into these quads, which are about the size of San Francisco. If you requested your list by quad name or number, that is what we used. Otherwise, we used the information you sent us to determine which quad or quads to use.

Animals

The animals on your species list are ones that occur within, *or may be affected by projects within*, the quads covered by the list. Fish and other aquatic species appear on your list if they are in the same watershed as your quad or if water use in your quad might affect them. Amphibians will be on the list for a quad or county if pesticides applied in that area may be carried to their habitat by air currents. Birds are shown regardless of whether they are resident or migratory. Relevant birds on the county list should be considered regardless of whether they appear on a quad list.

Plants

Any plants on your list are ones *that have actually been observed* in the quad or quads covered by the list. We have also included either a county species list or a list of species in nearby quads. We recommend that you check your project area for these plants. Plants may exist in an area without ever having been detected there.

Surveying

Some of the species on your list may not be affected by your project. A trained biologist or botanist, familiar with the habitat requirements of the species on your list, should determine whether they or habitats suitable for them may be affected by your project. We recommend that your surveys include any proposed and candidate species on your list. For plant surveys, we recommend using the enclosed *Guidelines for Conducting and Reporting Botanical Inventories for Federally Listed, Proposed and Candidate Species*. The results of your surveys should be published in any environmental documents prepared for your project.

State-Listed Species

If a species has been listed as threatened or endangered by the State of California, but not by us nor by the National Marine Fisheries Service, it will appear on your list as a Species of Concern. *However you should contact the California Department of Fish and Game for official information about these species.* Call (916) 322-2493 or write Marketing Manager, California Department of Fish and Game, Natural Diversity Data Base, 1416 Ninth Street, Sacramento, California 95814.

Your Responsibilities Under the Endangered Species Act

All plants and animals identified as *listed* on Enclosure A are fully protected under the Endangered Species Act of 1973, as amended. Section 9 of the Act and its implementing regulations prohibit the *take* of a federally listed wildlife species. Take is defined by the Act as "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect" any such animal. Take may include significant habitat modification or degradation where it actually kills or injures wildlife by significantly impairing essential behavioral patterns, including breeding, feeding, or shelter (50 CFR §17.3).

Take incidental to an otherwise lawful activity may be authorized by one of two procedures:

> If a Federal agency is involved with the permitting, funding, or carrying out of a project that may result in take, then that agency must engage in a *formal consultation* with the Service. During formal consultation, the Federal agency, the applicant and the Service work together to avoid or minimize the impact on listed species and their habitat. Such consultation would result in a *biological opinion* by the Service addressing the anticipated effect of the project on listed and proposed species. The opinion may authorize a limited level of incidental take.
>
> If no Federal agency is involved with the project, and federally listed species may be taken as part of the project, then you, the applicant, should apply for an *incidental take permit*. The Service may issue such a permit if you submit a satisfactory conservation plan for the species that would be affected by your project. Should your survey determine that federally listed or proposed species occur in the area and are likely to be affected by the project, we recommend that you work with this office and the California Department of Fish and Game to develop a plan that minimizes the project's direct and indirect impacts to listed species and compensates for project-related loss of habitat. You should include the plan in any environmental documents you file.

Critical Habitat

When a species is listed as endangered or threatened, areas of habitat considered essential to its conservation may be designated as *critical habitat*. These areas may require special management considerations or protection. They provide needed space for growth and normal behavior; food, water, air, light, other nutritional or physiological requirements; cover or shelter; and sites for breeding, reproduction, rearing of offspring, germination or seed dispersal.

Although critical habitat may be designated on private or State lands, activities on these lands are not restricted unless there is Federal involvement in the activities or direct harm to listed wildlife.

If any species has proposed or designated critical habitat within a quad, there will be a separate line for this on the species list. Maps and boundary descriptions of the critical habitat may be found in the *Federal Register*. The information is also reprinted in the *Code of Federal Regulations* (50 **CFR** 17.95).

Candidate Species

We recommend that you address impacts to *candidate* species. We put plants and animals on our candidate list when we have enough scientific information to eventually propose them for listing as threatened or endangered. By considering these species early in your planning process you may be able to avoid the problems that could develop if one of these candidates was listed before the end of your project.

Your list may contain a section called *Species of Concern*. This term includes former *category 2 candidate species* and other plants and animals of concern to the Service and other Federal, State and private conservation agencies and organizations. Some of these species may become candidate species in the future.

Wetlands

If your project will impact wetlands, riparian habitat, or other jurisdictional waters as defined by section 404 of the Clean Water Act and/or section 10 of the Rivers and Harbors Act, you will need to obtain a permit from the U.S. Army Corps of Engineers. Impacts to wetland habitats require site specific mitigation and monitoring. For questions regarding wetlands, please contact Mark Littlefield of this office at (916) 414-6580.

Updates

Our database is constantly updated as species are proposed, listed and delisted. If you address proposed, candidate and special concern species in your planning, this should not be a problem. We also continually strive to make our information as accurate as possible. Sometimes we learn that a particular species has a different range than we thought. This should not be a problem if you consider the species on the county or surrounding-quad lists that we have enclosed. If you have a long-term project or if your project is delayed, please feel free to contact us about getting a current list. You can also find out the current status of a species by going to the Service's Internet page: *www.fws.gov*

GUIDELINES FOR CONDUCTING AND REPORTING BOTANICAL INVENTORIES FOR FEDERALLY LISTED, PROPOSED AND CANDIDATE PLANTS
(September 23, 1996)

These guidelines describe protocols for conducting botanical inventories for federally listed, proposed and candidate plants, and describe minimum standards for reporting results. The Service will use, in part, the information outlined below in determining whether the project under consideration may affect any listed, proposed or candidate plants, and in determining the direct, indirect, and cumulative effects.

Field inventories should be conducted in a manner that will locate listed, proposed, or candidate species (target species) that may be present. The entire project area requires a botanical inventory, except developed agricultural lands. The field investigator(s) should:

1. Conduct inventories at the appropriate times of year when target species are present and identifiable. Inventories will include all potential habitats. Multiple site visits during a field season may be necessary to make observations during the appropriate phenological stage of all target species.

2. If available, use a regional or local reference population to obtain a visual image of the target species and associated habitat(s). If access to reference populations is not available, investigators should study specimens from local herbaria.

3. List every species observed and compile a comprehensive list of vascular plants for the entire project site. Vascular plants need to be identified to a taxonomic level which allows rarity to be determined.

4. Report results of botanical field inventories that include:

   a. a description of the biological setting, including plant community, topography, soils, potential habitat of target species, and an evaluation of environmental conditions, such as timing or quantity of rainfall, which may influence the performance and expression of target species

   b. a map of project location showing scale, orientation, project boundaries, parcel size, and map quadrangle name

   c. survey dates and survey methodology(ies)

   d. if a reference population is available, provide a written narrative describing the target species reference population(s) used, and date(s) when observations were made

   e. a comprehensive list of all vascular plants occurring on the project site for each habitat type

   f. current and historic land uses of the habitat(s) and degree of site alteration

   g. presence of target species off-site on adjacent parcels, if known

h. an assessment of the biological significance or ecological quality of the project site in a local and regional context

5. If target species is(are) found, report results that additionally include:

   a. a map showing federally listed, proposed and candidate species distribution as they relate to the proposed project

   b. if target species is (are) associated with wetlands, a description of the direction and integrity of flow of surface hydrology. If target species is (are) affected by adjacent off-site hydrological influences, describe these factors.

   c. the target species phenology and microhabitat, an estimate of the number of individuals of each target species per unit area; identify areas of high, medium and low density of target species over the project site, and provide acres of occupied habitat of target species. Investigators could provide color slides, photos or color copies of photos of target species or representative habitats to support information or descriptions contained in reports.

   d. the degree of impact(s), if any, of the proposed project as it relates to the potential unoccupied habitat of target habitat.

6. Document findings of target species by completing California Native Species Field Survey Form(s) and submit form(s) to the Natural Diversity Data Base. Documentation of determinations and/or voucher specimens may be useful in cases of taxonomic ambiguities, habitat or range extensions.

7. Report as an addendum to the original survey, any change in abundance and distribution of target plants in subsequent years. Project sites with inventories older than three years from the current date of project proposal submission will likely need additional survey. Investigators need to assess whether an additional survey(s) is (are) needed.

8. Adverse conditions may prevent investigator(s) from determining presence or identifying some target species in potential habitat(s) of target species. Disease, drought, predation, or herbivory may preclude the presence or identification of target species in any year. An additional botanical inventory(ies) in a subsequent year(s) may be required if adverse conditions occur in a potential habitat(s). Investigator(s) may need to discuss such conditions.

9. Guidance from California Department of Fish and Game (CDFG) regarding plant and plant community surveys can be found in Guidelines for Assessing the Effects of Proposed Developments on Rare and Endangered Plants and Plant Communities, 1984. Please contact the CDFG Regional Office for questions regarding the CDFG guidelines and for assistance in determining any applicable State regulatory requirements.

ENCLOSURE A

Endangered and Threatened Species that May Occur in
or be Affected by Projects in the Selected Quads Listed Below
Reference File No. 1-1-02-SP-3036

Regional Transit South Sacramento Corridor

August 26, 2002

QUAD: 496B FLORIN

Listed Species

Mammals

riparian (San Joaquin Valley) woodrat, *Neotoma fuscipes riparia* (E) *

riparian brush rabbit, *Sylvilagus bachmani riparius* (E) *

Birds

bald eagle, *Haliaeetus leucocephalus* (T)

Reptiles

giant garter snake, *Thamnophis gigas* (T)

Amphibians

California tiger salamander, *Ambystoma californiense* (C/E)

California red-legged frog, *Rana aurora draytonii* (T)

Fish

Critical habitat, delta smelt, *Hypomesus transpacificus* (T)

delta smelt, *Hypomesus transpacificus* (T)

Central Valley steelhead, *Oncorhynchus mykiss* (T) NMFS

winter-run chinook salmon, *Oncorhynchus tshawytscha* (E) NMFS

Central Valley spring-run chinook salmon, *Oncorhynchus tshawytscha* (T) NMFS

Critical Habitat, Central Valley spring-run chinook, *Oncorhynchus tshawytscha* (T) NMFS

Sacramento splittail, *Pogonichthys macrolepidotus* (T)

Invertebrates

vernal pool fairy shrimp, *Branchinecta lynchi* (T)

valley elderberry longhorn beetle, *Desmocerus californicus dimorphus* (T)

vernal pool tadpole shrimp, *Lepidurus packardi* (E)

Proposed Species

Birds

mountain plover, *Charadrius montanus* (PT)

Candidate Species

Fish

Central Valley fall/late fall-run chinook salmon, *Oncorhynchus tshawytscha* (C) NMFS

Critical habitat, Central Valley fall/late fall-run chinook, *Oncorhynchus tshawytscha* (C) NMFS

Species of Concern

Mammals

Pacific western big-eared bat, *Corynorhinus (=Plecotus) townsendii townsendii* (SC)

small-footed myotis bat, *Myotis ciliolabrum* (SC)

long-legged myotis bat, *Myotis volans* (SC)

Yuma myotis bat, *Myotis yumanensis* (SC)

San Joaquin pocket mouse, *Perognathus inornatus* (SC)

Birds

tricolored blackbird, *Agelaius tricolor* (SC)

grasshopper sparrow, *Ammodramus savannarum* (SC)

short-eared owl, *Asio flammeus* (SC)

western burrowing owl, *Athene cunicularia hypugaea* (SC)

oak titmouse, *Baeolophus inornatus* (SLC)

Aleutian Canada goose, *Branta canadensis leucopareia* (D)

Swainson's hawk, *Buteo Swainsoni* (CA)

ferruginous hawk, *Buteo regalis* (SC)

Lawrence's goldfinch, *Carduelis lawrencei* (SC)

Vaux's swift, *Chaetura vauxi* (SC)

black tern, *Chlidonias niger* (SC)

white-tailed (=black shouldered) kite, *Elanus leucurus* (SC)

little willow flycatcher, *Empidonax traillii brewsteri* (CA)

American peregrine falcon, *Falco peregrinus anatum* (D)

greater sandhill crane, *Grus canadensis tabida* (CA)

loggerhead shrike, *Lanius ludovicianus* (SC)

Lewis' woodpecker, *Melanerpes lewis* (SC)

long-billed curlew, *Numenius americanus* (SC)

Nuttall's woodpecker, *Picoides nuttallii* (SLC)

white-faced ibis, *Plegadis chihi* (SC)

bank swallow, *Riparia riparia* (CA)

rufous hummingbird, *Selasphorus rufus* (SC)

Reptiles

northwestern pond turtle, *Clemmys marmorata marmorata* (SC)

California horned lizard, *Phrynosoma coronatum frontale* (SC)

Amphibians

western spadefoot toad, *Spea hammondii* (SC)

Fish

green sturgeon, *Acipenser medirostris* (SC)

river lamprey, *Lampetra ayresi* (SC)

Kern brook lamprey, *Lampetra hubbsi* (SC)

Pacific lamprey, *Lampetra tridentata* (SC)

longfin smelt, *Spirinchus thaleichthys* (SC)

Invertebrates

Antioch Dunes anthicid beetle, *Anthicus antiochensis* (SC)

Sacramento anthicid beetle, *Anthicus sacramento* (SC)

Midvalley fairy shrimp, *Branchinecta mesovallensis* (SC)

California linderiella fairy shrimp, *Linderiella occidentalis* (SC)

Plants

legenere, *Legenere limosa* (SC)

valley sagittaria (=Sanford's arrowhead), *Sagittaria sanfordii* (SC)

QUAD: 512C SACRAMENTO EAST

Listed Species

Birds

bald eagle, *Haliaeetus leucocephalus* (T)

Reptiles

giant garter snake, *Thamnophis gigas* (T)

Amphibians

California tiger salamander, *Ambystoma californiense* (C/E)

California red-legged frog, *Rana aurora draytonii* (T)

Fish

Critical habitat, delta smelt, *Hypomesus transpacificus* (T)

delta smelt, *Hypomesus transpacificus* (T)

Central Valley steelhead, *Oncorhynchus mykiss* (T) NMFS

winter-run chinook salmon, *Oncorhynchus tshawytscha* (E) NMFS

Central Valley spring-run chinook salmon, *Oncorhynchus tshawytscha* (T) NMFS

Sacramento splittail, *Pogonichthys macrolepidotus* (T)

Invertebrates

vernal pool fairy shrimp, *Branchinecta lynchi* (T)

Critical habitat, valley elderberry longhorn beetle, *Desmocerus californicus dimorphus* (T)

valley elderberry longhorn beetle, *Desmocerus californicus dimorphus* (T)

vernal pool tadpole shrimp, *Lepidurus packardi* (E)

Proposed Species

Birds

mountain plover, *Charadrius montanus* (PT)

Candidate Species

Fish

Central Valley fall/late fall-run chinook salmon, *Oncorhynchus tshawytscha* (C) NMFS

Species of Concern

Mammals

Pacific western big-eared bat, *Corynorhinus (=Plecotus) townsendii townsendii* (SC)

small-footed myotis bat, *Myotis ciliolabrum* (SC)

long-legged myotis bat, *Myotis volans* (SC)

Yuma myotis bat, *Myotis yumanensis* (SC)

San Joaquin pocket mouse, *Perognathus inornatus* (SC)

Birds

tricolored blackbird, *Agelaius tricolor* (SC)

grasshopper sparrow, *Ammodramus savannarum* (SC)

short-eared owl, *Asio flammeus* (SC)

western burrowing owl, *Athene cunicularia hypugaea* (SC)

oak titmouse, *Baeolophus inornatus* (SLC)

Aleutian Canada goose, *Branta canadensis leucopareia* (D)

Swainson's hawk, *Buteo Swainsoni* (CA)

ferruginous hawk, *Buteo regalis* (SC)

Lawrence's goldfinch, *Carduelis lawrencei* (SC)

Vaux's swift, *Chaetura vauxi* (SC)

black tern, *Chlidonias niger* (SC)

white-tailed (=black shouldered) kite, *Elanus leucurus* (SC)

little willow flycatcher, *Empidonax traillii brewsteri* (CA)

American peregrine falcon, *Falco peregrinus anatum* (D)

greater sandhill crane, *Grus canadensis tabida* (CA)

loggerhead shrike, *Lanius ludovicianus* (SC)

Lewis' woodpecker, *Melanerpes lewis* (SC)

long-billed curlew, *Numenius americanus* (SC)

Nuttall's woodpecker, *Picoides nuttallii* (SLC)

white-faced ibis, *Plegadis chihi* (SC)

bank swallow, *Riparia riparia* (CA)

rufous hummingbird, *Selasphorus rufus* (SC)

Reptiles

northwestern pond turtle, *Clemmys marmorata marmorata* (SC)

California horned lizard, *Phrynosoma coronatum frontale* (SC)

Amphibians

western spadefoot toad, *Spea hammondii* (SC)

Fish

green sturgeon, *Acipenser medirostris* (SC)

river lamprey, *Lampetra ayresi* (SC)

Pacific lamprey, *Lampetra tridentata* (SC)

longfin smelt, *Spirinchus thaleichthys* (SC)

Invertebrates

Antioch Dunes anthicid beetle, *Anthicus antiochensis* (SC)

Sacramento anthicid beetle, *Anthicus sacramento* (SC)

Midvalley fairy shrimp, *Branchinecta mesovallensis* (SC)

California linderiella fairy shrimp, *Linderiella occidentalis* (SC)

Plants

valley sagittaria (=Sanford's arrowhead), *Sagittaria sanfordii* (SC)

KEY:

(E)	*Endangered*	Listed (in the Federal Register) as being in danger of extinction.
(T)	*Threatened*	Listed as likely to become endangered within the foreseeable future.
(P)	*Proposed*	Officially proposed (in the Federal Register) for listing as endangered or threatened.
(PX)	*Proposed Critical Habitat*	Proposed as an area essential to the conservation of the species.
(C)	*Candidate*	Candidate to become a *proposed* species.
(SC)	*Species of Concern*	May be endangered or threatened. Not enough biological information has been gathered to support listing at this time.
(SLC)	*Species of Local Concern*	Species of local or regional concern or conservation significance.
(MB)	*Migratory Bird*	Migratory bird
NMFS	NMFS species	Under the jurisdiction of the National Marine Fisheries Service. Contact them directly.
(D)	*Delisted*	Delisted. Status to be monitored for 5 years.
(CA)	*State-Listed*	Listed as threatened or endangered by the State of California.
(*)	*Extirpated*	Possibly extirpated from this quad.
(**)	*Extinct*	Possibly extinct.
	Critical Habitat	Area essential to the conservation of a species.

ENCLOSURE A

Endangered and Threatened Species that May Occur in or be Affected by
Projects in the Area of the Following California Counties
Reference File No. 1-1-02-SP-3036

Regional Transit South Sacramento Corridor

August 26, 2002

SACRAMENTO COUNTY

Listed Species

Mammals

riparian (San Joaquin Valley) woodrat, *Neotoma fuscipes riparia* (E) *

Birds

bald eagle, *Haliaeetus leucocephalus* (T)

Reptiles

giant garter snake, *Thamnophis gigas* (T)

Amphibians

California red-legged frog, *Rana aurora draytonii* (T)

California tiger salamander, *Ambystoma californiense* (C/E)

Fish

Central Valley spring-run chinook salmon, *Oncorhynchus tshawytscha* (T) NMFS

Central Valley steelhead, *Oncorhynchus mykiss* (T) NMFS

Critical Habitat, Central Valley spring-run chinook, *Oncorhynchus tshawytscha* (T) NMFS

Critical habitat, Central Valley steelhead, *Oncorhynchus mykiss* (T) NMFS

Critical habitat, delta smelt, *Hypomesus transpacificus* (T)

Critical habitat, winter-run chinook salmon, *Oncorhynchus tshawytscha* (E) NMFS

Sacramento splittail, *Pogonichthys macrolepidotus* (T)

delta smelt, *Hypomesus transpacificus* (T)

winter-run chinook salmon, *Oncorhynchus tshawytscha* (E) NMFS

Invertebrates

Conservancy fairy shrimp, *Branchinecta conservatio* (E)

Critical habitat, valley elderberry longhorn beetle, *Desmocerus californicus dimorphus* (T)

delta green ground beetle, *Elaphrus viridis* (T)

valley elderberry longhorn beetle, *Desmocerus californicus dimorphus* (T)

vernal pool fairy shrimp, *Branchinecta lynchi* (T)

vernal pool tadpole shrimp, *Lepidurus packardi* (E)

Plants

Antioch Dunes evening-primrose, *Oenothera deltoides ssp. howellii* (E)

Sacramento Orcutt grass, *Orcuttia viscida* (E)

slender Orcutt grass, *Orcuttia tenuis* (T)

soft bird's-beak, *Cordylanthus mollis ssp. mollis* (E) *

Proposed Species

Birds

mountain plover, *Charadrius montanus* (PT)

Candidate Species

Birds

Western yellow-billed cuckoo, *Coccyzus americanus occidentalis* (C)

Fish

Central Valley fall/late fall-run chinook salmon, *Oncorhynchus tshawytscha* (C) NMFS

Critical habitat, Central Valley fall/late fall-run chinook, *Oncorhynchus tshawytscha* (C) NMFS

Species of Concern

Mammals

Pacific western big-eared bat, *Corynorhinus (=Plecotus) townsendii townsendii* (SC)

San Francisco dusky-footed woodrat, *Neotoma fuscipes annectens* (SC)

San Joaquin pocket mouse, *Perognathus inornatus* (SC)

Yuma myotis bat, *Myotis yumanensis* (SC)

fringed myotis bat, *Myotis thysanodes* (SC)

greater western mastiff-bat, *Eumops perotis californicus* (SC)

long-eared myotis bat, *Myotis evotis* (SC)

long-legged myotis bat, *Myotis volans* (SC)

pale Townsend's big-eared bat, *Corynorhinus (=Plecotus) townsendii pallescens* (SC)

small-footed myotis bat, *Myotis ciliolabrum* (SC)

Birds

Aleutian Canada goose, *Branta canadensis leucopareia* (D)

American bittern, *Botaurus lentiginosus* (SC)

American peregrine falcon, *Falco peregrinus anatum* (D)

Brewer's sparrow, *Spizella breweri* (SC)

California thrasher, *Toxostoma redivivum* (SC)

Lawrence's goldfinch, *Carduelis lawrencei* (SC)

Lewis' woodpecker, *Melanerpes lewis* (SC)

Nuttall's woodpecker, *Picoides nuttallii* (SLC)

Swainson's hawk, *Buteo Swainsoni* (CA)

bank swallow, *Riparia riparia* (CA)

black rail, *Laterallus jamaicensis coturniculus* (CA)

black tern, *Chlidonias niger* (SC)

common loon, *Gavia immer* (SC)
ferruginous hawk, *Buteo regalis* (SC)
grasshopper sparrow, *Ammodramus savannarum* (SC)
greater sandhill crane, *Grus canadensis tabida* (CA)
little willow flycatcher, *Empidonax traillii brewsteri* (CA)
loggerhead shrike, *Lanius ludovicianus* (SC)
long-billed curlew, *Numenius americanus* (SC)
oak titmouse, *Baeolophus inornatus* (SLC)
rufous hummingbird, *Selasphorus rufus* (SC)
short-eared owl, *Asio flammeus* (SC)
tricolored blackbird, *Agelaius tricolor* (SC)
western burrowing owl, *Athene cunicularia hypugaea* (SC)
white-faced ibis, *Plegadis chihi* (SC)
white-tailed (=black shouldered) kite, *Elanus leucurus* (SC)

Reptiles

California horned lizard, *Phrynosoma coronatum frontale* (SC)
northwestern pond turtle, *Clemmys marmorata marmorata* (SC)
silvery legless lizard, *Anniella pulchra pulchra* (SC)
southwestern pond turtle, *Clemmys marmorata pallida* (SC)

Amphibians

foothill yellow-legged frog, *Rana boylii* (SC)
western spadefoot toad, *Spea hammondii* (SC)

Fish

Kern brook lamprey, *Lampetra hubbsi* (SC)
Pacific lamprey, *Lampetra tridentata* (SC)
green sturgeon, *Acipenser medirostris* (SC)
longfin smelt, *Spirinchus thaleichthys* (SC)
river lamprey, *Lampetra ayresi* (SC)

Invertebrates

Antioch Dunes anthicid beetle, *Anthicus antiochensis* (SC)
California linderiella fairy shrimp, *Linderiella occidentalis* (SC)
Midvalley fairy shrimp, *Branchinecta mesovallensis* (SC)
Sacramento anthicid beetle, *Anthicus sacramento* (SC)
San Joaquin dune beetle, *Coelus gracilis* (SC)
curved-foot hygrotus diving beetle, *Hygrotus curvipes* (SC)

Plants

Ahart's (dwarf) rush, *Juncus leiospermus var. ahartii* (SC)

Amador (Bisbee Peak) rush-rose, *Helianthemum suffrutescens* (SLC)
Boggs Lake hedge-hyssop, *Gratiola heterosepala* (CA)
Mason's lilaeopsis, *Lilaeopsis masonii* (SC)
Northern California black walnut, *Juglans californica var. hindsii* (SC) *
Red Bluff (dwarf) rush, *Juncus leiospermus var. leiospermus* (SC)
San Joaquin spearscale (=saltbush), *Atriplex joaquiniana* (SC)
Suisun Marsh aster, *Aster lentus* (SC)
Tuolumne coyote-thistle (=button-celery), *Eryngium pinnatisectum* (SC)
delta tule-pea, *Lathyrus jepsonii var. jepsonii* (SC)
legenere, *Legenere limosa* (SC)
pincushion navarretia, *Naverretia myersii spp. myersii* (SC)
stinkbells, *Fritillaria agrestis* (SLC)
valley sagittaria (=Sanford's arrowhead), *Sagittaria sanfordii* (SC)

KEY:

(E)	*Endangered*	Listed (in the Federal Register) as being in danger of extinction.
(T)	*Threatened*	Listed as likely to become endangered within the foreseeable future.
(P)	*Proposed*	Officially proposed (in the Federal Register) for listing as endangered or threatened.
(PX)	*Proposed Critical Habitat*	Proposed as an area essential to the conservation of the species.
(C)	*Candidate*	Candidate to become a *proposed* species.
(SC)	*Species of Concern*	Other species of concern to the Service.
(SLC)	*Species of Local Concern*	Species of local or regional concern or conservation significance.
(D)	*Delisted*	Delisted. Status to be monitored for 5 years.
(CA)	*State-Listed*	Listed as threatened or endangered by the State of California.
NMFS	NMFS species	Under jurisdiction of the National Marine Fisheries Service. Contact them directly.
*	*Extirpated*	Possibly extirpated from the area.
**	*Extinct*	Possibly extinct
	Critical Habitat	Area essential to the conservation of a species.

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Sacramento Fish and Wildlife Office
2800 Cottage Way, Room W-2605
Sacramento, California 95825-1846

IN REPLY REFER TO:
PPN 2926
ER 02/0263

April 22, 2002

Mr. David M. Melko
Policy and Program Manager
Sacramento Regional Transit District
P.O. Box 2110
Sacramento, California 95812-2110

Dear Mr. Melko:

Thank you for the opportunity to review the Notice of Intent to prepare a Supplemental Environmental Impact Statement for the proposed light rail extension project in Sacramento County, California. The proposed project would extend light rail service from Meadowview Road to Calvine Road at Auberry Road. The enclosures are intended to assist you in your continued environmental review of this proposal. Future consultation with the U.S. Fish and Wildlife Service (Service) may be required under the Fish and Wildlife Coordination Act if project activities are anticipated to impact jurisdictional wetlands, and/or the Endangered Species Act if project activities are anticipated to affect federally listed species.

Enclosure A provides a list of sensitive species that may occur in or near the project site. The Service recommends that surveys be completed by a qualified biologist on the proposed project site to confirm the presence or absence of special-status species or their habitats. Enclosure B recommends general guidelines for identifying and mitigating project impacts to fish, wildlife, and their habitats. The Council on Environmental Quality developed regulations for implementing the National Environmental Policy Act, and defines mitigation to include: (1) avoiding the impact; (2) minimizing the impact; (3) rectifying the impact; (4) reducing or eliminating the impact over time; and (5) compensating for impacts. The Service supports and adopts this definition of mitigation and considers the specific elements to represent the desirable sequence of steps in the mitigation planning process. Accordingly, we maintain the best way to mitigate adverse biological impacts is avoidance when at all possible.

We encourage you to use these guidelines to develop a comprehensive environmental document that addresses these needs. If you have any questions regarding these comments, please contact Jerry Bielfeldt (Watershed Planning Branch) in the Sacramento Fish and Wildlife Office at (916) 414-6584.

Sincerely,

Michael B. Hoover
Acting Field Supervisor

E-20

REGIONAL TRANSIT
APR 26 2002
POL/PROGRAM MGR

Enclosures
cc:
AES, Portland, OR
RM, CDFG, Region 2, Rancho Cordova, CA (w/o enclosures)

Endangered and Threatened Species that May Occur in
or be Affected by Projects in the Selected Quads Listed Below
Reference File No. 1-1-02-SP-1660
South Sacramento Light Rail Extension, Meadowview Road to Calvine/Auberry
April 12, 2002

QUAD: 496B FLORIN

Listed Species

Mammals

riparian (San Joaquin Valley) woodrat, *Neotoma fuscipes riparia* (E) *

riparian brush rabbit, *Sylvilagus bachmani riparius* (E) *

Birds

bald eagle, *Haliaeetus leucocephalus* (T)

Reptiles

giant garter snake, *Thamnophis gigas* (T)

Amphibians

California red-legged frog, *Rana aurora draytonii* (T)

Fish

Critical habitat, delta smelt, *Hypomesus transpacificus* (T)

delta smelt, *Hypomesus transpacificus* (T)

Central Valley steelhead, *Oncorhynchus mykiss* (T) NMFS

winter-run chinook salmon, *Oncorhynchus tshawytscha* (E) NMFS

Central Valley spring-run chinook salmon, *Oncorhynchus tshawytscha* (T) NMFS

Critical Habitat, Central Valley spring-run chinook, *Oncorhynchus tshawytscha* (T) NMFS

Sacramento splittail, *Pogonichthys macrolepidotus* (T)

Invertebrates

vernal pool fairy shrimp, *Branchinecta lynchi* (T)

valley elderberry longhorn beetle, *Desmocerus californicus dimorphus* (T)

vernal pool tadpole shrimp, *Lepidurus packardi* (E)

Proposed Species

Birds

mountain plover, *Charadrius montanus* (PT)

Candidate Species

Amphibians

California tiger salamander, *Ambystoma californiense* (C)

Fish

Central Valley fall/late fall-run chinook salmon, *Oncorhynchus tshawytscha* (C) NMFS

Critical habitat, Central Valley fall/late fall-run chinook, *Oncorhynchus tshawytscha* (C) NMFS

Species of Concern

Mammals

Pacific western big-eared bat, *Corynorhinus (=Plecotus) townsendii townsendii* (SC)

small-footed myotis bat, *Myotis ciliolabrum* (SC)

long-legged myotis bat, *Myotis volans* (SC)

Yuma myotis bat, *Myotis yumanensis* (SC)

San Joaquin pocket mouse, *Perognathus inornatus* (SC)

Birds

tricolored blackbird, *Agelaius tricolor* (SC)

grasshopper sparrow, *Ammodramus savannarum* (SC)

short-eared owl, *Asio flammeus* (SC)

western burrowing owl, *Athene cunicularia hypugaea* (SC)

oak titmouse, *Baeolophus inornatus* (SLC)

Aleutian Canada goose, *Branta canadensis leucopareia* (D)

Swainson's hawk, *Buteo Swainsoni* (CA)

ferruginous hawk, *Buteo regalis* (SC)

Lawrence's goldfinch, *Carduelis lawrencei* (SC)

Vaux's swift, *Chaetura vauxi* (SC)

black tern, *Chlidonias niger* (SC)

white-tailed (=black shouldered) kite, *Elanus leucurus* (SC)

little willow flycatcher, *Empidonax traillii brewsteri* (CA)

American peregrine falcon, *Falco peregrinus anatum* (D)

greater sandhill crane, *Grus canadensis tabida* (CA)

loggerhead shrike, *Lanius ludovicianus* (SC)

Lewis' woodpecker, *Melanerpes lewis* (SC)

long-billed curlew, *Numenius americanus* (SC)

Nuttall's woodpecker, *Picoides nuttallii* (SLC)

white-faced ibis, *Plegadis chihi* (SC)

bank swallow, *Riparia riparia* (CA)

rufous hummingbird, *Selasphorus rufus* (SC)

Reptiles

northwestern pond turtle, *Clemmys marmorata marmorata* (SC)

California horned lizard, *Phrynosoma coronatum frontale* (SC)

Amphibians

western spadefoot toad, *Spea hammondii* (SC)

Fish

green sturgeon, *Acipenser medirostris* (SC)

river lamprey, *Lampetra ayresi* (SC)

Kern brook lamprey, *Lampetra hubbsi* (SC)

Pacific lamprey, *Lampetra tridentata* (SC)

longfin smelt, *Spirinchus thaleichthys* (SC)

Invertebrates

Antioch Dunes anthicid beetle, *Anthicus antiochensis* (SC)

Sacramento anthicid beetle, *Anthicus sacramento* (SC)

Midvalley fairy shrimp, *Branchinecta mesovallensis* (SC)

California linderiella fairy shrimp, *Linderiella occidentalis* (SC)

Plants

legenere, *Legenere limosa* (SC)

valley sagittaria (=Sanford's arrowhead), *Sagittaria sanfordii* (SC)

KEY:

(E)	*Endangered*	Listed (in the Federal Register) as being in danger of extinction.
(T)	*Threatened*	Listed as likely to become endangered within the foreseeable future.
(P)	*Proposed*	Officially proposed (in the Federal Register) for listing as endangered or threatened.
(PX)	*Proposed Critical Habitat*	Proposed as an area essential to the conservation of the species.
(C)	*Candidate*	Candidate to become a *proposed* species.
(SC)	*Species of Concern*	May be endangered or threatened. Not enough biological information has been gathered to support listing at this time.
(SLC)	*Species of Local Concern*	Species of local or regional concern or conservation significance.
(MB)	*Migratory Bird*	Migratory bird
NMFS	NMFS species	Under the jurisdiction of the National Marine Fisheries Service. Contact them directly.
(D)	*Delisted*	Delisted. Status to be monitored for 5 years.
(CA)	*State-Listed*	Listed as threatened or endangered by the State of California.
(*)	*Extirpated*	Possibly extirpated from this quad.
(**)	*Extinct*	Possibly extinct.
	Critical Habitat	Area essential to the conservation of a species.

Endangered and Threatened Species that May Occur in or be Affected by
Projects in the Area of the Following California Counties
Reference File No. 1-1-02-SP-1660
April 12, 2002

SACRAMENTO COUNTY

Listed Species

Mammals

riparian (San Joaquin Valley) woodrat, *Neotoma fuscipes riparia* (E) *

Birds

bald eagle, *Haliaeetus leucocephalus* (T)

Reptiles

giant garter snake, *Thamnophis gigas* (T)

Amphibians

California red-legged frog, *Rana aurora draytonii* (T)

Fish

Central Valley spring-run chinook salmon, *Oncorhynchus tshawytscha* (T) NMFS
Central Valley steelhead, *Oncorhynchus mykiss* (T) NMFS
Critical Habitat, Central Valley spring-run chinook, *Oncorhynchus tshawytscha* (T) NMFS
Critical habitat, Central Valley steelhead, *Oncorhynchus mykiss* (T) NMFS
Critical habitat, delta smelt, *Hypomesus transpacificus* (T)
Critical habitat, winter-run chinook salmon, *Oncorhynchus tshawytscha* (E) NMFS
Sacramento splittail, *Pogonichthys macrolepidotus* (T)
delta smelt, *Hypomesus transpacificus* (T)
winter-run chinook salmon, *Oncorhynchus tshawytscha* (E) NMFS

Invertebrates

Conservancy fairy shrimp, *Branchinecta conservatio* (E)
Critical habitat, valley elderberry longhorn beetle, *Desmocerus californicus dimorphus* (T)
delta green ground beetle, *Elaphrus viridis* (T)
valley elderberry longhorn beetle, *Desmocerus californicus dimorphus* (T)
vernal pool fairy shrimp, *Branchinecta lynchi* (T)
vernal pool tadpole shrimp, *Lepidurus packardi* (E)

Plants

Antioch Dunes evening-primrose, *Oenothera deltoides ssp. howellii* (E)
Sacramento Orcutt grass, *Orcuttia viscida* (E)
slender Orcutt grass, *Orcuttia tenuis* (T)
soft bird's-beak, *Cordylanthus mollis ssp. mollis* (E) *

Proposed Species

Birds

mountain plover, *Charadrius montanus* (PT)

Candidate Species

Birds

Western yellow-billed cuckoo, *Coccyzus americanus occidentalis* (C)

Amphibians

California tiger salamander, *Ambystoma californiense* (C)

Fish

Central Valley fall/late fall-run chinook salmon, *Oncorhynchus tshawytscha* (C) NMFS

Critical habitat, Central Valley fall/late fall-run chinook, *Oncorhynchus tshawytscha* (C) NMFS

Species of Concern

Mammals

Pacific western big-eared bat, *Corynorhinus (=Plecotus) townsendii townsendii* (SC)

San Francisco dusky-footed woodrat, *Neotoma fuscipes annectens* (SC)

San Joaquin pocket mouse, *Perognathus inornatus* (SC)

Yuma myotis bat, *Myotis yumanensis* (SC)

fringed myotis bat, *Myotis thysanodes* (SC)

greater western mastiff-bat, *Eumops perotis californicus* (SC)

long-eared myotis bat, *Myotis evotis* (SC)

long-legged myotis bat, *Myotis volans* (SC)

pale Townsend's big-eared bat, *Corynorhinus (=Plecotus) townsendii pallescens* (SC)

small-footed myotis bat, *Myotis ciliolabrum* (SC)

Birds

Aleutian Canada goose, *Branta canadensis leucopareia* (D)

American bittern, *Botaurus lentiginosus* (SC)

American peregrine falcon, *Falco peregrinus anatum* (D)

Brewer's sparrow, *Spizella breweri* (SC)

California thrasher, *Toxostoma redivivum* (SC)

Lawrence's goldfinch, *Carduelis lawrencei* (SC)

Lewis' woodpecker, *Melanerpes lewis* (SC)

Nuttall's woodpecker, *Picoides nuttallii* (SLC)

Snowy Egret, *Egretta thula* (MB)

Swainson's hawk, *Buteo Swainsoni* (CA)

bank swallow, *Riparia riparia* (CA)

black rail, *Laterallus jamaicensis coturniculus* (CA)

black tern, *Chlidonias niger* (SC)

common loon, *Gavia immer* (SC)
ferruginous hawk, *Buteo regalis* (SC)
grasshopper sparrow, *Ammodramus savannarum* (SC)
greater sandhill crane, *Grus canadensis tabida* (CA)
little willow flycatcher, *Empidonax traillii brewsteri* (CA)
loggerhead shrike, *Lanius ludovicianus* (SC)
long-billed curlew, *Numenius americanus* (SC)
oak titmouse, *Baeolophus inornatus* (SLC)
rufous hummingbird, *Selasphorus rufus* (SC)
short-eared owl, *Asio flammeus* (SC)
tricolored blackbird, *Agelaius tricolor* (SC)
western burrowing owl, *Athene cunicularia hypugaea* (SC)
white-faced ibis, *Plegadis chihi* (SC)
white-tailed (=black shouldered) kite, *Elanus leucurus* (SC)

Reptiles

California horned lizard, *Phrynosoma coronatum frontale* (SC)
northwestern pond turtle, *Clemmys marmorata marmorata* (SC)
silvery legless lizard, *Anniella pulchra pulchra* (SC)
southwestern pond turtle, *Clemmys marmorata pallida* (SC)

Amphibians

foothill yellow-legged frog, *Rana boylii* (SC)
western spadefoot toad, *Spea hammondii* (SC)

Fish

Kern brook lamprey, *Lampetra hubbsi* (SC)
Pacific lamprey, *Lampetra tridentata* (SC)
green sturgeon, *Acipenser medirostris* (SC)
longfin smelt, *Spirinchus thaleichthys* (SC)
river lamprey, *Lampetra ayresi* (SC)

Invertebrates

Antioch Dunes anthicid beetle, *Anthicus antiochensis* (SC)
California linderiella fairy shrimp, *Linderiella occidentalis* (SC)
Midvalley fairy shrimp, *Branchinecta mesovallensis* (SC)
Sacramento anthicid beetle, *Anthicus sacramento* (SC)
San Joaquin dune beetle, *Coelus gracilis* (SC)
curved-foot hygrotus diving beetle, *Hygrotus curvipes* (SC)

Plants

Ahart's (dwarf) rush, *Juncus leiospermus var. ahartii* (SC)

Amador (Bisbee Peak) rush-rose, *Helianthemum suffrutescens* (SLC)
Boggs Lake hedge-hyssop, *Gratiola heterosepala* (CA)
Mason's lilaeopsis, *Lilaeopsis masonii* (SC)
Northern California black walnut, *Juglans californica var. hindsii* (SC) *
Red Bluff (dwarf) rush, *Juncus leiospermus var. leiospermus* (SC)
San Joaquin spearscale (=saltbush), *Atriplex joaquiniana* (SC)
Suisun Marsh aster, *Aster lentus* (SC)
Tuolumne coyote-thistle (=button-celery), *Eryngium pinnatisectum* (SC)
delta tule-pea, *Lathyrus jepsonii var. jepsonii* (SC)
legenere, *Legenere limosa* (SC)
pincushion navarretia, *Naverretia myersii spp. myersii* (SC)
stinkbells, *Fritillaria agrestis* (SLC)
valley sagittaria (=Sanford's arrowhead), *Sagittaria sanfordii* (SC)

KEY:

(E)	*Endangered*	Listed (in the Federal Register) as being in danger of extinction.
(T)	*Threatened*	Listed as likely to become endangered within the foreseeable future.
(P)	*Proposed*	Officially proposed (in the Federal Register) for listing as endangered or threatened.
(PX)	*Proposed Critical Habitat*	Proposed as an area essential to the conservation of the species.
(C)	*Candidate*	Candidate to become a *proposed* species.
(SC)	*Species of Concern*	Other species of concern to the Service.
(SLC)	*Species of Local Concern*	Species of local or regional concern or conservation significance.
(D)	*Delisted*	Delisted. Status to be monitored for 5 years.
(CA)	*State-Listed*	Listed as threatened or endangered by the State of California.
NMFS	NMFS species	Under jurisdiction of the National Marine Fisheries Service. Contact them directly.
*	*Extirpated*	Possibly extirpated from the area.
**	*Extinct*	Possibly extinct
	Critical Habitat	Area essential to the conservation of a species.

Important Information
About Your Species List

How We Make Species Lists

We store information about endangered and threatened species lists by U.S. Geological Survey 7½ minute *quads*. The United States is divided into these quads, which are about the size of San Francisco. If you requested your list by quad name or number, that is what we used. Otherwise, we used the information you sent us to determine which quad or quads to use.

The animals on your species list are ones that occur within, *or may be affected by projects within*, the quads covered by the list. Fish and other aquatic species appear on your list if they are in the same watershed as your quad or if water use in your quad might affect them. Amphibians will be on the list for a quad or county if pesticides applied in that area may be carried to their habitat by air currents. Birds are shown regardless of whether they are resident or migratory. Relevant birds on the county list should be considered regard-less of whether they appear on a quad list.
Plants

Any plants on your list are ones *that have actually been observed* in the quad or quads covered by the list. We have also included either a county species list or a list of species in nearby quads. We recommend that you check your project area for these plants. Plants may exist in an area without ever having been detected there.

Surveying

Some of the species on your list may not be affected by your project. A trained biologist or botanist, familiar with the habitat requirements of the species on your list, should determine whether they or habitats suitable for them may be affected by your project. We recommend that your surveys include any proposed and candidate species on your list. For plant surveys, we recommend using the enclosed *Guidelines for Conducting and Reporting Botanical Inventories for Federally Listed, Proposed and Candidate Species*. The results of your surveys should be published in any environmental documents prepared for your project.

State-Listed Species

If a species has been listed as threatened or endangered by the State of California, but not by us nor by the National Marine Fisheries Service, it will appear on your list as a Species of Concern. *However you should contact the California Department of Fish and Game for official information about these species.* Call (916) 322-2493 or write Marketing Manager, California Department of Fish and Game, Natural Diversity Data Base, 1416 Ninth Street, Sacramento, California 95814.

Your Responsibilities Under the Endangered Species Act

All plants and animals identified as *listed* on Enclosure A are fully protected under the Endangered Species Act of 1973, as amended. Section 9 of the Act and its implementing regulations prohibit the *take* of a federally listed wildlife species. Take is defined by the Act as "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect" any such animal. Take may include significant habitat

modification or degradation where it actually kills or injures wildlife by significantly impairing essential behavioral patterns, including breeding, feeding, or shelter (50 CFR §17.3).

Take incidental to an otherwise lawful activity may be authorized by one of two procedures:

> If a Federal agency is involved with the permitting, funding, or carrying out of a project that may result in take, then that agency must engage in a *formal consultation* with the Service. During formal consultation, the Federal agency, the applicant and the Service work together to avoid or minimize the impact on listed species and their habitat. Such consultation would result in a *biological opinion* by the Service addressing the anticipated effect of the project on listed and proposed species. The opinion may authorize a limited level of incidental take.
>
> If no Federal agency is involved with the project, and federally listed species may be taken as part of the project, then you, the applicant, should apply for an *incidental take permit*. The Service may issue such a permit if you submit a satisfactory conservation plan for the species that would be affected by your project. Should your survey determine that federally listed or proposed species occur in the area and are likely to be affected by the project, we recommend that you work with this office and the California Department of Fish and Game to develop a plan that minimizes the project's direct and indirect impacts to listed species and compen-sates for project-related loss of habitat. You should include the plan in any environmental documents you file.

Critical Habitat

When a species is listed as endangered or threatened, areas of habitat considered essential to its conservation may be designated as *critical habitat*. These areas may require special management considerations or protection. They provide needed space for growth and normal behavior; food, water, air, light, other nutritional or physiological requirements; cover or shelter; and sites for breeding, reproduction, rearing of offspring, germination or seed dispersal.

Although critical habitat may be designated on private or State lands, activities on these lands are not restricted unless there is Federal involvement in the activities or direct harm to listed wildlife.

If any species has proposed or designated critical habitat within a quad, there will be a separate line for this on the species list. Maps and boundary descriptions of the critical habitat may be found in the *Federal Register*. The information is also reprinted in the *Code of Federal Regulations* (50 **CFR** 17.95).

Candidate Species

We recommend that you address impacts to *candidate* species. We put plants and animals on our candidate list when we have enough scientific information to eventually propose them for listing as threatened or endangered. By considering these species early in your planning process you may be able to avoid the problems that could develop if one of these candidates was listed before the end of your project.

Species of Concern

Your list may contain a section called *Species of Concern*. This is an informal term that refers to those species that the Sacramento Fish and Wildlife Office believes might be in need of concentrated

conservation actions. Such conservation actions vary depending on the health of the populations and degree and types of threats. At one extreme, there may only need to be periodic monitoring of populations and threats to the species and its habitat. At the other extreme, a species may need to be listed as a Federal threatened or endangered species. Species of concern receive no legal protection and the use of the term does not necessarily mean that the species will eventually be proposed for listing as a threatened or endangered species.

Wetlands

If your project will impact wetlands, riparian habitat, or other jurisdictional waters as defined by section 404 of the Clean Water Act and/or section 10 of the Rivers and Harbors Act, you will need to obtain a permit from the U.S. Army Corps of Engineers. Impacts to wetland habitats require site specific mitigation and monitoring. For questions regarding wetlands, please contact Mark Littlefield of this office at (916) 414-6580.

Updates

Our database is constantly updated as species are proposed, listed and delisted. If you address proposed, candidate and special concern species in your planning, this should not be a problem. We also continually strive to make our information as accurate as possible. Sometimes we learn that a particular species has a different range than we thought. This should not be a problem if you consider the species on the county that we have enclosed. If you have a long-term project or if your project is delayed, please contact us for a current list. You can also find out the current status of a species by going to the Service's Internet page: www.fws.gov.

ENCLOSURE B

The goal of the U.S. Fish and Wildlife Service is to conserve, protect and enhance fish, wildlife, and their habitats by timely and effective provision of fish and wildlife information and recommendations. To assist us in accomplishing this goal, we would like to see the items described below discussed in your environmental documents for the proposed project.

Project Description. The document should very clearly state the purposes of, and document the needs for, the proposed project so that the capabilities of the various alternatives to meet the purposes and needs can be readily determined.

A thorough description of all permanent and temporary facilities to be constructed and work to be done as a part of the project should be included. The document should identify any new access roads, equipment staging areas, and gravel processing facilities which are needed. Figures accurately depicting proposed project features in relation to natural features (such as streams, wetlands, riparian areas, and other habitat types) in the project area should be included.

Affected Environment. The document should show the location of, and describe, all vegetative cover types in the areas potentially affected by all project alternatives and associated activities. Tables with acreages of each cover type with and without the project for each alternative would also be appropriate. We recommend that all wetlands in the project area be delineated and described according to the classification system found in the Service's Classification of Wetlands and Deepwater Habitats of the United States (Cowardin 1979). The Service's National Wetland Inventory maps would be one starting point for this effort.

The document should present and analyze a full range of alternatives to the proposed project. At least one alternative should be designed to avoid all impacts to wetlands, including riparian areas. Similarly, within each alternative, measures to minimize or avoid impacts to wetlands should be included.

Lists of fish and wildlife species expected to occur in the project area should be in the document. The lists should also indicate for each species whether or not it is a resident or migrant, and the period(s) of the year it would be expected in the project area.

Environmental Consequences. The sections on impacts to fish and wildlife should discuss impacts from vegetation removal (both permanent and temporary), filling or degradation of wetlands, interruption of wildlife migration corridors, and disturbance from trucks and other machinery during construction and/or operation. These sections should also analyze possible impacts to streams from construction of outfall structures, pipeline crossings, and filling. Impacts on water quality, including nutrient loading, sedimentation, toxics, biological oxygen demand, and temperature in receiving waters should also be discussed in detail along with the resultant effects on fish and aquatic invertebrates. Discussion of indirect impacts to fish, wildlife, and their habitats, including impacts from growth induced by the proposed project, should also be addressed in the document. The impacts of each alternative should be discussed in sufficient detail to allow comparison between the alternatives.

Because of their very high value to migratory birds, and their ever-increasing scarcity in California, our mitigation goal for wetlands (including riparian and riverine wetlands) is no net loss of in-kind habitat value or acreage (whichever is greater).

For unavoidable impacts, to determine the mitigation credits available for a given mitigation project, we evaluate what conditions would exist on the mitigation site in the future in the absence of the mitigation actions, and compare those conditions to the conditions we would expect to develop on the site with implementation of the mitigation plan.

Mitigation habitat should be equal to or exceed the quality of the habitat to be affected by the project. Baseline information would need to be gathered at the impact site to be able to quantify this goal in terms of plant species diversity, shrub and tree canopy cover, stems/acre, tree height, etc. The ultimate success of the project should be judged according to these same measurements at the mitigation site.

Criteria should be developed for assessing the progress of the project during its developmental stages as well. Assessment criteria should include rates of plant growth, plant health, and evidence of natural reproduction. Success criteria should be geared toward equaling or exceeding the quality of the highest quality habitat to be affected. In other words, the mitigation effort would be deemed a success in relation to this goal if the mitigation site met or exceeded habitat measurements at a "model" site (plant cover, density, species diversity, etc.).

The plan should present the proposed ground elevations at the mitigation site, along with elevations in the adjacent areas. A comparison of the soils of the proposed mitigation and adjacent areas should also be included in the plan, and a determination made as to the suitability of the soils to support habitats consistent with the mitigation goals.

Because wetland ecosystems are driven by suitable hydrological conditions, additional information must be developed on the predicted hydrology of the mitigation site. The plan should describe the depth of the water table, and the frequency, duration, areal extent, and depth of flooding which would occur on the site. The hydrologic information should include an analysis of extreme conditions (drought, flooding) as well as typical conditions.

The plan must include a timeframe for implementing the mitigation in relation to the proposed project. We recommend that mitigation be initiated prior to the onset of construction. If there will be a substantial time lag between project construction and completion of the mitigation, a net loss of habitat values would result, and more mitigation would be required to offset this loss.

Generally, monitoring of the mitigation site should occur annually for at least the first five years, biennially for years 6 through 11, and every five years thereafter until the mitigation has met all success criteria. Remediation efforts and additional monitoring should occur if success criteria are not met during the first five years. Some projects will require monitoring throughout the life of the project. Reports should be prepared after each monitoring session.

The cumulative impacts of the project, when viewed in conjunction with other past, existing, and foreseeable projects, need to be addressed. Cumulative impacts to fish, wildlife, wetlands and other habitats, and water quality should be included.

Mitigation Planning. Under provisions of the Fish and Wildlife Coordination Act, the Service advises the U.S. Army Corps of Engineers on projects involving dredge and fill activities in "waters of the United States", of which wetlands and some riparian habitats are subcategories. Since portions of this proposal may ultimately require a Corps permit, the Service will subsequently be involved under the Coordination Act. Therefore, if you have not done so already, we suggest that you or your representative consult the Corps regarding onsite wetlands and related habitats that may fall under their jurisdiction, and include this information in the draft document. When reviewing Corps public notices, the Service generally does not object to projects meeting the following criteria:

1. They are ecologically sound;

2. The least environmentally damaging reasonable alternative is selected;

3. Every reasonable effort is made to avoid or minimize damage or loss of fish and wildlife resources and uses;

4. All important recommended means and measures have been adopted, with guaranteed implementation to satisfactorily compensate for unavoidable damage or loss consistent with the appropriate mitigation goal; and

5. For wetlands and shallow water habitats, the proposed activity is clearly water dependent and there is a demonstrated public need.

The Service may recommend the "no project" alternative for those projects which do not meet all of the above criteria, and where there is likely to be a significant fish and wildlife resource loss.

When projects impacting waterways or wetlands are deemed acceptable to the Service, we recommend full mitigation for any impacts to fish and wildlife. The Council on Environmental Quality regulations for implementing the National Environmental Policy Act define mitigation to include: 1) Avoiding the impact; 2) minimizing the impact; 3) rectifying the impact; 4) reducing or eliminating the impact over time; and 5) compensating for impacts. The Service supports and adopts this definition of mitigation and considers the specific elements to represent the desirable sequence of steps in the mitigation planning process. Accordingly, we maintain that the best way to mitigate for adverse biological impacts is to avoid them altogether.

The document should describe all measures proposed to avoid, minimize, or compensate for impacts to fish and wildlife and their habitats. The measures should be presented in as much detail as possible to allow us to evaluate their probable effectiveness.

The plan should require the preparation of "as-built" plans. Such plans provide valuable information, especially if the mitigation effort fails. Similarly, a "time-zero" report should be mandated. This report would describe exactly what was done during the construction of the mitigation project, what problems were encountered, and what corrections or modifications to the plans were undertaken.

The plan should detail how the site is to be maintained during the mitigation establishment period, and how long the establishment period will be. It will also be important to note what entity will perform the maintenance activities, and what entity will ultimately own and manage the site. In addition, a mechanism to fund the maintenance and management of the site should be established and identified. A permanent easement should be placed on the property used for the mitigation that would preclude incompatible activities on the site in perpetuity.

Finally, in some cases, a performance bond may be required as part of the mitigation plan. The amount of the bond should be sufficient to cover the costs of designing and implementing an adequate mitigation plan (and purchasing land if needed) should the proposed plan not succeed.

Reference

Cowardin, L.M., V. Carter, F.C. Golet, and E.T. LaRoe. 1979. Classification of wetlands and deepwater habitats of the United States. FWS/OBS-79/31. U.S. Fish and Wildlife Service, Washington, D.C. 103 pp.

Table E- 1 Special-status Plant Species

Species	Federal	State	CNPS	Habitat Description[1-6]	Bloom Period[7]	Survey Dates	Elevation Range	Potential for Occurrence	Affected by Project
Suisun marsh aster *Aster lentus*	FSC	--	1B	Near shore marsh vegetation grows along bank or shore in tidally influenced coastal and valley freshwater marshes. Northeast of Fagan Slough, Jersey Island.	August – November	June 26, August 15 and 21	0 – 3m	Unlikely	N/A
San Joaquin saltbush *Atriplex joaquiniana*	--	--	1B	Chenopod scrub, meadows, and alkaline valley and foothill grasslands.	April – September	June 26, August 15 and 21	<300m	Unlikely	N/A
Soft bird's-beak *Cordylanthus mollis* ssp. *mollis*	FE	Rare	1B	Coastal saltwater marshes and swamps.	July – September	June 26, August 15 and 21	0 – 3m	Unlikely	N/A
Dwarf downingia *Downingia pusilla*	--	--	2	Valley and foothill grassland and vernal pools.	March – May	June 26, August 15 and 21	1 – 445m	Medium Potential	Potential habitat loss/ disturbance
Tuolumne coyote-thistle (=button-celery) *Eryngium pinnatisectum*	FSC	--	1B	Cismontane woodland, lower montane coniferous forest, vernal pools.	June – August	June 26, August 15 and 21	70 – 915m	Unlikely	N/A

Table E- 1 Special-status Plant Species

Species	Federal	State	CNPS	Habitat Description[1-6]	Bloom Period[7]	Survey Dates	Elevation Range	Potential for Occurrence	Affected by Project
Stinkbells *Fritillaria agrestis*	SLC	--	4	Chaparral, cismontane woodland, pinyon and juniper woodland, valley and foothill grassland/clay, sometimes serpentinite.	March-June	June 26, August 15 and 21	10-1,555m	Unlikely	N/A
Boggs Lake hedge-hyssop *Gratiola heterosepala*	--	SE	1B	Marshes and swamps (lake margins), vernal pools/clay.	April-August	June 26, August 15 and 21	10-2,375m	Medium Potential	Potential habitat loss/ disturbance
Amador (Bisbee Peak) rush-rose *Helianthemum suffrutescens*	SLC	--	3	Chaparral (often serpentine, gabbroic, or lone soil).	April – June	June 26, August 15 and 21	45 – 840m	Unlikely	N/A
Northern California walnut *Juglans californica* var. *hindsii*	FSC	--	1B	Riparian forests and riparian woodlands.	April – May	June 26, August 15 and 21	50 – 200m	Unlikely	N/A
Ahart's (dwarf) rush *Juncus leiospermus* var. *ahartii*	FSC	--	1B	Valley and foothill grasslands.	March – May	June 26, August 15 and 21	30 – 100m	Unlikely	N/A
Red Bluff (dwarf) rush *Juncus leiospermus* var. *leiospermus*	FSC	--	1B	Chaparral, cismontane woodlands, meadows and seeps, valley and foothill grasslands, vernal pools.	March – May	June 26, August 15 and 21	35 – 1020m	Unlikely	N/A

Table E- 1 Special-status Plant Species

Species	Federal	State	CNPS	Habitat Description[1-6]	Bloom Period[7]	Survey Dates	Elevation Range	Potential for Occurrence	Affected by Project
Delta tule-pea *Lathyrus jepsonii* var. *jepsonii*	FSC	--	1B	Marshes and swamps (freshwater and brackish).	May-September	June 26, August 15 and 21	0-4m	Unlikely	N/A
Legenere *Legenere limosa*	FSC	--	1B	Vernal pools.	April – June	June 26, August 15 and 21	1 – 880m	Medium Potential	Potential habitat loss/ disturbance
Mason's lilaeopsis *Lilaeopsis masonii*	FSC	Rare	1B	Marshes and swamps, both brackish and freshwater, and riparian scrub.	April – October	June 26, August 15 and 21	0 – 10m	Unlikely	N/A
Pincushion navarretia *Naverretia myersii* spp. *myersii*	FSC	--	1B	Vernal pools.	May	June 26, August 15 and 21	20 – 330m	Unlikely	N/A
Antioch Dunes evening-primrose *Oenothera deltoides* ssp. *howellii*	FE	SE	1B	Inland dunes.	March – September	June 26, August 15 and 21	<30m	Unlikely	N/A
Sacramento Orcutt grass *Orcuttia viscida*	FE	SE	1B	Vernal pools.	April – July	June 26, August 15 and 21	30 – 100m	Medium Potential	Potential habitat loss/ disturbance

Table E- 1 Special-status Plant Species

Species	Federal	State	CNPS	Habitat Description[1-6]	Bloom Period[7]	Survey Dates	Elevation Range	Potential for Occurrence	Affected by Project
Sanford's arrowhead *Sagittaria sanfordii*	FSC	--	1B	Marshes and swamps (assorted shallow freshwater).	May-October	June 26, August 15 and 21	0 –610m	Medium Potential	Potential habitat loss/ disturbance

Federal status:
- FE Listed as endangered under the Federal Endangered Species Act
- FT Listed as threatened under the Federal Endangered Species Act
- PE Proposed for listing as endangered under the Federal Endangered Species Act
- PT Proposed for listing as threatened under the Federal Endangered Species Act
- FC Candidate species for listing under the Federal Endangered Species Act
- FSC Species of concern as identified by the U.S. Fish and Wildlife Service
- SLC Species of local or regional concern or conservation significance

State Status:
- SE Listed as endangered under the California Endangered Species Act
- ST Listed as threatened under the California Endangered Species Act
- CSC Species of concern as identified by the California Department of Fish and Game
- Rare Species identified as rare by the California Department of Fish and Game

California Native Plant Society Listing Categories (CNPS 2002)
- 1A Plant species that are presumed extinct in California
- 1B Plant species that are rare, threatened, or endangered in California and elsewhere
- 2 Plant species that are rare, threatened, or endangered in California, but are more common elsewhere
- 3 Plant species that lack the necessary information to assign them to a listing status
- 4 Plant species that have a limited distribution or that are infrequent throughout a broader area in California

Reference Citations:

[1] Abrams 1923
[2] Abrams 1944
[3] Abrams 1951
[4] Abrams and Ferris 1960
[5] Hickman, ed. 1993
[6] Munz 1959
[7] CNPS 2002

Table E- 1. Special-status Wildlife Species

Species	Federal	State	Habitat Association	Potential for Occurrence	Affected by Project
Invertebrates					
Conservation fairy shrimp *Branchinecta conservatio*	FE	--	Inhabits large vernal pools with highly turbid water. Known from disjunct populations in Tehama, Solano, Glenn, Merced, and Ventura counties .[3]	Unlikely	No: Outside of known range.
Vernal pool fairy shrimp *Branchinecta lynchi*	FT	--	Endemic to the grasslands of the Central Valley, Central Coast Mountains, and South Coast Mountains of California, in static rain-filled pools. Inhabits small, clear-water sandstone-depression pools and grassed swales, earth slumps, or basalt-flow depression pools.[3]	Potential Occupant	Potential habitat loss/ disturbance
Midvalley fairy shrimp *Branchinecta mesovallensis*	FSC	--	Midvalley Fairy Shrimp is a newly described species that inhabits pools in only a handful of counties within the Great Central Valley, including Sacramento, Solano, Merced, Madera, San Joaquin, Fresno, and Contra Costa counties. A small, soft-bodied crustacean that lives in vernal pools, seasonal wetlands that fill with water during fall and winter rains.[3]	Potential Occupant	Potential habitat loss/ disturbance
Vernal pool tadpole shrimp *Lepidurus packardi*	FE	--	Inhabits seasonal pools in unplowed grasslands with old alluvial soils underlain by hardpan or in sandstone depressions.[3]	Potential Occupant	Potential habitat loss/ disturbance
California linderiella *Linderiella occidentalis*	FSC	--	Seasonal pools in unplowed grasslands with old alluvial soils underlain by hardpan or in sandstone depressions. Water in pools has very low alkalinity, conductivity, and total dissolved solids (TDS).[3]	Potential Occupant	Potential habitat loss/ disturbance

Table E- 1. Special-status Wildlife Species

Species	Federal	State	Habitat Association	Potential for Occurrence	Affected by Project
San Joaquin dune beetle *Coelus gracilis*	FSC	--	Inhabits sites with sandy substrates in fossil dunes along the western edge of the San Joaquin Valley. [3]	Unlikely	N/A
Antioch Dunes anthicid beetle *Anthicus antiochensis*	FSC	--	Antioch dunes preserve area. [3]	Unlikely	N/A
Sacramento anthicid beetle *Anthicus sacramento*	FSC	--	Restricted to sand dune areas of Sacramento-San Joaquin Delta. Inhabits sand slipfaces along bamboo and willow. [3]	Unlikely	N/A
Delta green ground beetle *Elaphrus viridis*	FT	--	The Delta Green is associated with playa vernal pool habitats, seasonally wet pools that accumulate in low areas with poor drainage. It is presently known to occur only in Solano County northeast of the San Francisco Bay Area. [3]	Unlikely	N/A
Curved-foot hygrotus diving beetle *Hygrotus curvipes*	FSC	--	Aquatic beetle known only from shallow, muddy pools at Oakley, Contra Costa County. [3]	Unlikely	N/A
Valley elderberry longhorn beetle *Desmocerus californicus dimorphus*	FT	--	Occurs only in the Central Valley of California, in association with blue elderberry (*Sambucus mexicana*). Prefers to lay eggs in elderberry stems 2 to 8 inches in diameter; some preference shown for "stressed" elderberries. [3]	Unlikely	N/A
Fish					
River lamprey *Lampetra ayresi*	FSC	CSC	Ranges from the Sacramento-San Joaquin Delta region northward; however, it appears most numerous in the Sacramento and San Joaquin Rivers. [4]	Unlikely	N/A
Kern brook lamprey *Lampetra hubbsi*	FSC	CSC	Inhabits waters of the San Joaquin River system and the Kern River. Spawning occurs in gravel-bottomed areas, the ammocoetes utilize muddy-bottomed areas to burrow and feed. [4]	Unlikely	N/A

Table E- 1. Special-status Wildlife Species

Species	Federal	State	Habitat Association	Potential for Occurrence	Affected by Project
Pacific lamprey *Lampetra tridentata*	FSC	--	Most coastal streams and rivers of California. [4]	Unlikely	N/A
Green sturgeon *Acipenser medirostris*	FSC	CSC	Primarily marine, this species seldom migrates inland beyond the estuaries of large rivers. [4]	Unlikely	N/A
Central Valley steelhead *Oncorhynchus mykiss*	FT	--	Critical habitat was designated to include all river reaches accessible to listed steelhead in the Sacramento and San Joaquin Rivers and tributaries in California. The river reaches and estuarine areas of the Sacramento-San Joaquin delta are also included. [3,4]	Unlikely	N/A
Winter-run chinook salmon *Oncorhynchus tshawytscha*	FE	SE	Spawning occurs in the Sacramento River, up to the Keswick Dam. Requires clean, cold water over gravel beds with water temperatures between 6 and 14 degrees Celsius for spawning. This listing refers to the evolutionary significant unit (ESU) of chinook salmon with a winter spawning run. [3,4]	Unlikely	N/A
Central Valley spring-run chinook salmon *Oncorhynchus tshawytscha*	FT	ST	Critical habitat for this ESU includes the Sacramento River and its tributaries, river reaches and estuarine areas of the Sacramento-San Joaquin Delta, waters from Chipps Island westward to Carquinez Bridge, and waters of the San Francisco Bay (north of the San Francisco/Oakland Bay Bridge) from San Pablo Bay to the Golden Gate Bridge. Adult numbers depend on pool depth and volume, amount of cover, and proximity to gravel. [3,4]	Unlikely	N/A
Central Valley fall/late fall-run chinook salmon *Oncorhynchus tshawytscha*	FC	CSC	Breeding runs occur in the Sacramento River and its tributaries, river reaches and estuarine areas of the Sacramento-San Joaquin Delta are also utilized. [3,4]	Unlikely	N/A

Table E- 1. Special-status Wildlife Species

Species	Federal	State	Habitat Association	Potential for Occurrence	Affected by Project
Delta smelt *Hypomesus transpacificus*	FT	ST	This species inhabits the Sacramento-San Joaquin Delta and seasonally inhabits the Suisun Bay, Carquinez Strait, and San Pablo Bay. This species is seldom found at salinities above 10 PPT, and is most often found at salinities below 2 PPT. Spawning appears to occur in side channels and sloughs in the middle reaches of the Delta. [3,4]	Unlikely	N/A
Longfin smelt *Spirinchus thaleichthys*	FSC	CSC	This species prefers moderately saline water and may be found in major bays and estuaries from San Francisco Bay Northward. It lives in the bay waters throughout the summer, moving into the lower reaches of the rivers that flow into these bays in the fall to spawn. [4]	Unlikely	N/A
Sacramento splittail *Pogonichthys macrolepidotus*	FT	CSC	Inhabits slow moving river sections and dead end sloughs. Requires flooded vegetation for spawning and foraging for young. Endemic to lakes and rivers of the Central Valley, but Now confined to the Delta, Suisun Bay, and associated marshes. [3,4]	Unlikely	N/A
Amphibians					
California tiger salamander *Ambystoma californiense*	FSC	CSC	Annual grasslands and grassy understory of valley-foothill hardwood habitats in central and Northern California. Requires underground refuges, especially ground squirrel burrows, and vernal pools or other seasonal water sources for breeding. [7]	Unlikely	N/A
Western spadefoot toad *Scaphiopus (=Spea) hammondii*	FSC	CSC	Occurs primarily in grassland environments, but can also be found in valley-foothill hardwood woodlands. Shallow, temporary ponds are used for breeding and egg-laying. [7]	Unlikely	N/A

Table E- 1. Special-status Wildlife Species

Species	Federal	State	Habitat Association	Potential for Occurrence	Affected by Project
California red-legged frog *Rana aurora draytonii*	FT	CSC	Lowlands and foothills in a variety of aquatic, riparian, and upland environments, near permanent sources of water. [3, 7]	Unlikely	N/A
Foothill yellow-legged frog *Rana boylii*	FSC	CSC	Partially shaded, shallow streams with riffles and rocky substrates in a variety of vegetation communities. [7]	Unlikely	N/A
Reptiles					
Western pond turtle *Clemmys marmorata*	FSC	CSC	Includes both subspecies (*C. m. pallida* and *C. m. marmorata*). Aquatic habitat of ponds, marshes, streams, and irrigation ditches that have abundant emergent or riparian vegetation. [7]	Unlikely	N/A
California horned lizard *Phrynosoma coronatum frontale*	FSC	CSC	Found in a variety of habitats including scrubland, grassland, coniferous forest, and broadleaved forests. Common in lowlands along sandy washes where low shrubs provide cover. [7]	Medium Potential	Potential habitat loss/ disturbance
Silvery legless lizard *Anniella pulchra pulchra*	FSC	CSC	Typically occurs in sandy or loose loamy soils under sparse vegetation. Soil moisture is essential, with the species showing a preference towards soils with high moisture content. [7]	Unlikely	N/A
Giant garter snake *Thamnophis gigas*	FT	ST	Prefers freshwater marsh and low gradient streams. Has adapted to drainage canals and irrigation ditches. [3,7]	Potential Occupant	Potential habitat loss/ disturbance
Birds					
Common loon *Gavia immer*	FSC	CSC	Estuarine and sub tidal marine habitats along the coast. Uncommon on large deep lakes in valleys and foothills throughout the state. [5,9]	Unlikely	N/A

Table E- 1. Special-status Wildlife Species

Species	Federal	State	Habitat Association	Potential for Occurrence	Affected by Project
Double-crested cormorant (rookery site) *Phalacrocorax auritus*	--	CSC	A yearlong resident along the entire coast of California and on islands lakes, in fresh, salt, and estuarine waters. [5, 9]	Unlikely	N/A
American bittern *Botaurus lentiginosus*	FSC	--	An inhabitant of fresh or saline emergent wetlands. [5, 9]	Low Potential	Potential habitat loss/ disturbance
Snowy egret *Egretta thula*	MNBMC	--	Inhabits fresh and saline emergent wetlands, coastal estuaries, ponds, slow-moving rivers, irrigation ditches, and wet fields. [5, 9]	Medium Potential	Potential habitat loss/ disturbance
Great egret (rookery sites) *Ardea alba*	MNBMC	--	Colonial nester in large trees. Rookery sites located near marshes, tide-flats, irrigated pastures, and margins of rivers and lakes. [5, 9]	Medium Potential	Potential habitat loss/ disturbance
Great blue heron (rookery sites) *Ardea herodias*	MNBMC	--	Colonial nester in tall trees, cliff sides, and sequestered spots on marshes. Rookery sites in close proximity to foraging areas, marshes, lake margins, tide-flats, rivers and streams, and wet meadows. [5, 9]	Medium Potential	Potential habitat loss/ disturbance
White-faced ibis *Plegadis chihi*	FSC/ MNBMC	CSC	Breeds in dense, fresh emergent wetlands; however, this species has declined in California and no longer breeds regularly. Fairly widespread during migration, foraging in fresh emergent wetlands, wet meadows, and irrigated or flooded pastures and croplands. [5, 9]	Unlikely	N/A
Aleutian Canada goose *Branta canadensis leucoparia*	De-listed 2001	--	The Central Valley appears to be the main wintering ground of this subspecies. Typically forages in fields near their roosting areas (lakes and ponds). [3, 5, 9]	Unlikely	N/A

Table E- 1. Special-status Wildlife Species

Species	Federal	State	Habitat Association	Potential for Occurrence	Affected by Project
White-tailed kite *Elanus leucurus*	FSC	CFP	Low rolling foothills/valley margins with scattered oaks and river bottomlands or marshes adjacent to deciduous woodland. Open grasslands, meadows, or marshes are utilized for foraging. Isolated, dense-topped trees in close proximity to foraging areas are used for nesting and perching. [5, 9]	Potential Occupant	Potential habitat loss/ disturbance
Bald eagle *Haliaeetus leucocephalus*	FT	SE/CFP	Breeds and roosts in remote coniferous forests in close proximity to a river, stream lake, reservoir, marsh, or other large wetland areas. [3, 5, 9]	Unlikely	N/A
Swainson's hawk (nesting) *Buteo swainsoni*	--	ST	Breeds in stands sparse juniper-sage flats, riparian areas and in oak savannahs. Requires adjacent suitable foraging habit such as grasslands, alfalfa, or grain fields supporting rodent populations. [3, 5, 9]	Potential Occupant	Potential habitat loss/ disturbance
Ferruginous hawk *Buteo regalis*	FSC	CSC	A winter migrant that commonly inhabits grasslands, prairies, and brushy open country. [5, 9]	Unlikely	N/A
American peregrine falcon *Falco peregrinus anatum*	FD	SE	Inhabits open country, breeding near rivers, wetlands, lakes, or other aquatic features, nests on cliffs, banks, dunes, mounds, and human-made structures. [5, 9]	Unlikely	N/A
California black rail *Laterallus jamaicensis coturiculus*	FSC	ST	Mainly inhabits salt marshes bordering larger bays. Occurs in tidal salt marsh with dense pickelweed; Also in freshwater and brackish marshes. [5, 9]	Unlikely	N/A

Table E- 1. Special-status Wildlife Species

Species	Federal	State	Habitat Association	Potential for Occurrence	Affected by Project
Greater sandhill crane *Grus canadensis tabida*	--	ST	In summer this species is found in wet meadow, shallow lacustrine, and fresh emergent wetland habitats. It winters primarily in Sacramento and San Joaquin valleys from Tehama Co. south to Kings Co. where it inhabits annual and perennial grasslands, moist croplands with rice or corn stubble, and open emergent wetlands. [3, 5, 9]	Unlikely	N/A
Mountain plover *Charadrius montanus*	FPT	CSC	Short grass plains, low rolling grass hills, freshly plowed agricultural fields, and newly sprouting grain fields. Often associated with short vegetation and bare ground. [5, 9]	Low Potential	Potential habitat loss/ disturbance
Long-billed curlew *Numenius americanus*	FSC	CSC	Uncommon to locally very common as a winter visitant from early July to early April along most of the California coast, and in the Central and Imperial valleys. Preferred winter habitats include large coastal estuaries, upland herbaceous areas, and croplands. [5, 9]	Unlikely	N/A
Black tern *Chlidonias niger*	FSC	CSC	Commonly inhabits bays, salt ponds, river mouths, and pelagic waters during spring and fall migrations. Restricted to freshwater environments while breeding. [5, 9]	Unlikely	N/A
Western yellow-billed cuckoo *Coccyzus americanus occidentalis*	FC	SE	An inhabitant of riparian forests, in broad, lower flood-bottoms of larger river systems. Possibly extirpated from the area. [3, 5, 9]	Unlikely	N/A
Short-eared owl *Asio flammeus*	FSC	CSC	Open areas, such as annual and perennial grasslands, prairies, meadows, irrigated lands, and fresh emergent wetlands. [5, 9]	Low Potential	Potential habitat loss/ disturbance

Table E- 1. Special-status Wildlife Species

Species	Federal	State	Habitat Association	Potential for Occurrence	Affected by Project
Western burrowing owl *Athene cunicularia hypugaea*	FSC	CSC	Burrow sites occur in open, dry annual or perennial grasslands, deserts, and scrublands characterized by low-growing vegetation. A subterranean nester, dependent upon burrowing mammals, most notably, the California ground squirrel. [5, 9]	Potential Occupant	Potential habitat loss/ disturbance
Vaux's swift *Chaetura vauxi*	FSC	CSC	Prefers redwood and Douglas-fir communities; nests are typically placed in large hollow trees and snags. Forages high in the air over most communities; however, shows an apparent preference for foraging above rivers and lakes. [5, 9]	Unlikely	N/A
Rufous hummingbird *Selasphorus rufus*	FSC	--	Found in a wide variety of habitats with nectar producing flowers. Uses valley foothill hardwood, valley foothill hardwood-coniferous, riparian, and various chaparral habitats. [5, 9]	Unlikely	N/A
Lewis' woodpecker *Melanerpes lewis*	FSC	--	An uncommon, local winter resident, inhabiting oak savannas, and open deciduous and conifer environments. Breeds locally along the eastern slopes of the Coast Ranges. [5, 9]	Unlikely	N/A
Little willow flycatcher *Empidonax traillii brewsteri*	--	SE	A spring and fall migrant at lower elevations, primarily in riparian habitats from central/coastal California north. Previously bred throughout much of the lowland and montane portions of its range. Breeding is now primarily limited to the Sierra Nevada and Cascade Ranges. [3, 5, 9]	Unlikely	N/A
Loggerhead shrike *Lanius ludovicianus*	FSC	CSC	Inhabits open areas with sparse shrubs, trees, and other perches. [5, 9]	Potential Occupant	Potential habitat loss/ disturbance

Table E- 1. Special-status Wildlife Species

Species	Federal	State	Habitat Association	Potential for Occurrence	Affected by Project
Bank swallow *Riparia riparia*	--	ST	A colonial nesting species, nests primarily in riparian and other lowland habitats. Vertical banks/cliffs composed of fine textured/sandy soils near streams, rivers, lakes, or the ocean are required to excavate nesting hole. [3, 5, 9]	Unlikely	N/A
California thrasher *Toxostoma redivivum*	FSC	--	A common resident of foothills and lowlands in cismontane California. Occupies moderate to dense chaparral habitats and, to a lesser extent, thickets in young or open valley foothill riparian habitat. [5, 9]	Unlikely	N/A
Grasshopper sparrow *Ammodramus savannarum*	FSC	--	A summer resident, occurring in dry, dense grasslands, containing a variety of grass, tall forbs, and scattered shrubs. [6, 9]	Low Potential	Potential habitat loss/ disturbance
Brewer's sparrow *Spizella breweri*	FSC	--	Breeds in extensive shrub stands with moderate canopy coverage most commonly associated with sagebrush. [6, 9]	Unlikely	N/A
Tricolored blackbird *Agelaius tricolor*	--	CSC	Inhabits dense cattail marshes, marshy meadows and rangeland. A highly colonial species, it is most numerous in the Central Valley and vicinity of California. [3, 5, 9]	Unlikely	N/A
Lawrence's goldfinch *Carduelis lawrencei*	FSC	--	Inhabits valley foothill hardwood, valley foothill hardwood-conifer, and chaparral communities. Breeds in open oak or other arid woodland and chaparral communities, in close proximity to water. [5, 9]	Unlikely	N/A
Mammals					

Table E- 1. Special-status Wildlife Species

Species	Federal	State	Habitat Association	Potential for Occurrence	Affected by Project
Pale Townsend's big-eared bat *Corynorhinus townsendii pallescens*	FSC	CSC/BLM Sensitive	Inhabits a wide variety of environments, but most common in mesic sites. Roosting, maternity, and hibernacula sites free from human disturbance are required.[1, 2, 8, 10]	Unlikely	N/A
Pacific western big-eared bat *Corynorhinus townsendii townsendii*	FSC	CSC/BLM Sensitive	Occupies the humid, coastal regions of northern and central California, in a wide variety of habitats. Roosts in caves, buildings, and mine tunnels. This species is highly sensitive to human disturbance at roosting, maternity, and hibernacula sites. [1, 2,8, 10]	Unlikely	N/A
Small-footed myotis bat *Myotis ciliolabrum*	FSC	BLM sensitive	Inhabits relatively arid wooded and brushy uplands in close proximity to water, from sea level to about 8,900 feet. Maternity colonies may occur in buildings, caves, and mines. [1, 2, 8, 10]	Unlikely	N/A
Long-eared myotis bat *Myotis evotis*	FSC	BLM sensitive	May be found in a variety of brush, woodland, and forest communities, from sea level to about 9,000 feet; shows a preference toward coniferous woodlands and forests. Nursery colonies located in buildings, crevices, spaces under bark, snags; night roosting in caves. [1, 2, 8, 10]	Unlikely	N/A
Fringed myotis bat *Myotis thysanodes*	FSC	BLM sensitive	May be found in a variety of environments; valley and foothill hardwood, hardwood-conifer and pinyon-juniper woodland provide optimal habitat. Maternity colonies and roosts located in caves, mines, buildings, and crevices. [1, 2, 8, 10]	Unlikely	N/A

Table E- 1. Special-status Wildlife Species

Species	Federal	State	Habitat Association	Potential for Occurrence	Affected by Project
Long-legged myotis bat *Myotis volans*	FSC	BLM sensitive	This species is most commonly associated with woodland and forest communities above 4,000 feet. However, may also forage in chaparral, coastal scrub, Great Basin shrub habitats, and in early successional stages of woodlands and forests. Occurrence records ranges from sea level to 11,400 feet. Roosts in rock crevices, buildings, under tree bark, in snags, mines, and caves. [1, 2, 8, 10]	Unlikely	N/A
Yuma myotis bat *Myotis yumanensis*	FSC	CSC/BLM sensitive	Optimal environments include open forests and woodlands in proximity to bodies of water used for foraging; maternity colonies in caves, mines, crevices, and buildings. [1, 2, 8, 10]	Unlikely	N/A
Greater western mastiff-bat *Eumops perotis californicus*	FSC	CSC	This species utilizes a wide range of open habitats including coastal scrub, annual grasslands, and conifer woodlands. Roosts in or on buildings, crevices in cliffs, trees, and in tunnels[1, 2, 8, 10]	Unlikely	N/A
San Joaquin pocket mouse *Perognathus inornatus inornatus*	FSC	--	Inhabits grasslands and blue oak savannas. Requires friable soils. [1, 2, 8, 10]	Unlikely	N/A
Riparian (San Joaquin Valley) woodrat *Neotoma fuscipes riparia*	FE	CSC	Known from an area along the San Joaquin, Stanislaus, and Tuolumne rivers in Stanislaus and San Joaquin counties. An inhabitant of riparian communities containing a mixture of trees, brush, and suitable nesting sites (Williams 1986). Possibly extirpated from the area. [1, 2, 10]	Unlikely	N/A
San Francisco dusky-footed woodrat *Neotoma fuscipes annectens*	FSC	CSC	Oak and riparian woodlands with moderate canopy and dense understory; chaparral. [1, 2, 8, 10]	Unlikely	N/A

Table E- 1. Special-status Wildlife Species

Species	Federal	State	Habitat Association	Potential for Occurrence	Affected by Project
Riparian brush rabbit *Sylvilagus bachmani riparius*	FE	SE	Habitat is valley floor riparian and floodplain - only in San Joaquin and Stanislaus counties. [1, 3, 10]	Unlikely	N/A

Federal status:

FE Listed as endangered under the Federal Endangered Species Act
FT Listed as threatened under the Federal Endangered Species Act
FC Candidate species for listing under the Federal Endangered Species Act
FPT Proposed as a threatened species under the Federal Endangered Species Act
FSC Species of concern as identified by the U.S. Fish and Wildlife Service
FD Delisted in accordance with the Federal Endangered Species Act
MNBMC Migratory Nongame Birds of Management Concern

State Status:

SE Listed as endangered under the California Endangered Species Act
ST Listed as threatened under the California Endangered Species Act
CSC Species of concern as identified by the California Department of Fish and Game
CFP Listed as fully protected by the California Fish and Game Code
Rare Species identified as rare by the California Department of Fish and Game

Reference Citations:

[1] Ingles 1965
[2] Jameson and Peeters 1988
[3] CDFG 2002
[4] McGinnis 1984
[5] Peterson 1990
[6] Rising 1996
[7] Stebbins 1985
[8] Williams 1986
[9] Zeiner et al. 1990a
[10] Zeiner et al. 1990b

DEPARTMENT OF THE ARMY
U.S. ARMY ENGINEER DISTRICT, SACRAMENTO
CORPS OF ENGINEERS
1325 J STREET
SACRAMENTO, CALIFORNIA 95814-2922

RECEIVED
MAY 23 2006
ESD

REPLY TO
ATTENTION OF

May 17, 2006

Regulatory Branch (200500580)

David Melko
Sacramento Regional Transit District
1400 29th Street
Sacramento, California 95816

Dear Mr. Melko:

We are responding to your consultant's request for an approved jurisdictional determination for the South Sacramento Corridor Phase 2 site. This approximately 32-acre site begins at Meadowview Road by the Union Pacific Railroad (UPRR) grade crossing and extends southward along the existing UPRR right-of-way to Union House Creek, where it turns eastward on to the Sacramento Regional County Sanitation District Bufferlands, and then parallels Union House Creek to Bruceville Road at Cosumnes River College. The site is further located within portions of Sections 7, 8, 14, 15, 16, 17, 22, and 23, Township 7 North, Range 5 East, MDB&M, Sacramento County, California.

Based on available information and a site inspection by Anna Sutton of our office on March 20, 2006, we concur with the estimate of waters of the United States, as depicted on the **April 25, 2006, South Sacramento Phase 2 Corridor Wetland Delineation Map, Figures 5-A through 5-X** drawing prepared by **Parsons**. Approximately **9.21** acres of waters of the United States, including wetlands, are present within the survey area. These waters are regulated under Section 404 of the Clean Water Act, in accordance with 33 CFR Part 328.3 (a) (5) and (7) since the wetlands within the project area are adjacent to Union House Creek and Morrison Creek. The area also includes portions of Union House Creek and Morrison Creek. Morrison Creek is tributary to the American River which flows into the Sacramento River, a navigable waterway.

This verification is valid for five years from the date of this letter, unless new information warrants revision of the determination before the expiration date. This letter contains an approved jurisdictional determination for your site. If you object to this determination, you may request an administrative appeal under Corps regulations at 33 CFR Part 331. Enclosed you will find a Notification of Appeal Process (NAP) fact sheet and Request for Appeal (RFA) form. If you request to appeal this you must submit a completed RFA form to the South Pacific Division Office at the following address:

Doug Pomeroy, Administrative Appeal Review Officer
Army Corps of Engineers, South Pacific Division
CESPD-PDS-O
333 Market Street, Room 923
San Francisco, California 94105-2195
Telephone: 415-977-8035 FAX: 415-977-8129

In order for an RFA to be accepted by the Corps, the Corps must determine that it is complete, that it meets the criteria for appeal under 33 CFR Part 331.5, and that it has been received by the Division Office within 60 days of the NAP. Should you decide to submit an RFA form, it must be received at the above address by July 16, 2006. It is not necessary to submit an RFA form to the Division Office if you do not object to the determination in this letter.

You should provide a copy of this letter and notice to all other affected parties, including any individual who has an identifiable and substantial legal interest in the property.

This determination has been conducted to identify the limits of Corps of Engineers' Clean Water Act jurisdiction for the particular site identified in this request. This determination may not be valid for the wetland conservation provisions of the Food Security Act of 1985. If you or your tenant are USDA program participants, or anticipate participation in USDA programs, you should request a certified wetland determination from the local office of the Natural Resources Conservation Service, prior to starting work.

Please refer to identification number 200500580 in any correspondence concerning this project. If you have any questions, please contact Anna Sutton at our Sacramento Office, 1325 J Street, Room 1480, Sacramento, California 95814-2922, email *Anna.M.Sutton@usace.army.mil*, or telephone 916-557-7759. You may also use our website: *www.spk.usace.army.mil/regulatory.html*.

Sincerely,

Will Ness
Chief, Sacramento Office

Enclosure

Copy furnished with enclosures:

Jerome Wiggins, Federal Transit Administration, 201 Mission Street, San Francisco, California 94105

Adam Ballard, ECORP Consulting, Inc., 2260 Douglas Blvd., Suite 160, Roseville, California 95661

William Marshall, Storm Water and Water Quality Certification Unit, Central Valley Regional Water Quality Control Board, 11020 Sun Center Drive #200, Rancho Cordova, California 95670-6114

U.S. Fish and Wildlife Service, Wetlands Branch, 2800 Cottage Way, Suite W2605, Sacramento, California 95825-3901

Richard Radmacher, Assistant Planner, Planning and Community Development Department, County of Sacramento, 827 7th Street, Room 230, Sacramento, California 95814-2406

NOTIFICATION OF ADMINISTRATIVE APPEAL OPTIONS AND PROCESS AND REQUEST FOR APPEAL

Applicant: Sacramento Reg Transit, David Melko	File Number: 200500580	Date: 05/17/2006
Attached is:		See Section below
	INITIAL PROFFERED PERMIT (Standard Permit or Letter of permission)	A
	PROFFERED PERMIT (Standard Permit or Letter of permission)	B
	PERMIT DENIAL	C
X	APPROVED JURISDICTIONAL DETERMINATION	D
	PRELIMINARY JURISDICTIONAL DETERMINATION	E

SECTION I - The following identifies your rights and options regarding an administrative appeal of the above decision. Additional information may be found at http://usace.army.mil/inet/functions/cw/cecwo/reg or Corps regulations at 33 CFR Part 331.

A: INITIAL PROFFERED PERMIT: You may accept or object to the permit.

- ACCEPT: If you received a Standard Permit, you may sign the permit document and return it to the DISTRICT engineer for final authorization. If you received a Letter of Permission (LOP), you may accept the LOP and your work is authorized. Your signature on the Standard Permit or acceptance of the LOP means that you accept the permit in its entirety, and waive all rights to appeal the permit, including its terms and conditions, and approved jurisdictional determinations associated with the permit.

- OBJECT: If you object to the permit (Standard or LOP) because of certain terms and conditions therein, you may request that the permit be modified accordingly. You must complete Section II of this form and return the form to the DISTRICT engineer. Your objections must be received by the DISTRICT engineer within 60 days of the date of this notice, or you will forfeit your right to appeal the permit in the future. Upon receipt of your letter, the DISTRICT engineer will evaluate your objections and may: (a) modify the permit to address all of your concerns, (b) modify the permit to address some of your objections, or (c) not modify the permit having determined that the permit should be issued as previously written. After evaluating your objections, the DISTRICT engineer will send you a proffered permit for your reconsideration, as indicated in Section B below.

B: PROFFERED PERMIT: You may accept or appeal the permit

- ACCEPT: If you received a Standard Permit, you may sign the permit document and return it to the DISTRICT engineer for final authorization. If you received a Letter of Permission (LOP), you may accept the LOP and your work is authorized. Your signature on the Standard Permit or acceptance of the LOP means that you accept the permit in its entirety, and waive all rights to appeal the permit, including its terms and conditions, and approved jurisdictional determinations associated with the permit.

- APPEAL: If you choose to decline the proffered permit (Standard or LOP) because of certain terms and conditions therein, you may appeal the declined permit under the Corps of Engineers Administrative Appeal Process by completing Section II of this form and sending the form to the DIVISION (not district) engineer (address on reverse). This form must be received by the DIVISION engineer within 60 days of the date of this notice.

C: PERMIT DENIAL: You may appeal the denial of a permit under the Corps of Engineers Administrative Appeal Process by completing Section II of this form and sending the form to the DIVISION (not district) engineer (address on reverse). This form must be received by the DIVISION (not district) engineer within 60 days of the date of this notice.

D: APPROVED JURISDICTIONAL DETERMINATION: You may accept or appeal the approved JD or provide new information.

- ACCEPT: You do not need to notify the Corps to accept an approved JD. Failure to notify the Corps within 60 days of the date of this notice, means that you accept the approved JD in its entirety, and waive all rights to appeal the approved JD.

- APPEAL: If you disagree with the approved JD, you may appeal the approved JD under the Corps of Engineers Administrative Appeal Process by completing Section II of this form and sending the form to the DIVISION (not district) engineer (address on reverse). This form must be received by the DIVISION engineer within 60 days of the date of this notice. Exception: JD appeals based on new information must be submitted to the DISTRICT engineer within 60 days of the date of this notice.

E: PRELIMINARY JURISDICTIONAL DETERMINATION: You do not need to respond to the Corps regarding the preliminary JD. The Preliminary JD is not appealable. If you wish, you may request an approved JD (which may be appealed), by contacting the Corps district for further instruction. Also you may provide new information for further consideration by the Corps to reevaluate the JD.

SECTION II - REQUEST FOR APPEAL or OBJECTIONS TO AN INITIAL PROFFERED PERMIT

REASONS FOR APPEAL OR OBJECTIONS: (Describe your reasons for appealing the decision or your objections to an initial proffered permit in clear concise statements. You may attach additional information to this form to clarify where your reasons or objections are addressed in the administrative record.)

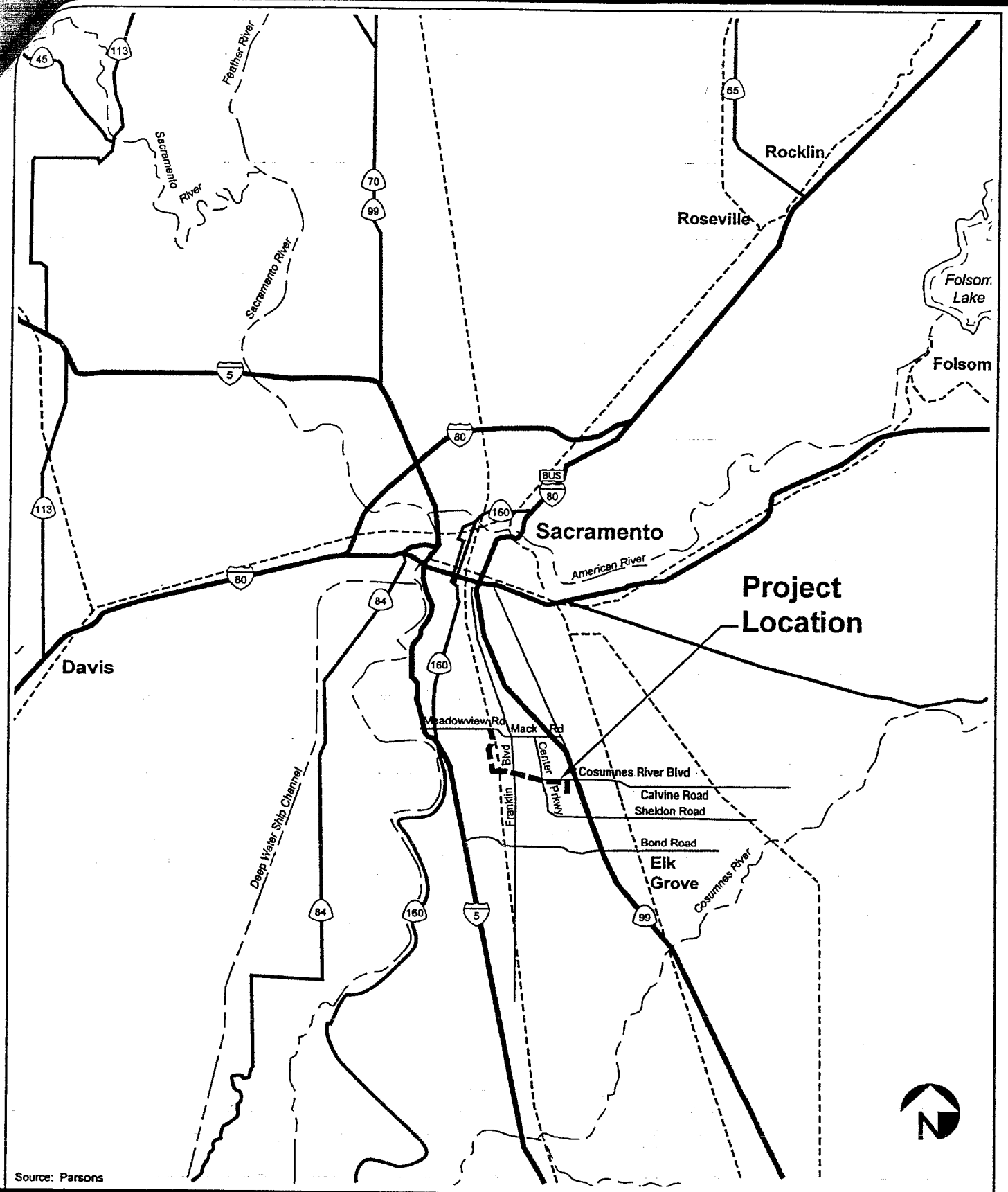
ADDITIONAL INFORMATION: The appeal is limited to a review of the administrative record, the Corps memorandum for the record of the appeal conference or meeting, and any supplemental information that the review officer has determined is needed to clarify the administrative record. Neither the appellant nor the Corps may add new information or analyses to the record. However, you may provide additional information to clarify the location of information that is already in the administrative record.

POINT OF CONTACT FOR QUESTIONS OR INFORMATION:

If you have questions regarding this decision and/or the appeal process you may contact: DISTRICT ENGINEER Sacramento District, Corps of Engineers Attn: Anna Sutton, Project Manager, Regulatory Branch 1325 J Street, Room 1480 Sacramento, CA 95814-2922 (916-557-7759) (Use this address for submittals to the DISTRICT ENGINEER)	If you only have questions regarding the appeal process you may also contact: DIVISION ENGINEER Army Engineer Division, South Pacific, CESPD-CM-O Attn: Doug Pomeroy, Administrative Appeal Review Officer, Army Corps of Engineers – CESPD-PDS-O, 333 Market Street, Room 923, San Francisco, CA 94105-2195, Telephone 415-977-8035, FAX 415-977-8129) (Use this address for submittals to the DIVISION ENGINEER)

RIGHT OF ENTRY: Your signature below grants the right of entry to Corps of Engineers personnel, and any government consultants, to conduct investigations of the project site during the course of the appeal process. You will be provided a 15 day notice of any site investigation, and will have the opportunity to participate in all site investigations.

_____ Signature of appellant or agent.	Date:	Telephone number:



Source: Parsons

South Sacramento Corridor Phase 2

PROJECT VICINITY

PARSONS

Figure 1

STATE OF CALIFORNIA – THE RESOURCES AGENCY GRAY DAVIS, Governor

OFFICE OF HISTORIC PRESERVATION
DEPARTMENT OF PARKS AND RECREATION
P.O. BOX 942896
SACRAMENTO, CA 94296-0001
(916) 653-6624 Fax: (916) 653-9824
calshpo@ohp.parks.ca.gov

RECEIVED
OCT 31 2003

25 September, 2003

Reply To: FTA030811A

Leslie T. Rogers
Regional Administrator, Region IX
U.S. Department of Transportation
Federal Transit Administration
201 Mission Street, Suite 2210
San Francisco, CA 94105-1839

Re: Request for Concurrence in the Historic Properties Survey Report for the South Sacramento Corridor Phase 2 Light Rail Transit Project

Dear Mr. Rogers:

Thank you for your August 5, 2003 letter requesting concurrence in the Historic Properties Survey Report for the above-mentioned project. You have provided me with the results of your efforts to determine whether the extension of an existing light rail corridor may affect historic properties. You have done this, and are consulting with me, in order to comply with Section 106 of the National Historic Preservation Act and implementing regulations codified at 36 CFR Part 800.

In anticipation of future growth within the Sacramento area, The Federal Transit Administration (FTA), in cooperation with Sacramento Regional Transit, proposes to extend the current South Corridor Light Rail line 5.1 miles from the newly constructed Meadowview Station south to Calvine Road in Sacramento County. There are three alternatives for the proposed project: one is a no-build alternative and a second would implement less expensive transit improvements on existing facilities other than light rail. The one build alternative has the potential to affect historic properties and consists of the construction of a dual light rail track.

The proposed light rail alignment begins at the newly constructed South Corridor Phase I Meadowview Station and continues south on the western side of the Union Pacific Railroad (UPRR) right-of-way, crosses Morrison Creek on a bridge and then turns east. After crossing the UPRR and Union House Creek on an aerial structure, the line continues east toward Franklin Blvd. After crossing Franklin Boulevard to Center Parkway, it will cross Center Parkway at grade either in the median (Cosumnes River Boulevard Median Option) or along the north edge of Cosumnes River Boulevard (Cosumnes River Boulevard Stay North Option). It will then turn south into Bruceville Road, turn east and fly over State Route 99, continue along Old Calvine Road, and finally terminate near the intersection of Auberry Drive and Calvine Road. The extension proposes four new stations; one that is optional and the three that include park-and-ride lots of varying sizes.

The FTA has defined the archaeological area of potential effects (APE) as the extent of proposed construction for all options of the build alternative. The architectural APE includes the Area of Direct Impact (ADI) and one parcel on all sides immediately adjacent to the ADI for the build alternative.

The Historic Resources Evaluation Report (HRER) identified 226 properties located within the APE. Of the 226 properties identified, 221 properties were constructed within the past 50 years and did not appear to have exceptional significance. These properties were not recorded or evaluated for this project. The following five properties were constructed prior to 1957 and were evaluated for eligibility to the National Register (NR). The FTA has determined that none of these buildings are eligible for inclusion in the NR:

- Western Pacific Railroad (UPRR) and trestles, constructed 1908-1910/1990s
- Morrison and Union House (Beacon) Channelized Creeks & Levees, constructed 1937-1953/ circa 1961
- 7721 Cotton Lane, built circa 1950
- 7809 Cotton Lane, built 1950
- 7825 Cotton Lane, built circa 1950

The Cultural Resources Inventory identified two archaeological resources within the APE. The first is a segment of an old road that is now under modern roadway. Old Calvine Road (CA-SAC-544H), and the second is the remnant of a home site occupied until ca. 1970 (CA-SAC-616H). The FTA states that neither meets the criteria for significance under Section 106 of the National Historic Preservation Act. The consultant states that the project will have no effect on known, potentially significant archaeological resources. However, they state that there is a potential that buried archaeological deposits may exist in certain portions of the APE and they recommend archaeological monitoring for the following areas.

- areas where pavement and structures cover a depositional context where buried archaeological deposits may occur (Cosumnes River Blvd., between Center Parkway and Bruceville Road: Old Calvine Road from Highway 99 to Auberry Drive);
- locations near natural stream crossings and stream-side terraces (Morrison, Union House, and Strawberry creeks): and
- three areas in the Bufferlands where magnetic anomalies were recorded using remote-sensing.

The FTA is requesting my review of the documents and my concurrence in their findings that the identified properties are not eligible for listing in the NR and that FTA's responsibilities pursuant to 36CFR800.4(d) implementing Section 106 of the NHPA have been met.

I have reviewed the documentation furnished and considered your request. Based on that review, I have the following comments:

1. The area of potential effects for this undertaking was adequately defined.
2. The steps taken to identify architectural properties that may be affected by the undertaking are satisfactory.
3. I concur in your determination that the 5 properties listed above and the 221 properties constructed within the past 50 years <u>are not eligible</u> for the NR.
4. I concur in your determination that the segment of old road now under modern roadway (Old Calvine Road; CA-SAC-544H) and the remnant of a home site (CA-SAC-616H) <u>are not eligible</u> for the NR.

I do not have sufficient information at this time regarding the likelihood that subsurface archaeological deposits could be encountered during subsurface excavation. The vertical extent of ground disturbance as a result of the implementation of the project is unclear. Please identify areas within the APE where extensive ground disturbance will occur and the likely nature and location of subsurface historic properties. Using data about the historical geomorphology and stratigraphy of the APE, I would request FTA to prepare and submit for my further review a predictive assessment that addresses the likelihood of discovering subsurface archaeological deposits within areas of the APE subject to excavation.

I will reserve my comments on the effects to historic properties until I have adequate information that addresses the magnitude and nature of the undertaking and a commensurate level of identification. I look forward to receiving the information requested and to concluding this consultation as promptly as possible. Your consideration of historic properties during project planning is appreciated and I look forward to the forthcoming information. If you have any questions in the meantime, please contact Andrea Galvin of my staff at (916) 653-4533 or at agalv@ohp.parks.ca.gov.

Sincerely,

for

Dr. Knox Mellon
State Historic Preservation Officer

NOV - 3

OPTIONAL FORM 99 (7-80)

FAX TRANSMITTAL

# of pages ▶ 3

To Mel Ko

From Wiggins

Dept./Agency PI

Phone # 415-744-2829

Fax # 415-744-2726

Fax # 916) 444-2156

NSN 7540-01-317-7368 5099-101 GENERAL SERVICES ADMINISTRATION

STATE OF CALIFORNIA – THE RESOURCES AGENCY

ARNOLD SCHWARZENEGGER, Governor

OFFICE OF HISTORIC PRESERVATION
DEPARTMENT OF PARKS AND RECREATION
P.O. BOX 942896
SACRAMENTO, CA 94296-0001
(916) 653-6624 Fax: (916) 653-9824
calshpo@ohp.parks.ca.gov

JUN 26 REC'D

June 21, 2006

In Reply Refer To: FTA030811A

Leslie T. Rogers
Regional Administrator
United States Department of Transportation
Federal Transit Administration, Region IX
201 Mission Street, Suite 2210
San Francisco, California 94105-1839

Re: Sacramento Regional Transit District South Sacramento Corridor Phase 2 Light Rail Transit Project, Sacramento County, California.

Dear Mr. Rogers:

Thank you for continuing consultation with our office regarding the above noted undertaking. Pursuant to 36 CFR Part 800 (as amended 8-05-04) regulations implementing Section 106 of the National Historic Preservation Act, the Federal Transit Administration (FTA), Region IX, is seeking my comments on its determination of effects that the proposed undertaking will have on historic properties. In my previous letter (September 25, 2003) regarding this consultation, I concurred with your determination of an Area of Potential Effects (APE), your efforts to identify architectural properties in the APE, and your determinations of National Register of Historic Places (NRHP) Eligibility for historic properties identified in the APE.

In your letter of July 5, 2005, you have responded to my request for additional information regarding the archeological sensitivity and corresponding likelihood of subsurface cultural deposits in the project APE. You are also requesting concurrence on the NRHP eligibility for one additional architectural historic property and you are requesting concurrence with a proposed finding of effect. Additionally, the following documentation has been submitted in support of this undertaking:

- *Cultural Resources Inventory of the South Sacramento Corridor Phase 2 Project* (S.A. Waechter, Far Western Anthropological Research Group, Inc.: May 2005).

- *Inventory and Evaluation of Historic Resources: South Sacramento Corridor Phase 2 Project Sacramento County, California* (JRP Historical Consulting Services: March 2005).

Although it would be preferable that some proactive subsurface investigation could have been included in your efforts to identify historic properties, I accept your additional information and evaluation of the archeological sensitivity of the APE for subsurface archeological deposits as satisfying that portion of my request. I acknowledge that pre-

project exploratory types of subsurface investigation (i.e., trenching or other excavation) in much of the APE would be disruptive to traffic in areas of existing roadways and potentially dangerous in areas bordering functioning levees. After reviewing your letter of July 5, 2005, the earlier correspondence in this undertaking, and the additional supporting documentation that you have submitted, I have the following comments:

1) I concur that the residential architectural property located at 3310 Meadowview Road (APN 053-0051-001) is *not* eligible for the National Register of Historic Places.

2) I further concur that FTA's proposed finding of No Historic Properties Affected is appropriate pursuant to 36 CFR Part 800.4(d)(1). Concurrence on this finding is predicated on the FTA conducting monitoring, by an archeologist who meets the Secretary of the Interior's standards for archeology, and a member of the local Native American community (if they so choose), of those areas that have been identified as potentially sensitive for buried archeological deposits in both your letter of July 5, 2005 and in the supporting documentation noted above (Waechter: 2005:18).

3) Be advised that under certain circumstances, such as unanticipated discovery or a change in project description, the FTA may have additional future responsibilities for this undertaking under 36 CFR Part 800.

Thank you for seeking my comments and for considering historic properties in planning your project. If you require further information, please contact William Soule, Associate State Archeologist, at phone 916-654-4614 or email wsoule@parks.ca.gov.

Sincerely,

Susan K Stratton for

Milford Wayne Donaldson, FAIA
State Historic Preservation Officer

STATE OF CALIFORNIA – THE RESOURCES AGENCY

ARNOLD SCHWARZENEGGER, Governor

OFFICE OF HISTORIC PRESERVATION
DEPARTMENT OF PARKS AND RECREATION
P.O. BOX 942896
SACRAMENTO, CA 94296-0001
(916) 653-6624 Fax: (916) 653-9824
calshpo@ohp.parks.ca.gov

JUN 26 REC'D

June 21, 2006

In Reply Refer To: FTA030811A

Leslie T. Rogers
Regional Administrator
United States Department of Transportation
Federal Transit Administration, Region IX
201 Mission Street, Suite 2210
San Francisco, California 94105-1839

Re: Sacramento Regional Transit District South Sacramento Corridor Phase 2 Light Rail Transit Project, Sacramento County, California.

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- *Cultural Resources Inventory of the South Sacramento Corridor Phase 2 Project* (S.A. Waechter, Far Western Anthropological Research Group, Inc.: May 2005).

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project exploratory types of subsurface investigation (i.e., trenching or other excavation) in much of the APE would be disruptive to traffic in areas of existing roadways and potentially dangerous in areas bordering functioning levees. After reviewing your letter of July 5, 2005, the earlier correspondence in this undertaking, and the additional supporting documentation that you have submitted, I have the following comments:

1) I concur that the residential architectural property located at 3310 Meadowview Road (APN 053-0051-001) is *not* eligible for the National Register of Historic Places.

2) I further concur that FTA's proposed finding of No Historic Properties Affected is appropriate pursuant to 36 CFR Part 800.4(d)(1). Concurrence on this finding is predicated on the FTA conducting monitoring, by an archeologist who meets the Secretary of the Interior's standards for archeology, and a member of the local Native American community (if they so choose), of those areas that have been identified as potentially sensitive for buried archeological deposits in both your letter of July 5, 2005 and in the supporting documentation noted above (Waechter: 2005:18).

3) Be advised that under certain circumstances, such as unanticipated discovery or a change in project description, the FTA may have additional future responsibilities for this undertaking under 36 CFR Part 800.

Thank you for seeking my comments and for considering historic properties in planning your project. If you require further information, please contact William Soule, Associate State Archeologist, at phone 916-654-4614 or email wsoule@parks.ca.gov.

Sincerely,

Susan K Stratton for

Milford Wayne Donaldson, FAIA
State Historic Preservation Officer

STATE OF CALIFORNIA

ARNOLD SCHWARZENEGGER, *Governor*

PUBLIC UTILITIES COMMISSION
515 L STREET, SUITE 1119
SACRAMENTO, CA 95814

April 2, 2008

Diane Nakano, PE
Assistant General Manager for Engineering & Construction
Sacramento Regional Transit District
P.O. Box 2110
Sacramento, CA 95812-2110

RE: Reply Comments to March 20, 2008 Letter on Sacramento Regional Transit District (SRTD) South Line Phase 2 in the City of Sacramento (City)

Dear Ms. Nakano:

Thank you for the further detail provided in your March 20, 2008 letter regarding SRTD's South Line Phase 2 project, in response to Commission Staff's comments to your Grade Crossing Safety Analysis Report. We agree that given the current progress of the crossing designs that further discussion on the specific design elements may be deferred until SRTD has advanced its designs sufficiently to define all elements. Please consider the comments Staff already provided on the preliminary designs, as you proceed.

General Order 164-D Section 10 requires in the "initial phase" of review that we reach agreement on which crossings will remain at grade. In its evaluation, Staff had recommended that Cosumnes River Boulevard be grade separated and that SRTD seek elimination of the Cosumnes River College Access Road crossing. Additionally, we recommended that SRTD fully explore whether a pedestrian grade separation at Center Parkway, over the SRTD tracks and Cosumnes River Boulevard, is feasible and necessary. Staff noted also that the remaining at-grade crossings of Meadowview Road, Franklin Road. Center Parkway, and the Cosumnes River College East Main Entrance Road were reasonable to remain at-grade, although specific comments were provided regarding the preliminary designs.

We appreciate that SRTD has committed to a grade separation of the highly skewed crossing at Cosumnes River Boulevard. Staff had significant safety concerns with that crossing remaining at-grade. Additionally, SRTD's commitment to either include the Cosumnes River College Access Road crossing in an extension of the grade separation of Cosumnes River Boulevard, or work with the college to re-route it, eliminates that crossing.

The remaining current issue is the pedestrian grade separated crossing of Center Parkway at Cosumnes River Boulevard. SRTD outlines several arguments against such a structure that are compelling. Additionally, we recognize SRTD efforts in meeting with the City to explore alternatives to a grade separation structure that assures pedestrian safety and adequate refuge areas between the SRTD tracks and the parallel Cosumnes River Boulevard for an at-grade solution at this location that appear more practicable. The City has agreed to work cooperatively with SRTD during final design of their

respective infrastructure. We agree that with the existing and planned infrastructure at this location and the limited space, as well as the established pedestrian travel patterns and the inability to develop channelization to limit at-grade pedestrian movements along Cosumnes River Boulevard at this location, a pedestrian over crossing of the SRTD tracks and Cosumnes River Boulevard, while technically feasible, is not practical nor justified. We are confident that SRTD is committed to reach consensus on the treatments of the refuge area and crossing at this location, and are satisfied that hazards can be eliminated or minimized to provide for the safety of the crossing of both the SRTD tracks and adjacent roadway.

We look forward to working with SRTD and the City to reach consensus on treatments and configuration all of the remaining at-grade crossings as the designs are fully developed. If you have any questions in this matter, please contact me at (916) 324-8325 or call David Stewart at (916) 324-7134.

Very truly yours,

Daren Gilbert, Supervisor
Rail Crossings Engineering Section
Consumer Protection and Safety Division

cc: Jerome Wiggins
Transportation Program Specialist
Federal Transit Administration
201 Mission Street, Suite 1650
San Francisco, CA 94105

Taiwo Jaiyeoba
Project Manager, South Line Phase 2
Sacramento Regional Transit District
P.O. Box 2110
Sacramento, CA 95812-2110

Vahak Petrossian, CPUC
Georgetta Gregory, CPUC
David Stewart, CPUC
Raed Dwairi, CPUC

APPENDIX F:

Sacramento Regional Transit District Board Resolution Certifying EIR for Locally Preferred Alternative

RESOLUTION NO. 95-05-2356

Adopted by the Board of Directors of the Sacramento Regional Transit District on the date of:

May 8, 1995

CERTIFYING THE FINAL ENVIRONMENTAL IMPACT REPORT AND DIRECTING FILING OF THE NOTICE OF DETERMINATION FOR THE SOUTH SACRAMENTO CORRIDOR LIGHT RAIL PROJECT

The Board of Directors of the Sacramento Regional Transit District does resolve as follows:

Section 1. Procedures. The Board of Directors of the Sacramento Regional Transit District finds as follows:

A. A Draft Environmental Impact Report ("Draft EIR"), a Proposed Final Environmental Impact Report ("Proposed Final EIR"), and an Addendum to the Proposed Final EIR were prepared by and for the Sacramento Regional Transit District ("RT") for transit improvements within the South Sacramento Corridor pursuant to the National Environmental Policy Act of 1969 as amended ("NEPA"); the California Environmental Quality Act ("CEQA") (Public Resources Code §21000 et seq.); the policies and procedures for implementation of NEPA (23 CFR Part 771); the Guidelines for Implementation of CEQA ("Guidelines") (14 Cal. Code Regs. §15000 et seq.); and the local CEQA procedures adopted by RT pursuant thereto.

B. The Notice of Preparation for the Draft EIR was sent to each Responsible Agency, Trustee Agency and federal agency in compliance with Section 15082 of the Guidelines.

C. The Notice of Completion of the Draft EIR was forwarded to the Governor's Office of Planning and Research in compliance with Section 15085 of the Guidelines.

D. RT consulted with and requested comments on the Draft EIR from Responsible Agencies, Trustee Agencies, and other state, federal and local agencies in compliance with Section 15086 of the Guidelines.

E. A Notice of Availability of the Draft EIR was published in a newspaper of general circulation in the area affected by the Proposed Project. The Notice of Availability was also sent to over 2,000 interested citizens. Copies of the Draft EIR were furnished to federal, state, regional and local agencies and to all libraries in the affected area, and a public hearing was properly noticed and held on October 24, 1994 to solicit comments

on the Draft EIR during a 45 day review period in compliance with Section 15087 of the Guidelines.

F. The Draft EIR was thereafter revised by preparation of the Proposed Final EIR to include responses to comments on the Draft EIR, a refinement of the description of the Proposed Project, a summary table of the significant impacts of the Proposed Project, and a list of persons, organizations and public agencies commenting on the Draft EIR. A Notice of Availability for the Proposed Final EIR was published in a newspaper of general circulation in the area affected by the Proposed Project and sent to over 2,000 interested citizens, and copies of the Proposed Final EIR were furnished to state, regional and local agencies and to all libraries in the affected area to solicit comments on the revisions to the Draft EIR during a 45 day review period in compliance with Sections 15088 and 15089 of the Guidelines.

G. Response to comments on the Proposed Final EIR have been compiled in an Addendum to the Proposed Final EIR.

H. The Draft EIR, the Proposed Final EIR, and the Addendum to the Proposed Final EIR together comprise the Final EIR in accordance with Section 15132 of the Guidelines.

I. The Final EIR reflects the independent judgement of the Board of Directors.

Section 2. Administrative Record. The Board of Directors of the Sacramento Regional Transit District finds as follows:

A. The record pertaining to this Final EIR includes only the following information as submitted to and considered by the Board of Directors:

(1) The Final EIR , including the Draft EIR, the Proposed Final EIR, the Addendum to the Proposed Final EIR, and written comments received during the public comment periods and responses thereto;

(2) All staff reports , memoranda, maps, letters, minutes of meetings, and other documents prepared by RT staff and consultants relating to the Project and presented to the Board of Directors at its hearing on the Draft EIR and at its meeting to certify the Final EIR;

(3) The proceedings before the RT Board of Directors relating to the Project, the Draft EIR, and the Final EIR, including testimony and documentary evidence introduced at the public hearings and public meetings, the transcript of all public hearings of the RT Board of Directors related to this matter, and the official minutes of such meetings; and

(4) This RT Resolution.

Section 3. Certification of the Final EIR. Pursuant to Section 15090 of the Guidelines, the RT Board of Directors hereby certifies that the Final EIR for the Project has been completed in compliance with CEQA, the Guidelines, and the local procedures adopted by RT pursuant thereto, and that the Board of Directors has reviewed and considered the information contained in the Final EIR prior to selection of a transportation mode and rejection of alternatives as set forth herein.

Section 4. Scope of the EIR. The Board of Directors of the Sacramento Regional Transit District finds as follows:

A. The Final EIR included a program-level of environmental analysis of alternative transportation modes and alternative light rail alignments to provide transportation and transit improvements with the South Sacramento area by the year 2010.

B. Pursuant to Section 15152 of the Guidelines, agencies are encouraged to tier EIRs to promote efficiency and compatibility of the CEQA process with the NEPA process. Tiering is appropriate when implementation of a project, such as the South Sacramento Corridor Light Rail Project, will require a series of approvals from federal and state agencies before construction can begin. A tiered EIR evaluates a project in light of the current and contemplated plans and provides an estimate of the environmental consequences of the entire project. A tiered EIR focuses the environmental review on the issues which are relevant to the phase of project approval under consideration. The Final EIR for the South Sacramento Corridor Light Rail Project was prepared as a tiered EIR.

Section 5 Project Alternatives. The Board of Directors of the Sacramento Regional Transit District finds as follows:

A. The Final EIR included an analysis of seven alternatives as set forth in the EIR and summarized as follows:

(1) Baseline or No Build Alternative which assumed only committed and fully funded road and transit improvements;

(2) Transportation Systems Management ("TSM") Low Alternative which assumed a 100% increase in bus transit services;

(3) TSM High Alternative which assumed 200% increase in bus transit services;

(4) Light Rail Transit ("LRT")-Low: Old Southern Pacific Railroad ("SPRR") Alignment Alternative which assumed an increase in bus transit services and includes a light rail extension in the old SPRR alignment;

(5) LRT-Low: Union Pacific Railroad ("UPRR") Alignment Alternative which assumed an increase in bus transit services and includes a light rail extension within the UPRR alignment;

(6) LRT-High Old SPRR Alignment Alternative which assumed an increase in bus transit services and includes a light rail extension in the old SPRR alignment; and

(7) LRT-High UPRR Alignment Alternative which assumed an increase in bus transit services and includes a light rail extension in the UPRR alignment.

B. The Final EIR also included six subalternatives to the LRT-High Old SPRR and UPRR Alignment Alternatives which included different combinations of light rail alignment extensions within the Elk Grove and Laguna areas.

Section 6. Proposed Project. The Board of Directors of the Sacramento Regional Transit District finds that the Proposed Project consists of the Light Rail Transit ("LRT")-Low Alternative along the Union Pacific Railroad ("UPRR") and includes the Elk Grove Extension as described in the Final EIR and summarized below.

Segment One: Downtown to Meadowview Road

The light rail alignment of the Proposed Project would begin in downtown Sacramento by branching off the existing Folsom line light rail tracks between 16th and 17th Streets at "R" Street. The outbound, or southbound track would connect to the existing eastbound track just east of 16th Street where the existing double track section ends in the eastbound direction, and would diverge from the eastbound track just east of 17th Street. The outbound track would then cross 18th Street at-grade and perpendicular to the street. It would then curve to the south, crossing 19th Street at-grade.

The outbound track would curve to the south again upon entering the existing UPRR mainline right-of-way. The inbound, or northbound, track would diverge north of the existing westbound track between 17th and 18th Streets. The inbound track would cross under the existing elevated light rail structure, at 19th Street as it crosses 19th Street at-grade. It would then run parallel with the outbound track as they both enter the UPRR mainline right-of-way heading south on the west side of a relocated UPRR mainline track. A station would be located between "T" and "U" streets. The light rail and relocated UPRR tracks would cross "S" and "T" streets at-grade and the tracks would be perpendicular to the streets.

The light rail alignment would proceed south in the UPRR right-of-way from the "T" Street Station to enter the Broadway Station just north of Broadway. The light rail alignment would cross "V", "W", and "X" streets at-grade ("U" Street does not cross the UPRR corridor) and pass under Highway 50, which is an existing elevated structure located

between and parallel to "W" and "X" streets. The Broadway Station would be located between "X" Street and Broadway.

After crossing Broadway at-grade, the light rail alignment would proceed southward from Broadway to the Freeport Boulevard/21st Street Station. The Freeport Boulevard/21st Street Station would be located on the south side of the Freeport Boulevard/21st Street at-grade crossing of the alignment.

After crossing Freeport Boulevard, the light rail alignment would enter the South Sacramento UPRR yard area. The light rail tracks would swing west, with the outbound light rail track coinciding with the existing UPRR mainline track alignment. The City College Station would be located just northeast of Hughes Stadium at Sacramento City College and north Sutterville Road.

After leaving City College Station, the light rail alignment would curve eastward and then pass under the Sutterville Road overpass as the tracks leave the UPRR yard area. After 26th Avenue, the light rail tracks would shift west with the outbound light rail track 20 feet from the westerly railroad right-of-way line and proceed south to the Fruitridge Station. The Fruitridge Station would be located on the northwest corner of the intersection of the right-of-way and Fruitridge Road.

The light rail alignment would continue in the UPRR right-of-way as it approaches the 47th Avenue Station. The 47th Avenue Station would be located opposite the Campbell Soup property, on the northwest corner of the intersection of the right-of-way and 47th Avenue.

After crossing 47th Avenue at-grade, the outbound light rail track would shift 4 feet to the west, placing it 16 feet from the western property line. The alignment would then proceed on tangent track transitioning just before the Florin Station. The Florin Station would be located on the northwest side of the UPRR and Florin Road intersection.

After crossing Florin Road at-grade, the light rail alignment would shift to the east. The light rail tracks would shift back to the west as they approach the Meadowview Station. The Meadowview Station would be located on the northwest side of the UPRR and Meadowview Road intersection.

Segment Two: Meadowview Road to Calvine Road/Auberry Drive

Southward from Meadowview Station, the light rail alignment would shift back to the east and then ascend on an aerial structure crossing over a relocated UPRR mainline track, thereby transitioning the light rail alignment from the west side to the east side of the UPRR right-of-way. The light rail alignment would cross over Morrison Creek within this elevated section. The outbound light rail track would be located 25 feet to the east of the UPRR track at the end of the aerial transition structure.

After Morrison Creek, the light rail tracks would then turn to the east and cross over Unionhouse Creek at-grade on a bridge. East of the Morrison Creek crossing, the light rail alignment would remain parallel and to the north of the planned Cosumnes River

Boulevard. The Franklin Boulevard Station would be located just southwest of the intersection of Franklin and Cosumnes River Boulevards.

The light rail alignment would proceed east and across Franklin Boulevard at-grade to Center Parkway where it would proceed diagonally across Center Parkway to the south side of Cosumnes River Boulevard. The alignment would continue along the south side of Cosumnes River Boulevard to the Cosumnes River College Station. The station would be placed on the campus, on the southwest corner of the intersection of Cosumnes River Boulevard and Bruceville Road.

The light rail alignment would then continue east parallel with and alongside the planned Cosumnes River Boulevard, crossing Bruceville Road at-grade to Highway 99, and then turning to the southeast run parallel with the west side of Highway 99, rising up on an embankment and structure in order to pass over Highway 99 opposite Old Calvine Road on an aerial structure. The alignment would then follow along the north side of old Calvine Road to the Calvine/Power Inn Station on the northwest corner of Power Inn and Old Calvine Roads, and then continue on to the Calvine/Auberry Station. The Calvine/Auberry Station would be the terminus station for this segment and would be located within the Calvine Special Planning Area on Lot "G". A 600-foot-long tail track with a pocket track would be provided east of the station.

Elk Grove Extension

The LRT-Low: Union Pacific Railroad (UPRR) Alignment would then be extended from the Calvine/Auberry Station 5.5 miles to the southeast along the Southern Pacific Railroad (SPRR) right-of-way to Grant Line Road in Elk Grove as described below.

From the Calvine/Auberry Station, the alignment would continue along the south side of Calvine Road within a 40-foot right-of-way reservation and then turn to the southeast, paralleling the west side of the existing SPRR mainline track within the 100-foot SPRR right-of-way. Continuing south, the alignment would pass over Strawberry Creek on a 90-foot long bridge.

The light rail alignment would continue to remain on tangent for this entire line section, with relocation of the SPRR tracks. At-grade crossings would be located at Sheldon and Bond Roads. The Sheldon Station would be on the northwest corner of the intersection of the SPRR right-of-way and Sheldon Road. The light rail alignment would continue south, crossing over Whitehouse Creek on a new bridge. The Bond Road Station would be located on the northwest corner of the intersection of the SPRR right-of-way and Bond Road. The light rail alignment would continue southward in the SPRR right-of-way, remaining on tangent until just before the Elk Grove Station, where the alignment would transition to the east and remain within the SPRR right-of-way along the western property line at the station.

At the Elk Grove Station, additional relocation of the SPRR tracks would be necessary because of the presence of a siding track in the vicinity of the station. The light rail alignment would cross over Laguna Creek, requiring a new bridge structure. The Elk

Grove Station would be located on the southeast corner of the intersection of the right-of-way and Elk Grove Boulevard. Continuing south from the Elk Grove Station, the light rail tracks would cross over Elk Grove Creek at two locations. Approximately 2,500 feet north of Grant Line Road, the light rail tracks would be grade-separated. The light rail horizontal alignment would continue on tangent over the structure and cross Grant Line Road at-grade, entering the station on the southwest side of the intersection of the SPRR right-of-way and Grant Line Road.

Section 7. Significant or Potentially Significant Impacts. The significant and potentially significant environmental impacts of the Proposed Project, including cumulative impacts, are set out in Exhibit "1", which is attached hereto and incorporated herein by this reference. These impacts are identified in the Final EIR or have otherwise been identified by the RT Board of Directors. As a tiered EIR, Section 15152 of the Guidelines allows deferral of adoption of construction and operational mitigation measures to a later stage of project approval. Therefore, as to each significant and potentially significant impact set forth in the Final EIR, the RT Board of Directors finds that it is appropriate to defer adoption of mitigation measures needed to mitigate the significant adverse environmental impacts of the Proposed Project until subsequent construction-level environmental analysis is conducted during the next phase of project development which is preliminary engineering. However, RT staff is directed to evaluate and incorporate as appropriate the proposed actions set forth in Exhibit "1" as part of the work program for the preliminary engineering phase wherein the Proposed Project description will be further refined.

Section 8. Notice of Determination. Pursuant to Section 21152(a) of CEQA Section 15094 of the Guidelines, staff is hereby directed to file a Notice of Determination with the County Clerk of Sacramento County and the Governor's Office of Planning and Research.

Section 9. Fish and Game Fee. Staff is hereby authorized and directed to pay the fee for the Department of Fish and Game review of the Final EIR and the County of Sacramento processing fee as required under Section 711.4 of the Fish and Game Code and the regulations issued pursuant thereto.

Section 10. Custodian of Records. The custodian of documents and other materials that constitute the record of proceedings upon which the Board of Directors has based its decision is the Planning Manager and such documents are located at 2811 "O" Street, Sacramento, California 95616.

Muriel Johnson

MURIEL JOHNSON, Chair

ATTEST:
PILKA ROBINSON, Secretary

By: Nancy R. Abeels

NANCY R. ABEELS, Assistant Secretary

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EXHIBIT 1

SUMMARY OF SIGNIFICANT AND POTENTIALLY SIGNIFICANT ENVIRONMENTAL IMPACTS OF THE PROPOSED SOUTH SACRAMENTO CORRIDOR LIGHT RAIL PROJECT

Impact Area	Impact	Proposed Actions
TRANSPORTATION		
4.2.2 RT Load Factor Standards	LRT load factors would be above 1.68, exceeding the RT standard of 1.5.	During the preliminary engineering phase load factors would be further analyzed. Decreasing headways during peak periods on routes operating over standard load factors would be considered for implementation.
4.3.3 Local Street Traffic Impacts: Blocked Intersections	LRT operation would produce queue lengths that would regularly block intersections at 19th and 20th Sts of "S", "T", "W", and "X" St, and Broadway; Freeport/2nd Ave; Florin/Serenity Drive; Meadowview/Tisdale Way; and Meadowview/"G" Parkway. LRT operation may precede overpass construction along the Elk Grove Extension at Calvine, Sheldon, and Elk Grove-Florin Rds.	Signing and striping would be included as part of the project design plans to warn motorist not to block the intersections.
4.3.3. Local Street Traffic Impacts: Intersection LOS	Intersections at Franklin Boulevard with Mack and Florin Rds and with Cosumnes River Blvd would be at LOS F during pm peak periods.	Further analysis during the preliminary engineering phase will evaluate reconfiguring intersections and, where appropriate, turn channelization. During construction, measures to avoid disrupting peak flow traffic would be developed. LOS may not improve above LOS "D".
4.4 Parking Impacts: Station Area Parking	Projected demand for parking at 47th Ave and Calvine/Auberry Stations would be greater than the parking supply.	Parking demand will be further analyzed during the preliminary engineering phase of project evaluation. Stations with parking deficiencies would need additional surface or structure parking provided. If necessary, measures to prevent spillover onto adjacent streets would be considered, including on-street parking restrictions.

Impact Area	Impact	Proposed Actions
4.5 Pedestrian and Bicycle Impacts	Station areas may incur pedestrian impacts due to the greater numbers of cars and people accessing the LRT stations. The LRT alignment may affect a planned bikeway at City College.	During the preliminary engineering phase of project evaluation, channelization, signaling and traffic control devices would be considered to facilitate the movement of vehicles and pedestrians. LRT design and construction would be coordinated with bikeway planning.
4.6 Impact on Railroad Operations and Freight Movements.	Construction of the LRT alignment would temporarily affect the freight operations of the UPRR and SPRR.	Coordinate with affected railroads so that mainline railroad operations would be subject to speed restrictions and short durations of service suspension until the mainline track is relocated.
LAND USE PLANS AND POLICIES		
5.2.2 Inconsistency With Planned or Approved Future Land Uses	The proposed project may affect City plans to widen Unionhouse Creek and County plans to rechannel Strawberry Creek and develop replacement wetlands near the proposed Calvine/Auberry Station. Potential conflicts with development plans also may affect the following proposed park-and-ride lots: UPRR/Meadowview Rd, SPRR/Sheldon Rd, and SPRR/Bond Rd.	RT will work with the City and County to include the proposed project in the respective General Plans in order to secure future dedications, reservations, and/or accommodations of future transit facilities during the entitlement process. RT will design facilities to the extent feasible to avoid conflict with existing uses or will work with property owners to relocate existing structures that are not compatible with project design plans. RT will work with the county, state and federal agencies to avoid planned wetlands near Calvine/Auberry or, if necessary, relocate or replace planned wetlands if project implementation affects the woodland areas.
5.2.4. Sacramento Regional Sanitation District Buffer Lands Management Plan	The LRT alignment, the proposed Franklin Blvd Station and LRT maintenance facility would be located on Regional Sanitation District buffer lands. Uses that congregate 25 or more people are not compatible with the District's Land Use Management Plan.	RT will work with the Sacramento Regional Sanitation District to ensure that RT's plan is compatible with District's land use management plan or ask for authorization to use fringe buffer lands for specific LRT facilities.
5.2.6 Conflict with Surrounding Land Uses	The aggregate effect of increased activity associated with LRT stations and park-and-ride lots may change the character of the adjacent area (see also Visual and Cultural Resources impacts).	RT will incorporate landscaped buffers, visual barriers and design features in project design plans to physically or visually separate LRT facilities from surrounding sensitive land uses.

Impact Area	Impact	Proposed Actions
5.2.7 Sites Subject to Potential Development	The following proposed station area or park-and-ride sites may receive land use entitlements before the area is preserved for RT use: 47th Avenue, Cosumnes River College, and Power Inn/Calvine Rd.	If RT facility needs requires acquisition of land which has previously been approved for development, RT will negotiate the amount of fair market value for loss of the approved use with affected property owners.
NEIGHBORHOOD AND BUSINESS		
5.4.2 Neighborhood Impacts	Proposed LRT stations could generate increased traffic and parking in the surrounding neighborhoods. (See also Traffic and Parking Impacts). Issues related to environmental justice will be addressed in the next preliminary engineering project phase.	During preliminary engineering, stations would be designed to include bus transfer, kiss-and-ride, and park-and-ride lots to mitigate the impact of riders parking in the neighborhoods. Traffic signalization and channelization measures would be considered to facilitate traffic movement in the station areas. Measures to prevent spillover onto adjacent streets would also be evaluated (see Traffic and Parking mitigation measures).
ACQUISITION AND DISPLACEMENT OF EXISTING USES		
5.5.2 Acquisition Impacts	The UPRR and SPRR mainline rights-of-way would be affected by the proposed project. RT will buy the rights-of-way in fee or buy an easement. Twelve acquisition sites would be required.	RT will comply with federal Uniform Relocation Assistance and Real Property Acquisition Policy Act of 1970 and the State of California Relocation Act in acquiring property for public use.
5.5.3 Relocation Impacts	The proposed project would require relocating 17-20 businesses that employ 73-130 employees. If the Meadowview Station were developed to capacity, 12 houses would be affected. Three additional houses would be affected along the Elk Grove Extension.	RT will develop and implement a relocation plan that follows the federal and state guidelines described under acquisition impacts.
PUBLIC SAFETY AND SECURITY		
5.6.2 Impacts to Police Protection Services	During operation, increased accidents at grade crossings and thefts and vandalism at park-and-ride lots would accompany the implementation of the proposed project.	RT will evaluate its security staff requirements commensurate with the service expansion and consider increasing staffing levels. RT will coordinate meetings with the relevant police departments and ensure that their concerns regarding safety of design features are incorporated into the LRT facilities as appropriate.

Impact Area	Impact	Proposed Actions
VISUAL AND AESTHETIC RESOURCES		
5.7.2 Direct Connector Ramps/Flyover Structures	The proposed project would have flyover structures reaching a maximum elevation of 23 feet at the following locations: Morrison Creek, SR 99/ Calvine Road, and SPRR/Grant Line Road. The structures would add a new visual element to the skyline.	Design of the flyover will be as streamlined and cost-effective as possible. However, the cumulative effect of the flyover structures cannot be fully resolved until design and evaluation is conducted during the preliminary engineering phase.
5.7.5 Park-and-ride Structures	Light and glare that would emanate from park-and-ride lots and the proposed LRT maintenance facility at Franklin Boulevard may affect nearby residences.	Design of LRT facilities would include visual barriers and/or light shields to diffuse light away from nearby residences.
CULTURAL RESOURCES		
5.8.2 Disturbance and/or Destruction of Undiscovered Prehistoric and Historic Properties	Buried cultural resources may be uncovered at park-and-ride sites within the City of Sacramento, within downtown Elk Grove, and along Strawberry and Laguna Creeks.	The preliminary engineering phase will include archaeological and cultural investigations. If buried cultural resources are uncovered during construction of the proposed project, a qualified archeologist would be brought in to determine the significance of the found materials and satisfy Section 106 requirements.
5.8.3 Impacts to Historic Railroad Properties and Historic Sites	The UPRR, SPRR (mainline), and Sacramento Valley Railroad alignments have been formally recorded as historic sites that fall within the Area of Potential Effect of the proposed project. Additionally, historic sites have been recorded at the proposed Meadowview Rd and Elk Grove Blvd park-and-ride lots.	Relocation of the mainline railroad track would be within the existing right-of-way and would not require additional mitigation. LRT project design will include efforts to avoid the historic sites at park and ride lots. If historic sites cannot be avoided, the site will be examined and a detailed research plan prepared and implemented to preserve the integrity of the historic site's character.
5.8.4 Demolition or Relocation of National Register Potentially Eligible Historic Structures	The proposed project along the Elk Grove extension would require removal of a historic complex at the proposed SPRR/Bond Rd park-and-ride lot.	If the historic complex is impacted after further design efforts, the property would be recorded according to Historic American Building Survey guidelines and Section 106 requirements in consultation with the State Office of Historic Preservation (SHPO).

Impact Area	Impact	Proposed Actions
5.8.5 Altering the Integrity of Historic Properties in the Project Right-of-Way.	The proposed project may affect 24 historic structures along the UPRR alignment and six historic properties along the Elk Grove extension.	If historic structures and associated buildings or landscape features are affected after further project design efforts, they will be placed in an Environmentally Sensitive Zone and will be avoided during construction. Section 106 requirements will be satisfied in consultation with SHPO.
5.8.7 Alteration or Loss of Integrity to Historic Structures, Neighborhoods, or Districts	The proposed 21st Street Station would be within the viewshed of the surrounding historic areas.	The station will be designed to be compatible with the surrounding historic neighborhoods to the extent feasible. RT will consult with the City's Design Review Board, local historic societies and neighborhood associations during the design phase.
PARKLANDS/SECTION 4(F) ANALYSIS		
5.9.2 Taking or Altering Parkland, Recreational, and Cultural Properties	The proposed project may affect historic properties that are found along the LRT alignment. If any historic property is directly affected by the construction of the proposed project and is found eligible for the National Register, a Section 4(f) evaluation would be required and US Department of Transportation approval would be obtained.	If historic properties cannot be avoided, RT will implement the project in concurrence with Section 4(f) mitigation measures developed in consultation with park property owners/agencies.
5.9.3 Indirect Impacts to Parklands	Construction activities may temporarily affect activities at Airport Park near the UPRR alignment north of 47th Ave.	Construction mitigation measures will be defined during the preliminary engineering phase to control dust and particulate matter.
GEOLOGY, SOILS, AND SEISMICITY		
5.10.2 Seismic Hazards 5.10.3 Expansive or Low-strength Soils and Shallow Groundwater	The entire alignment of the proposed project may be susceptible to secondary seismic hazards, including liquefaction, expansive or low-strength soils, and shallow groundwater.	Design and construction of the proposed project would comply with appropriate seismic zone requirements of the most recent edition of the Uniform Building Code. Site specific compaction/consolidation and shallow/ perched groundwater table investigations for all retained fill and aerial/bridge support structures would be performed in final design.

Impact Area	Impact	Proposed Actions
HYDROLOGY AND WATER QUALITY		
5.11.2 Exposure to Flooding 5.11.3 Runoff Generation 5.11.4 Water Quality	The segments of the proposed LRT alignment that are not embanked, particularly those along Unionhouse, Strawberry or Laguna Creeks, would risk flood exposure and erosion impacts.	During preliminary engineering and final design, site and structural designs will be reviewed by the City and County flood control/public works agencies. In addition, a Storm Water Pollution Prevention Plan will be developed in compliance with a NPDES permit from the Regional Water Quality Board.
5.12.2 Impact on the Burrowing Owl	Construction of the proposed project may affect the Burrowing Owl, a Species of Special Concern, due to burrows found in the UPRR right-of-way south of Florin Road. Thirty-seven Burrowing Owls were observed in this area during field reconnaissance.	During the preliminary engineering phase, more detailed impact analysis and evaluation of potential mitigation measures to avoid or lessen impacts to Burrowing Owls would be conducted in coordination with state and federal wildlife agencies. Relocating Burrowing Owls may be necessary.
5.12.3 Impact on Swainson's Hawk	Approximately 34 acres of foraging habitat of the Swainson's Hawk, a Category 3 Candidate Species, along the UPRR alignment south of 47th Ave and along the Elk Grove Extension north of Sheldon Rd may be affected by construction of proposed project.	During the preliminary engineering phase, more detailed analysis of the extent of the impact on the Swainson's Hawk would be undertaken in coordination with state and federal agencies. Foraging habitat may have to be replaced if impact cannot be avoided.
5.12.4 Tricolored Blackbird	Disturbance of the Tricolored Blackbird, a Species of Special Concern, during nesting or removal of habitat due to construction activities would be a significant impact. Two nesting colonies were observed between Calvine and Sheldon Roads along the SPRR mainline right-of-way during field reconnaissance.	During the preliminary engineering phase, construction activities will be scheduled to occur outside the nesting season, if possible. RT will consult with the California Dept of Fish and Game and the US Fish and Wildlife Service to identify and implement requisite mitigation strategies.
5.12.5 Purple Martin, Swallows, and Swifts	The Purple Martin, a Species of Special Concern, and other swallows and swifts are found along the UPRR alignment. Construction activities could affect these birds during nesting season. Two Barn Swallows, 20 Purple Martins and two to three pairs of Purple Martins were observed along the UPRR right-of-way during field reconnaissance.	During the preliminary engineering phase, construction activities will be scheduled to occur outside the nesting season if possible. A Memorandum of Understanding may be required with the California Dept. of Fish and Game to monitor the effects of construction disturbance on nesting activity.

Impact Area	Impact	Proposed Actions
5.12.7 Riparian Habitat	Construction of the proposed project south of Calvine Road along the SPRR alignment could disturb the riparian habitat of cottonwoods, valley oaks, and willows.	During the preliminary engineering phase, construction would be planned to avoid these habitats, if possible. If this is not possible, buffers would be established to minimize construction impacts and to protect the existing riparian resources.
5.12.8 Wetlands	Construction of the proposed project may affect 3.32 acres of wetlands along the UPRR MOS alignment and 2.43 acres along the Elk Grove extension.	During the preliminary engineering phase, avoidance of wetlands during construction of the proposed project will be implemented if possible. Otherwise, RT will initiate consultation with the US Corps of Army Engineers and apply for a Section 404 permit.
5.12.9 Oak and Other Native Trees	Over 139 oak trees and 204 native trees may be affected by construction of the proposed project along the UPRR alignment and the Elk Grove extension.	During preliminary engineering, project design would attempt to avoid or minimize impacts to native trees. RT would comply with city and county codes if required.
NOISE AND VIBRATION		
5.14.2 Construction Noise 5.14.3 and Construction Vibration	Construction noise related to implementing the proposed project would affect over 200 residential units located within 250 feet of the LRT alignment.	During preliminary engineering, RT will evaluate the construction schedule and equipment muffling measures to avoid or minimize noise impact to affected residents.
HAZARDOUS MATERIALS		
5.15.2 Subsurface and Shallow Groundwater Contamination Impacts	Contaminated soil may be encountered along the proposed LRT alignment at the existing UPRR yard near Sutterville Rd, at the proposed 47th Ave and Grant Line Rd Stations.	During preliminary or final engineering, RT would conduct a Phase I environmental assessment at these sites. If hazardous materials are found, RT would contact the Sacramento County Environmental Health Management Division to determine the appropriate remedial actions to meet County and state guidelines.
5.15.3 Toxic Airborne Emissions	Accidental releases of potentially toxic airborne emissions from industrial facilities may be encountered at the proposed 47th Ave and Grant Line Rd Station areas.	During preliminary or final engineering, RT will evaluate the potential for release of toxic airborne emissions and coordinate with nearby industrial facilities making use of chemicals that could become airborne and local emergency service agencies regarding emergency response plans.

Impact Area	Impact	Proposed Actions
5.15.4 Building Demolition 5.15.5 Rail Removal Impacts	Demolition of structures at the proposed 47th Ave and Florin Rd Station areas and removal of existing railroad track may expose construction workers to asbestos containing building materials, remnant hazardous materials, or contaminated soils.	During preliminary engineering, measures will be defined to address what to do if hazardous materials are encountered, including contacting the Sacramento County Environmental Health Management Division and taking appropriate remedial actions to meet County and state guidelines.
UTILITIES		
5.16.4 Sanitary Sewer Impacts 5.16.5 Oxygen Line Impacts	Construction of the proposed Franklin Blvd Station park-and-ride lot may affect the underlying City sewer and the Sacramento Regional Sanitation District oxygen lines.	During preliminary engineering, RT will consult with the City and the Regional Sanitation District to determine whether sewer or oxygen lines will have to be relocated and agency to be responsible for such relocation.
5.16.6 MCI Fiber Optic Cable Impacts 5.16.7 Sprint Optic Cable Impacts	MCI and Sprint fiber optic cables that parallel the UPRR railroad tracks would be affected by LRT construction activities.	RT will coordinate with MCI, Sprint and UPRR to relocate segments of the underground fiber optic cable that would be directly affected by project implementation.
5.16.8 SMUD Transmission Tower Impacts	The Sacramento Municipal Utility District has three transmission line towers on the site of the proposed Meadowview Rd Station area that would require relocation.	RT will work with SMUD to ensure that transmission towers are relocated if necessary to the edge of the proposed park-and-ride lot.

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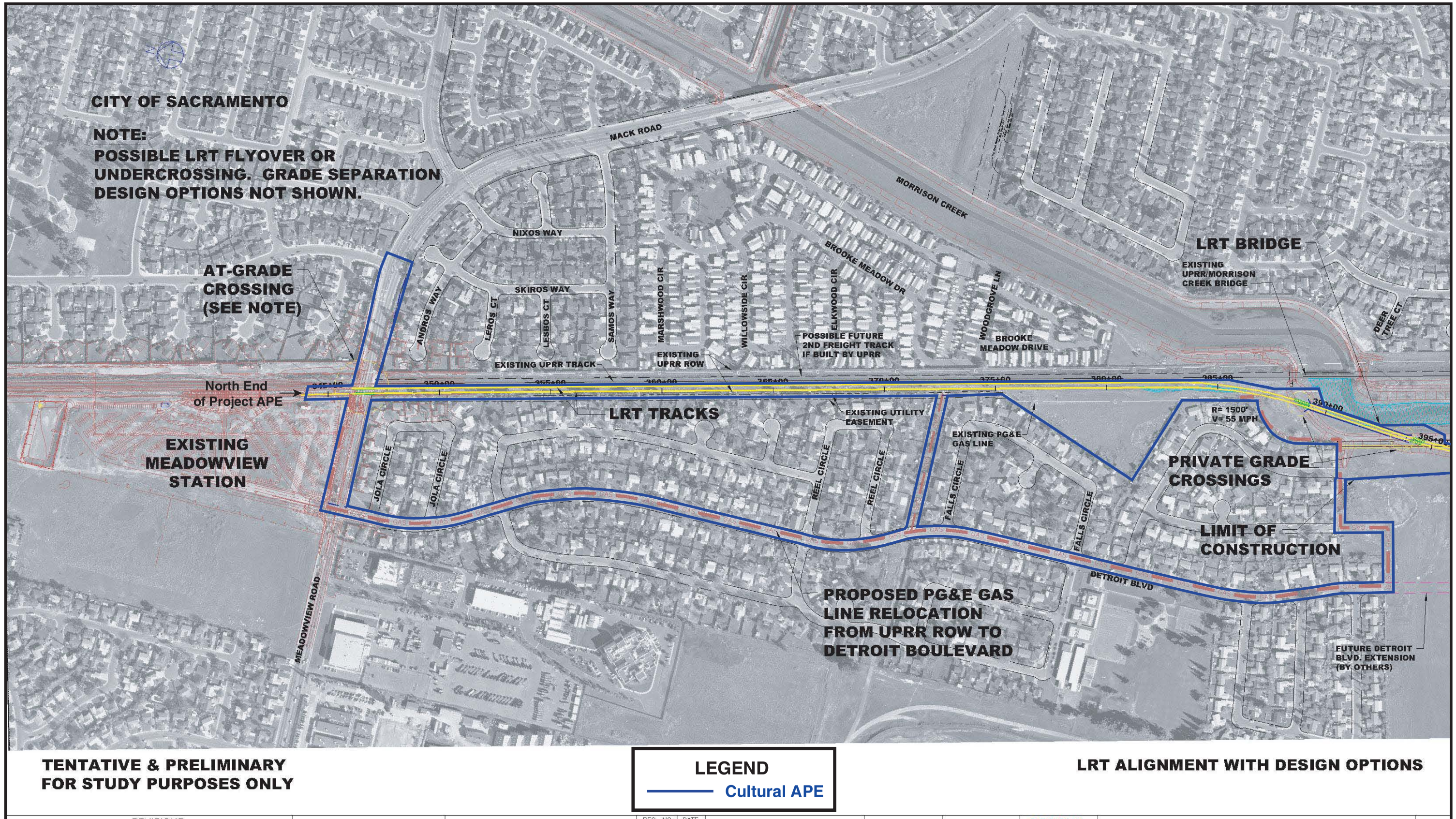
APPENDIX G:

Cultural Resources (Archeology) Area of Potential Effects (APE) Maps



TENTATIVE & PRELIMINARY FOR STUDY PURPOSES ONLY

LEGEND
Cultural APE

LRT ALIGNMENT WITH DESIGN OPTIONS

REVISIONS				
MARK	DATE	DESCRIPTION	BY	CHKD

SCALE: VERTICAL: ____ HORIZONTAL: 1"=200'
ORIGINAL SCALE IN INCHES FOR REDUCED PLAN
0 1 2 3

PROJECT ENGINEER: ____ REG. NO. ____ DATE ____
DESIGNED BY: ____
DRAWN BY: ____
CHECKED BY: ____

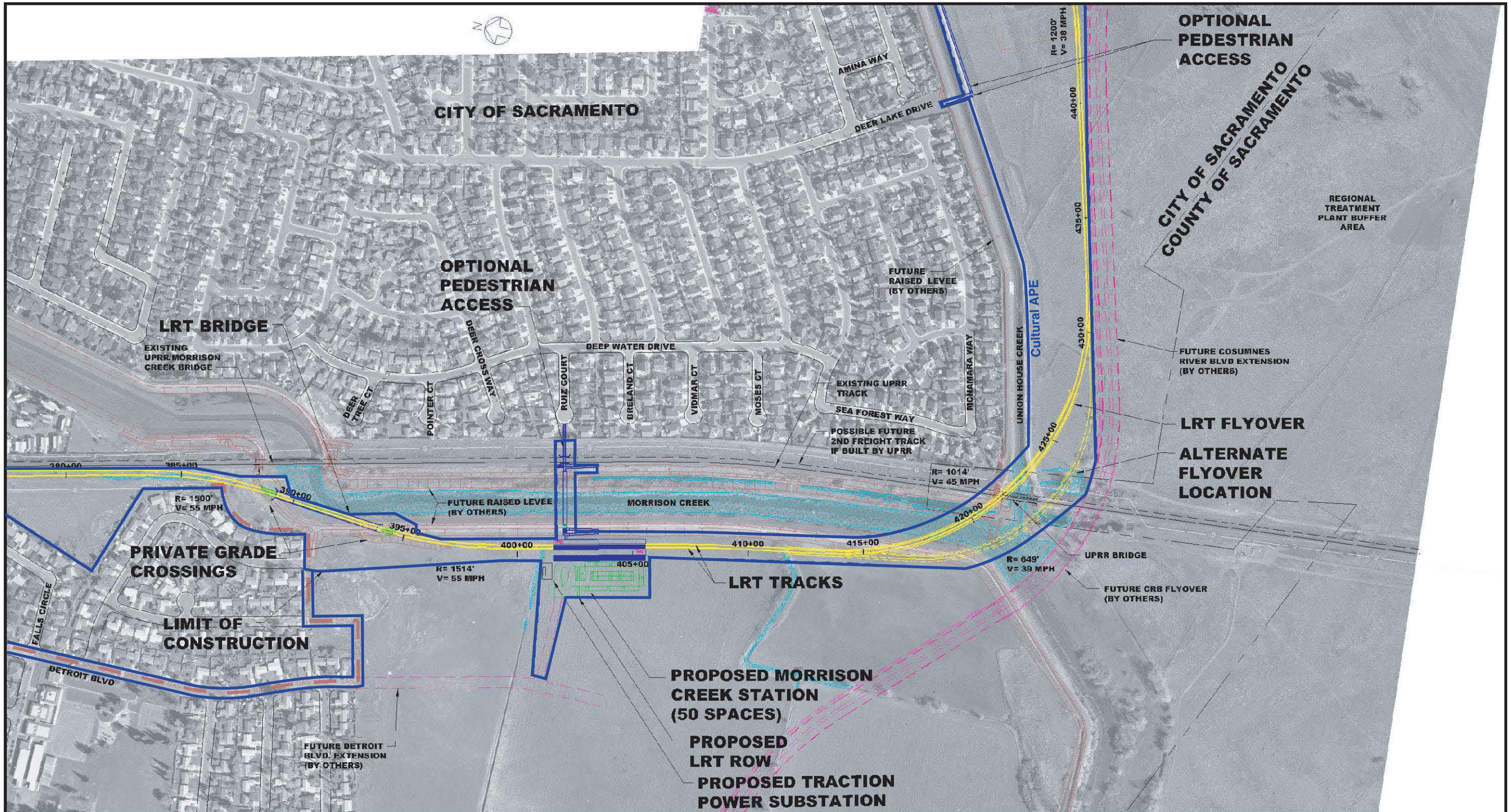
CI:
FILE: FOOTPRINT.DWG
DWG#: 1

REGIONAL TRANSIT

SOUTH SACRAMENTO PHASE 2 CORRIDOR
CONCEPTUAL ENGINEERING
PROJECT FOOTPRINT

G-01
SHEET 1 OF 5

Figure 4. Light Rail Transit Alignment with Design Options and Archaeological APE (1 of 5).



TENTATIVE & PRELIMINARY FOR STUDY PURPOSES ONLY

LEGEND
Cultural APE

LRT ALIGNMENT WITH DESIGN OPTIONS

REVISIONS				
MARK	DATE	DESCRIPTION	BY	CHKD
△				
△				
△				
△				

SCALE: VERTICAL: NO SCALE
HORIZONTAL: 1"=200'
ORIGINAL SCALE IN INCHES FOR REDUCED PLAN
0 1 2 3

PROJECT ENGINEER: C. UMOJU
DESIGNED BY:
DRAWN BY:
CHECKED BY:
REG. NO. DATE

CI:
FILE: FOOTPRINT.DWG
DWG#: 1

REGIONAL TRANSIT

SOUTH SACRAMENTO PHASE 2 CORRIDOR
CONCEPTUAL ENGINEERING
PROJECT FOOTPRINT

G-01
SHEET 2 OF 5

Figure 5. Light Rail Transit Alignment with Design Options and Archaeological APE (2 of 5).

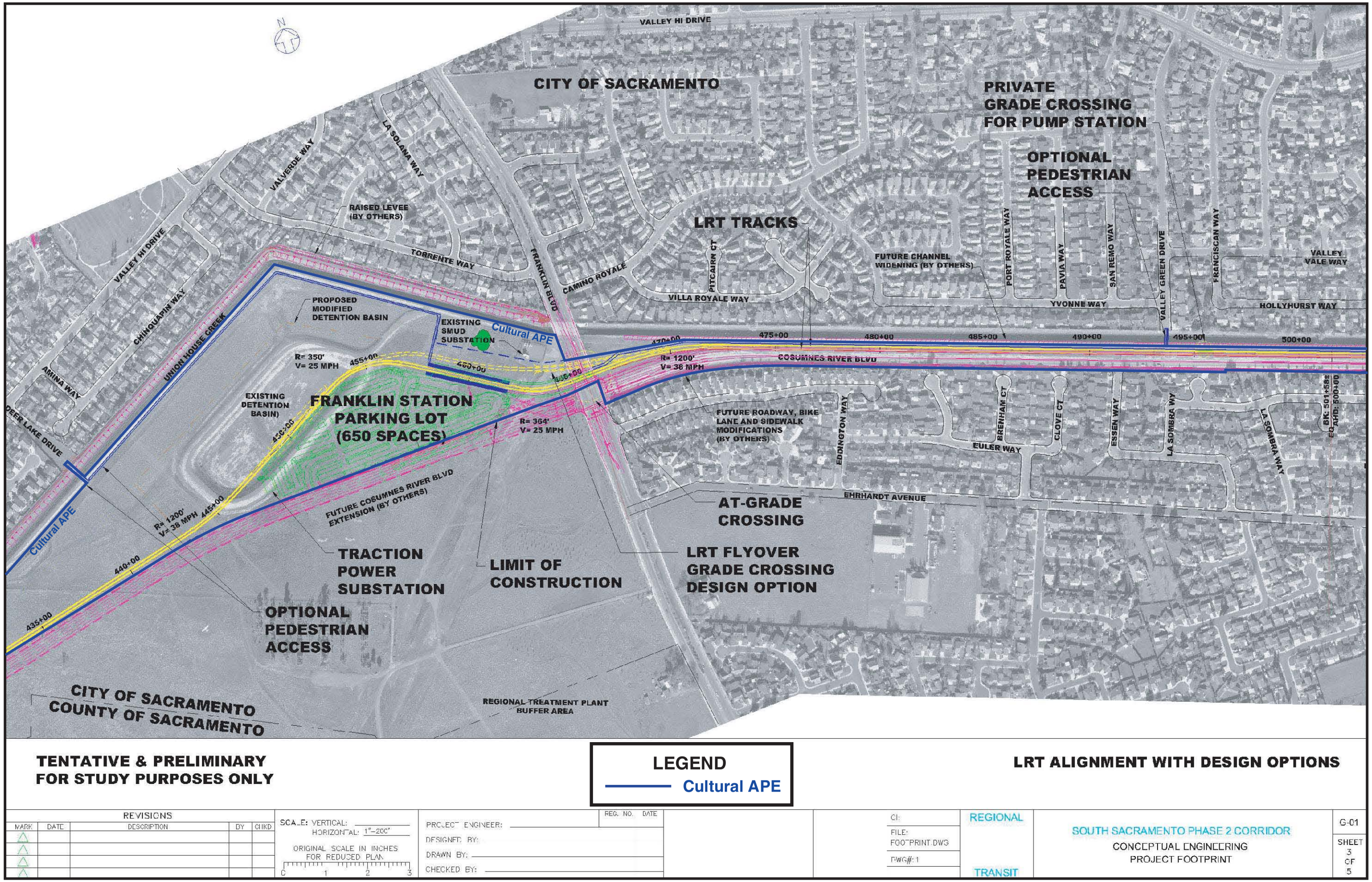
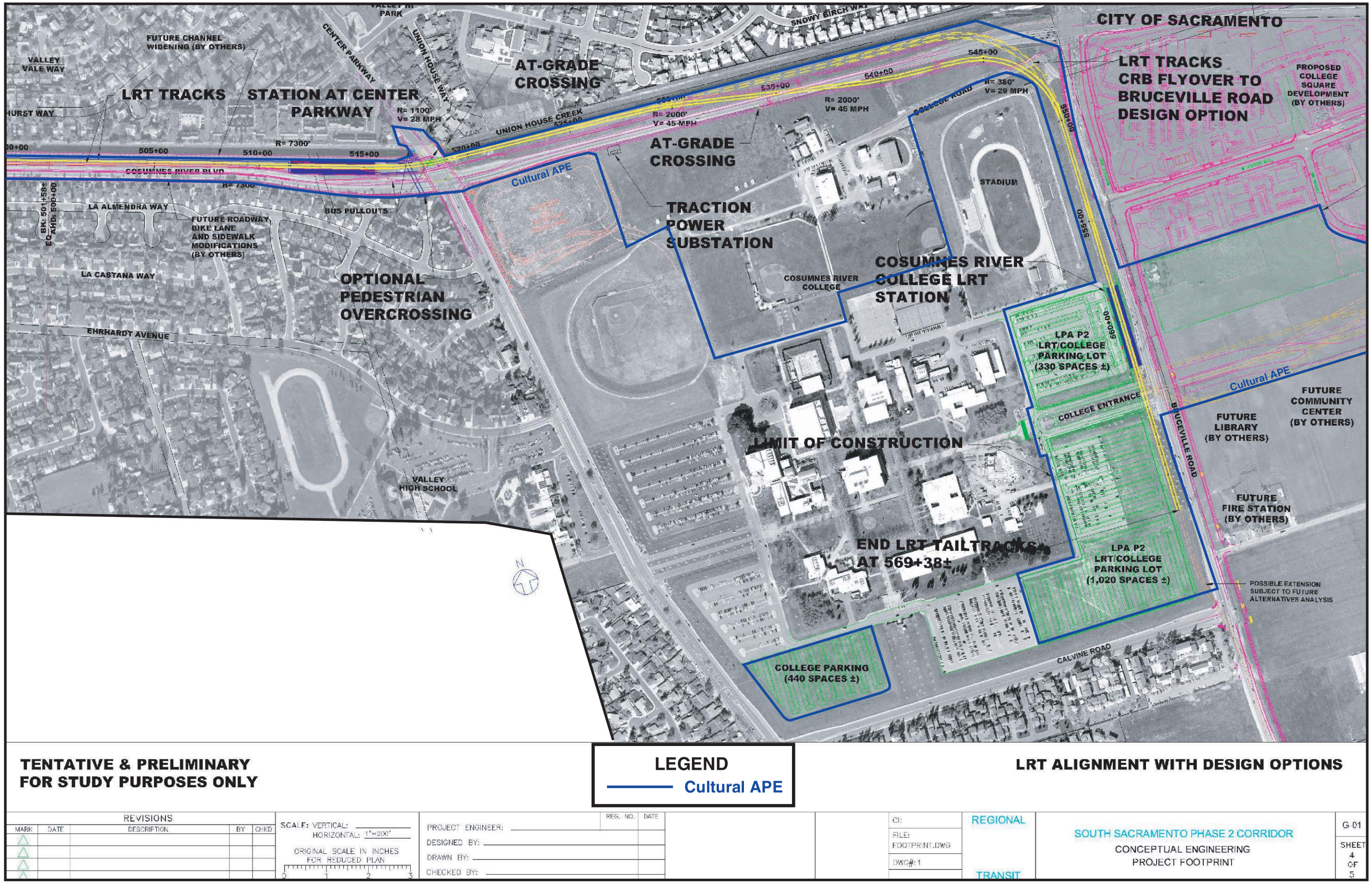


Figure 6. Light Rail Transit Alignment with Design Options and Archaeological APE (3 of 5).



TENTATIVE & PRELIMINARY
FOR STUDY PURPOSES ONLY

LEGEND
Cultural APE

LRT ALIGNMENT WITH DESIGN OPTIONS

REVISIONS				
MARK	DATE	DESCRIPTION	BY	CHKD

SCALE: VERTICAL: ____ HORIZONTAL: 1"=200'
ORIGINAL SCALE IN INCHES FOR REDUCED PLAN
0 1 2 3

PROJECT ENGINEER: ____ REG. NO. ____ DATE ____
DESIGNED BY: ____
DRAWN BY: ____
CHECKED BY: ____

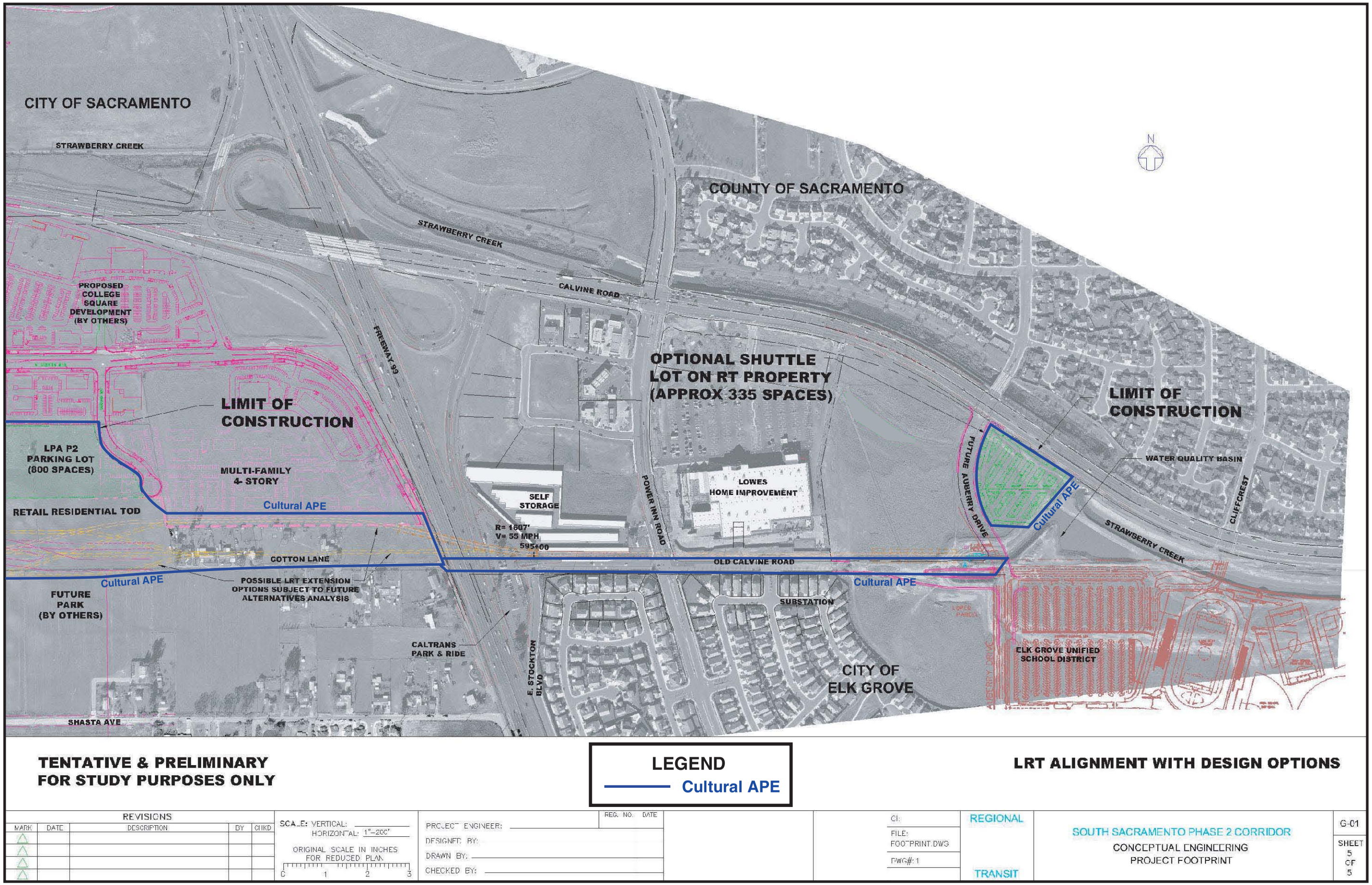
CI:
FILE: FOOTPRINT.DWG
DWG#: 1

REGIONAL TRANSIT

SOUTH SACRAMENTO PHASE 2 CORRIDOR
CONCEPTUAL ENGINEERING
PROJECT FOOTPRINT

G-01
SHEET 4 OF 5

Figure 7. Light Rail Transit Alignment with Design Options and Archaeological APE (4 of 5).



TENTATIVE & PRELIMINARY FOR STUDY PURPOSES ONLY

LEGEND
Cultural APE

LRT ALIGNMENT WITH DESIGN OPTIONS

REVISIONS				
MARK	DATE	DESCRIPTION	BY	CHKD

SCALE: VERTICAL: ____ HORIZONTAL: 1"=200'
ORIGINAL SCALE IN INCHES FOR REDUCED PLAN
0 1 2 3

PROJECT ENGINEER: ____ REG. NO. DATE
DESIGNED BY:
DRAWN BY: ____
CHECKED BY: ____

CI:
FILE: FOOTPRINT.DWG
DWG#: 1

REGIONAL TRANSIT

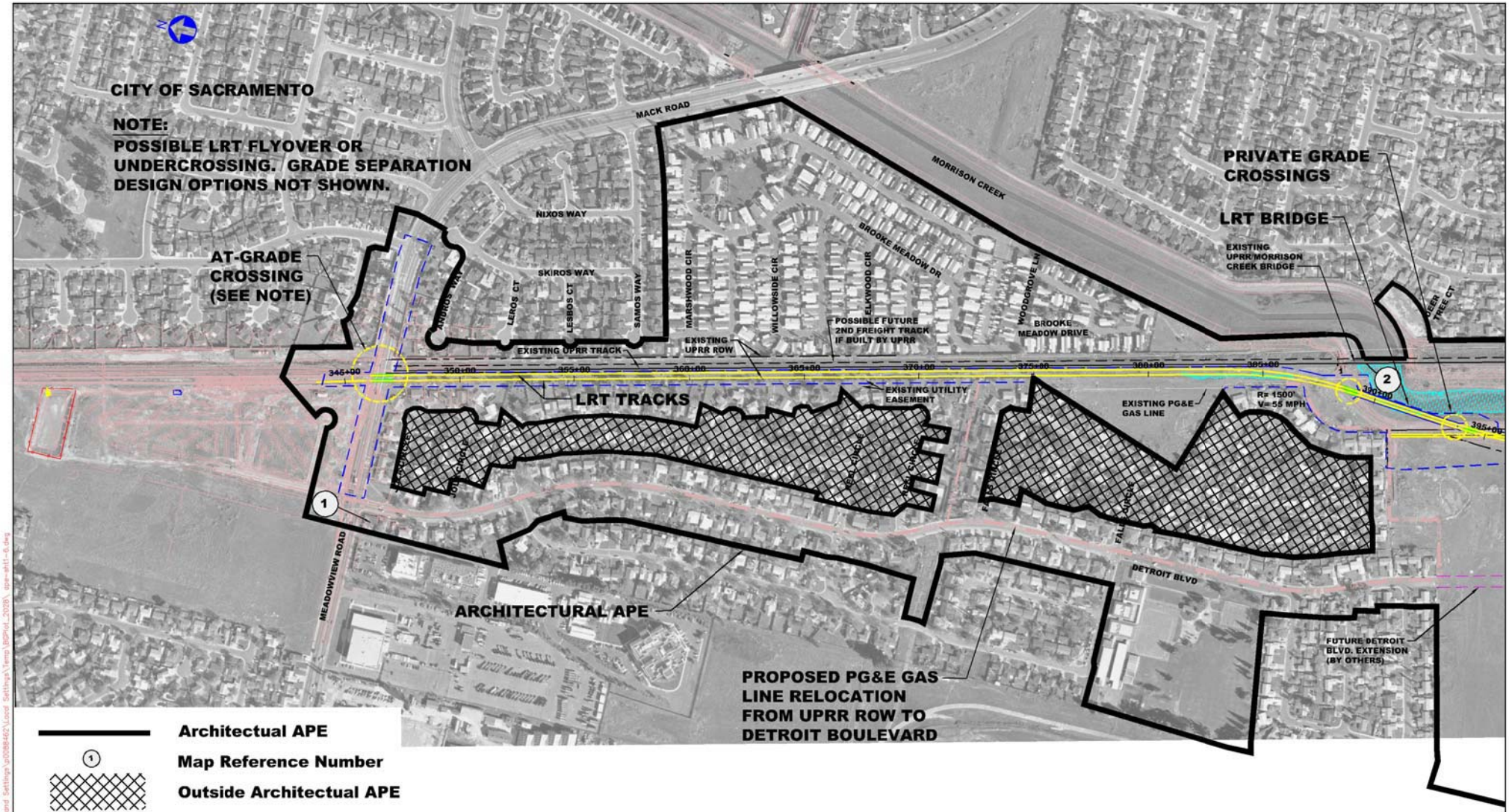
SOUTH SACRAMENTO PHASE 2 CORRIDOR
CONCEPTUAL ENGINEERING
PROJECT FOOTPRINT

G-01
SHEET 5 OF 5

Figure 8. Light Rail Transit Alignment with Design Options and Archaeological APE (5 of 5).

APPENDIX H:

Historic Architecture Area of Potential Effects (APE) Maps



Architectual APE

Map Reference Number

Outside Architectual APE

TENTATIVE & PRELIMINARY FOR STUDY PURPOSES ONLY

FEBRUARY 2005 ARCHITECTURAL APE
Figure 1-1

REVISIONS				
MARK	DATE	DESCRIPTION	BY	CHKD

SCALE: VERTICAL: ____ HORIZONTAL: 1"=200'
ORIGINAL SCALE IN INCHES FOR REDUCED PLAN
0 1 2 3

PROJECT ENGINEER: ____
DESIGNED BY: ____
DRAWN BY: ____
CHECKED BY: ____

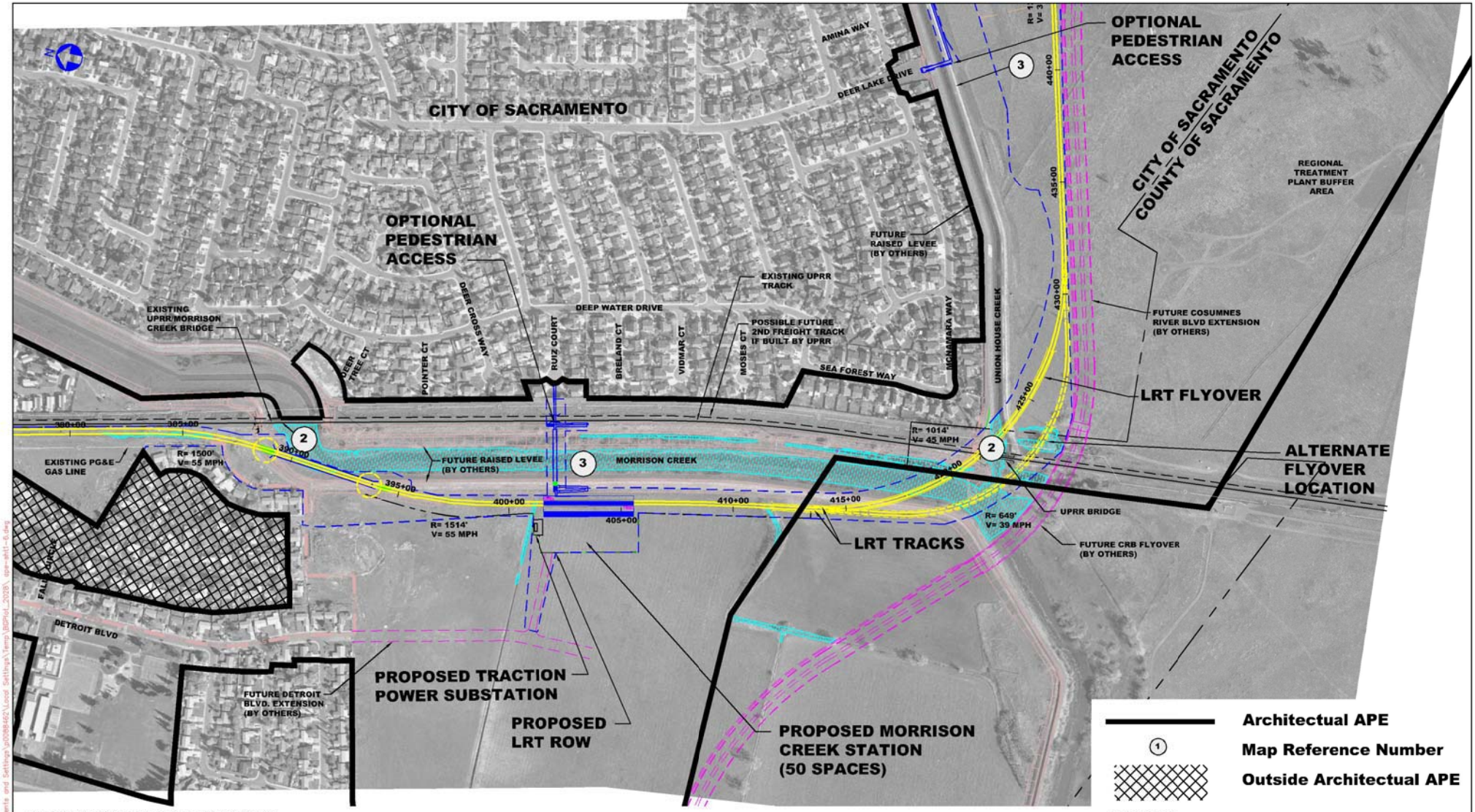
REG. NO.	DATE

CI:
FILE: FOOTPRINT.DWG
DWG#: 1

REGIONAL
TRANSIT

SOUTH SACRAMENTO PHASE 2 CORRIDOR
CONCEPTUAL ENGINEERING
PROJECT FOOTPRINT

G-01
SHEET 1 OF 6



TENTATIVE & PRELIMINARY FOR STUDY PURPOSES ONLY

FEBRUARY 2005 ARCHITECTURAL APE
Figure 1-2

REVISIONS				
MARK	DATE	DESCRIPTION	BY	CHKD

SCALE: VERTICAL: ____ HORIZONTAL: 1"=200'
ORIGINAL SCALE IN INCHES FOR REDUCED PLAN
0 1 2 3

PROJECT ENGINEER: ____
DESIGNED BY: ____
DRAWN BY: ____
CHECKED BY: ____

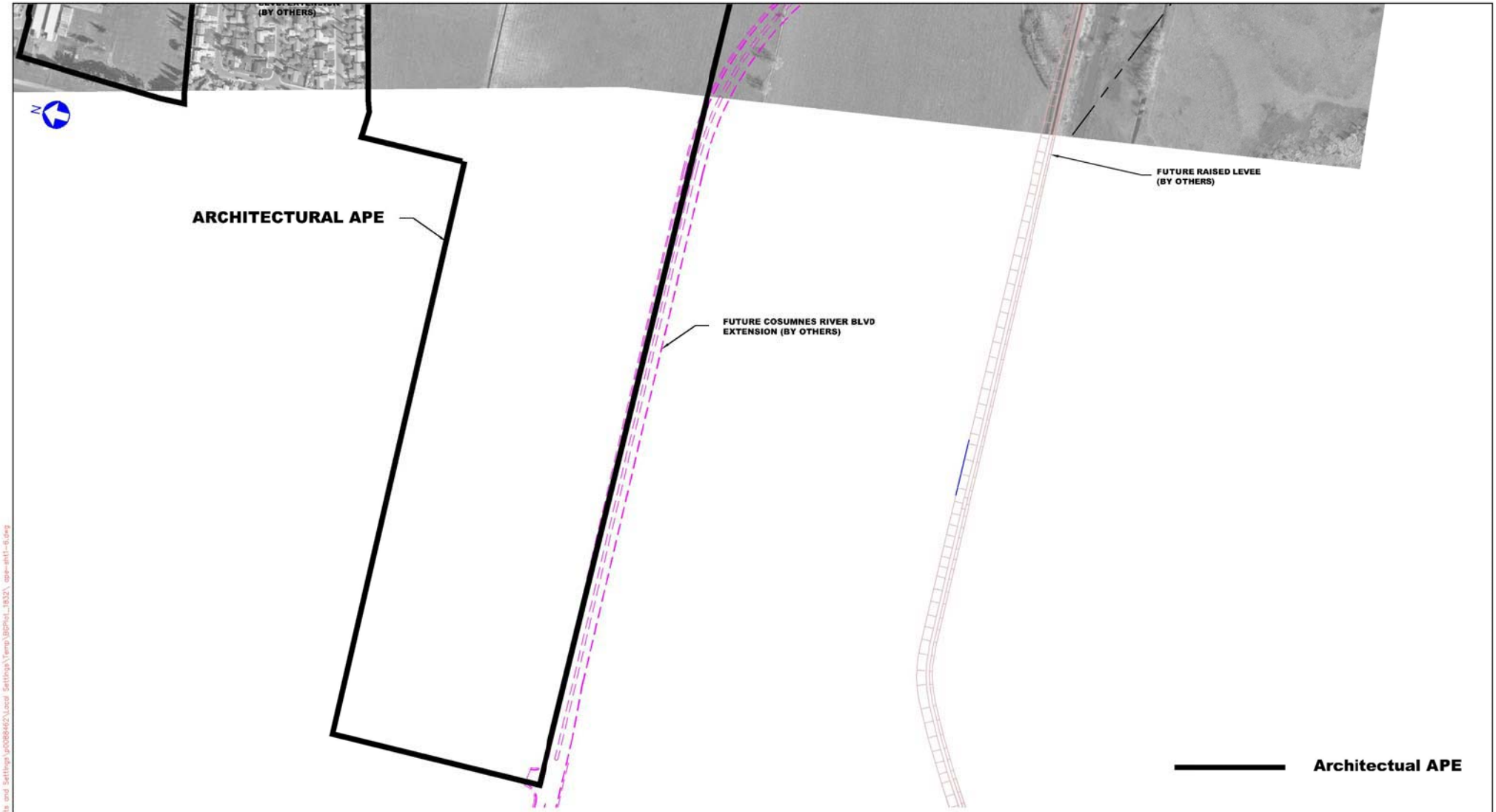
REG. NO.	DATE

CI:
FILE: FOOTPRINT.DWG
DWG#: 1

REGIONAL TRANSIT

SOUTH SACRAMENTO PHASE 2 CORRIDOR
CONCEPTUAL ENGINEERING
PROJECT FOOTPRINT

G-02
SHEET 2 OF 6



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FEBRUARY 2005 ARCHITECTURAL APE
Figure 1-3

REVISIONS				
MARK	DATE	DESCRIPTION	BY	CHKD

SCALE: VERTICAL: _____
HORIZONTAL: 1"=200'

ORIGINAL SCALE IN INCHES FOR REDUCED PLAN
0 1 2 3

PROJECT ENGINEER: _____ REG. NO. _____ DATE _____
DESIGNED BY: _____
DRAWN BY: _____
CHECKED BY: _____

CI:
FILE: FOOTPRINT.DWG
DWG#: 1

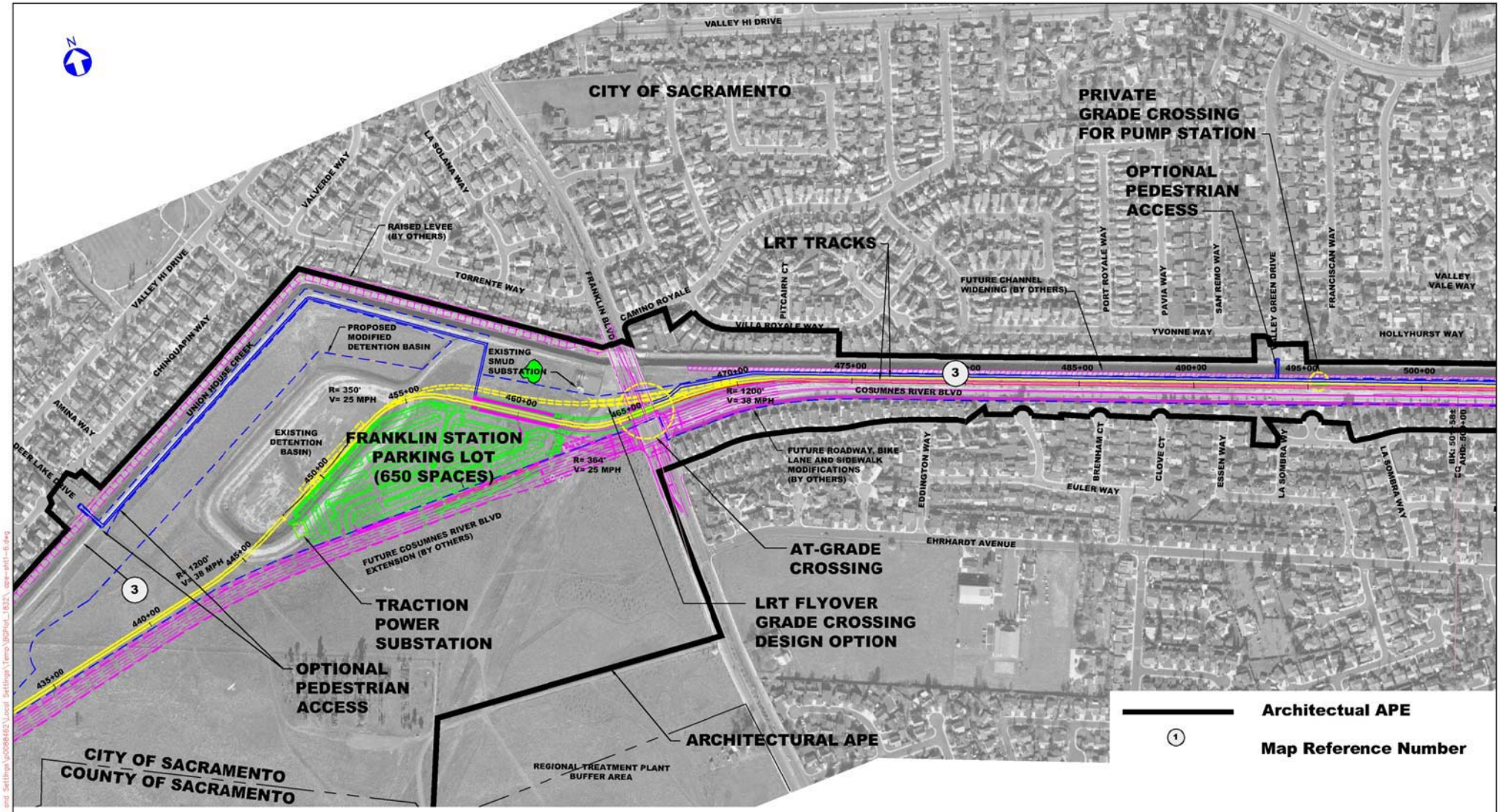
REGIONAL
TRANSIT

SOUTH SACRAMENTO PHASE 2 CORRIDOR
CONCEPTUAL ENGINEERING
PROJECT FOOTPRINT

G-03

SHEET 3 OF 6

Apr 26 , 2005 - 12:54pm C:\Documents and Settings\p0088462\Local Settings\Temp\BGPlot_18332\ cpw-alt1-6.dwg



TENTATIVE & PRELIMINARY
FOR STUDY PURPOSES ONLY

FEBRUARY 2005 ARCHITECTURAL APE
Figure 1-4

REVISIONS				
MARK	DATE	DESCRIPTION	BY	CHKD

SCALE: VERTICAL: ____ HORIZONTAL: 1"=200'
ORIGINAL SCALE IN INCHES FOR REDUCED PLAN
0 1 2 3

PROJECT ENGINEER: ____
DESIGNED BY: ____
DRAWN BY: ____
CHECKED BY: ____

REG. NO.	DATE

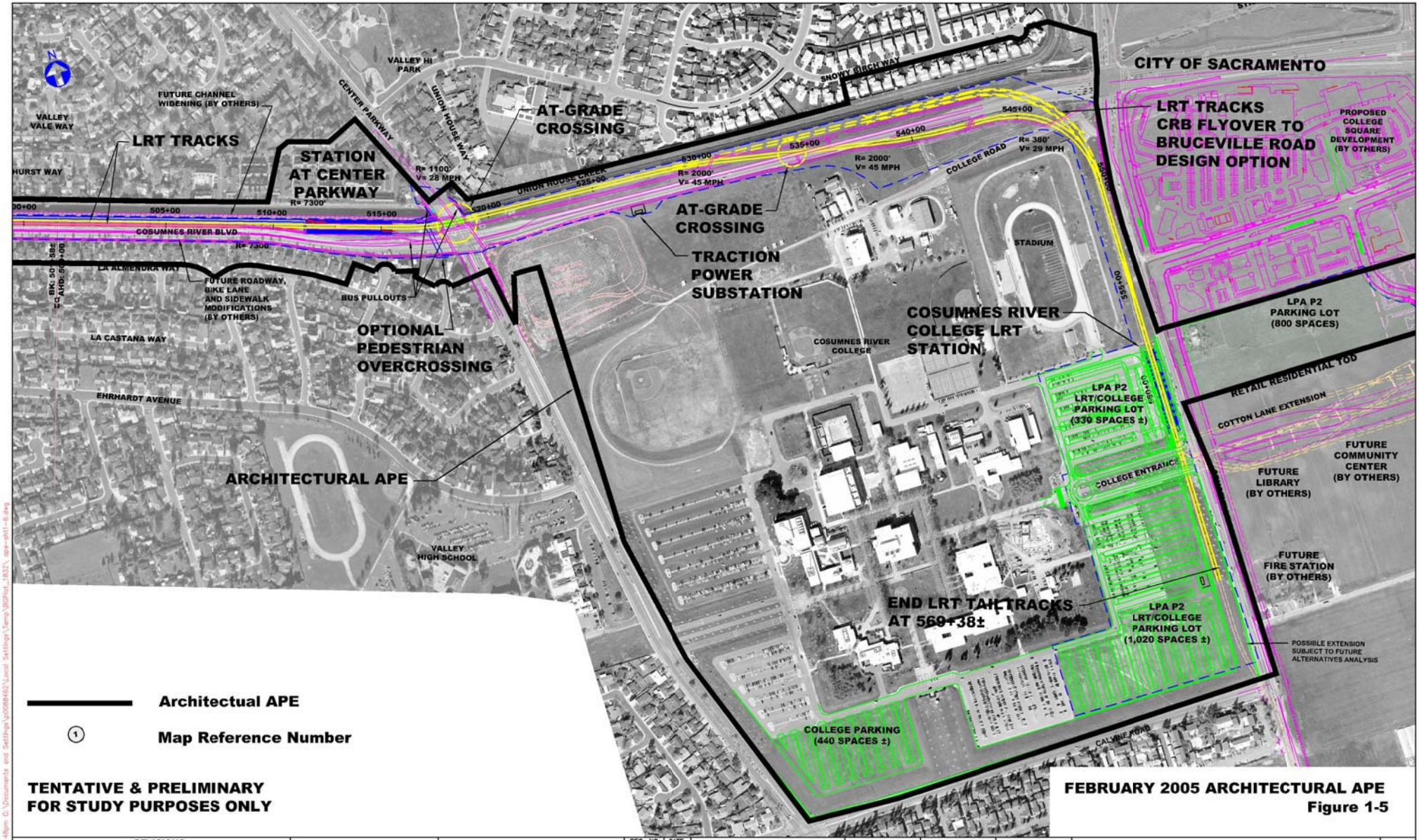
CI:
FILE: FOOTPRINT.DWG
DWG#: 1

REGIONAL
TRANSIT

SOUTH SACRAMENTO PHASE 2 CORRIDOR
CONCEPTUAL ENGINEERING
PROJECT FOOTPRINT

G-04
SHEET 4 OF 6

Apr 26 - 2005 - 1:09pm C:\Documents and Settings\p0028463\Local Settings\Temp\AGPlot_1832\ape-sht1-6.dwg



TENTATIVE & PRELIMINARY
FOR STUDY PURPOSES ONLY

FEBRUARY 2005 ARCHITECTURAL APE
Figure 1-5

REVISIONS				
MARK	DATE	DESCRIPTION	BY	CHKD

SCALE: VERTICAL: ____ HORIZONTAL: 1"=200'
ORIGINAL SCALE IN INCHES FOR REDUCED PLAN
0 1 2 3

PROJECT ENGINEER: ____
DESIGNED BY: ____
DRAWN BY: ____
CHECKED BY: ____

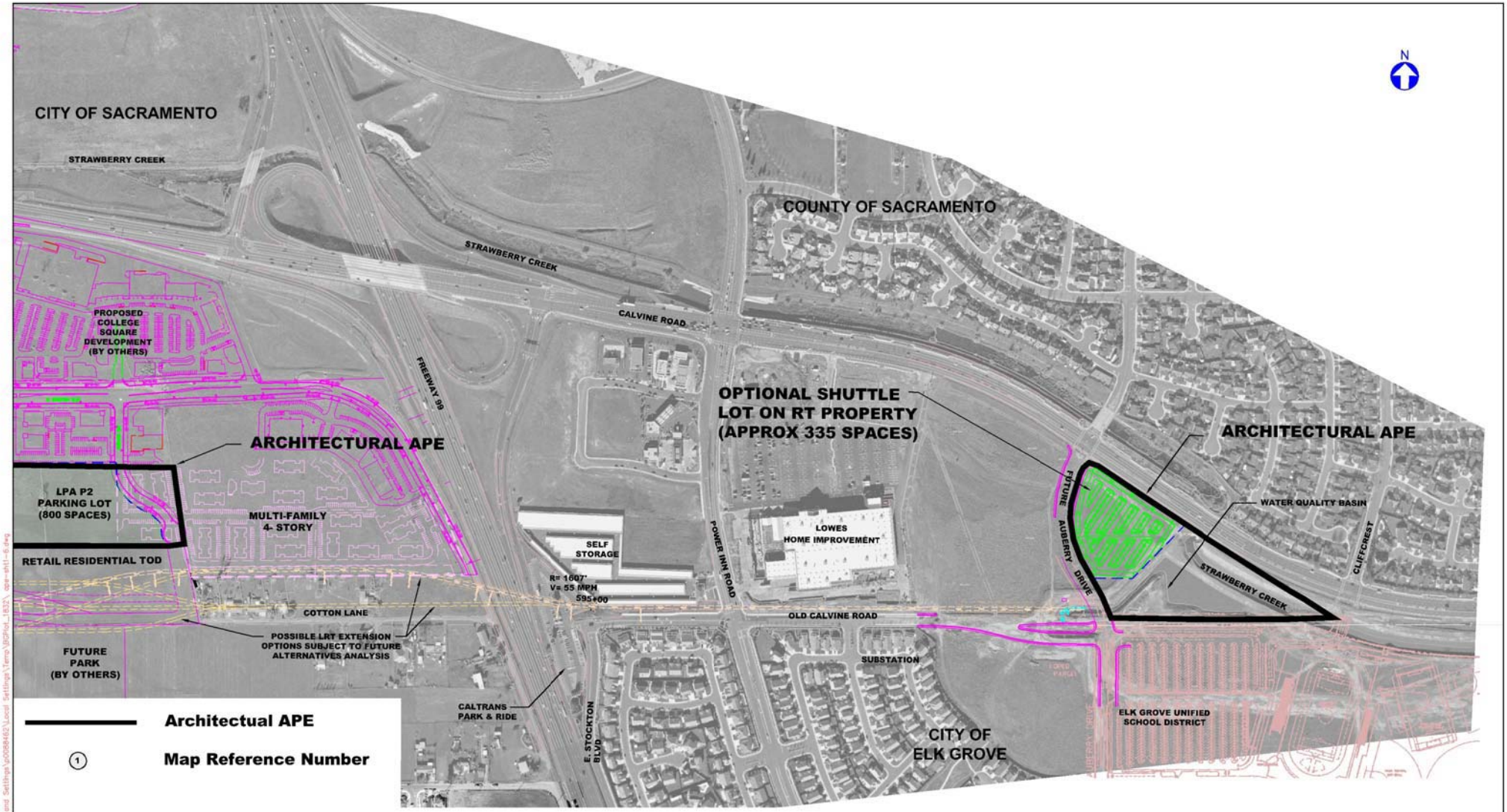
REG. NO.	DATE

CI:
FILE: FOOTPRINT.DWG
DWG#: 1

REGIONAL TRANSIT

SOUTH SACRAMENTO PHASE 2 CORRIDOR
CONCEPTUAL ENGINEERING
PROJECT FOOTPRINT

G-05
SHEET 5 OF 6



TENTATIVE & PRELIMINARY
FOR STUDY PURPOSES ONLY

FEBRUARY 2005 ARCHITECTURAL APE
Figure 1-6

REVISIONS				
MARK	DATE	DESCRIPTION	BY	CHKD

SCALE: VERTICAL: ____ HORIZONTAL: 1"=200'
ORIGINAL SCALE IN INCHES FOR REDUCED PLAN
0 1 2 3

PROJECT ENGINEER: ____
DESIGNED BY: ____
DRAWN BY: ____
CHECKED BY: ____

REG. NO.	DATE

CI:
FILE: FOOTPRINT.DWG
DWG#: 1

REGIONAL
TRANSIT

SOUTH SACRAMENTO PHASE 2 CORRIDOR
CONCEPTUAL ENGINEERING
PROJECT FOOTPRINT

G-06
SHEET 6 OF 6

APPENDIX I:

Air Quality Appendices

Air Quality Technical Appendices

CARB Data

Air Resources Board

iADAM

Highest 4 Daily Maximum 8-Hour Carbon Monoxide Averages

Sacramento-Del Paso Manor

FAQs

Year:	2005		2006		2007	
	Date	Measurement	Date	Measurement	Date	Measurement
National:						
First High:	Dec 11	3.51	Dec 3	3.49	Jan 24	2.90
Second High:	Dec 14	3.34	Dec 4	2.99	Jan 20	2.76
Third High:	Nov 23	3.09	Dec 3	2.93	Jan 25	2.67
Fourth High:	Nov 22	2.99	Dec 6	2.86	Jan 24	2.56
California:						
First High:	Dec 11	3.51	Dec 2	3.49	Jan 23	2.90
Second High:	Dec 13	3.34	Dec 4	2.99	Jan 19	2.76
Third High:	Nov 22	3.09	Dec 5	2.86	Jan 25	2.67
Fourth High:	Nov 21	2.96	Dec 1	2.80	Jan 9	2.33
# Days Above Nat'l Standard:		0		0		0
# Days Above State Standard:		0		0		0
Year Coverage:		97		96		95

Go Backward One Year | New Top 4 Summary | Go Forward One Year

Notes: All averages are expressed in parts per million.
State exceedances are shown in yellow . National exceedances are shown in orange .
An exceedance is not necessarily a violation.
Year Coverage indicates the extent to which available monitoring data represent the time of the year when concentrations are expected to be highest. 0 means that data represent none of the high period; 100 means that data represent the entire high period.
* There was insufficient (or no) data available to determine the value.

Switch: Hourly Ozone | 8-Hour Ozone | PM10 | PM2.5 | Nitrogen Dioxide | Sulfur Dioxide | Hydrogen Sulfide

Go to: Data Statistics Home Page | Top 4 Summaries Start Page

Welcome to California

Air Resources Board

iADAM

Highest 4 Daily Maximum Hourly Ozone Measurements

Sacramento-T Street

FAQs

Year:	2005		2006		2007	
	Date	Measurement	Date	Measurement	Date	Measurement
First High:	Jul 14	0.108	Jul 23	0.106	Jul 5	0.109
Second High:	Sep 30	0.102	Sep 1	0.103	Jun 18	0.095
Third High:	Jul 13	0.097	Sep 12	0.103	Sep 6	0.088
Fourth High:	Jul 15	0.096	Jun 23	0.099	Aug 30	0.087
# Days Above State Standard:		4		6		2
California Designation Value:		0.10		0.10		0.11
Expected Peak Day Conc.:		0.102		0.103		0.105
# Days Above Nat'l Standard:		*0*		*0*		*0*
National Design Value:		*0.102*		*0.103*		*0.103*
Year Coverage:		99		96		97

Go Backward One Year | New Top 4 Summary | Go Forward One Year

Notes: All concentrations are expressed in parts per million.
The national 1-hour ozone standard was revoked in June 2005 and is no longer in effect. Statistics related to the revoked standard are shown in *italics* or *italics* .
State exceedances are shown in yellow . Exceedances of the revoked national 1-hour standard are shown in *orange* .
An exceedance is not necessarily a violation.
Year Coverage indicates the extent to which available monitoring data represent the time of the year when concentrations are expected to be highest. 0 means that data represent none of the high period; 100 means that data represent the entire high period.
* There was insufficient (or no) data available to determine the value.

Switch: 8-Hour Ozone | PM10 | PM2.5 | Carbon Monoxide | Nitrogen Dioxide | Sulfur Dioxide | Hydrogen Sulfide

Go to: Data Statistics Home Page | Top 4 Summaries Start Page

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Air Resources Board

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Highest 4 Daily Maximum 8-Hour Ozone Averages

Sacramento-T Street

FAQs

Year:	2005		2006		2007	
	Date	8-Hr Average	Date	8-Hr Average	Date	8-Hr Average
National:						
First High:	Jul 14	0.087	Sep 12	0.090	Jul 5	0.089
Second High:	Jul 13	0.083	Jul 23	0.086	Aug 28	0.078
Third High:	Jul 15	0.083	Sep 1	0.085	Aug 30	0.075
Fourth High:	Jul 26	0.077	Jul 20	0.084	Jun 18	0.073
California:						
First High:	Jul 14	0.087	Sep 12	0.090	Jul 5	0.090
Second High:	Jul 13	0.084	Jul 23	0.087	Aug 28	0.078
Third High:	Jul 15	0.083	Sep 1	0.086	Aug 30	0.076
Fourth High:	Jul 26	0.077	Jul 20	0.085	Jun 18	0.073
National:						
# Days Above Nat'l 1997 Std.:		1		3		2
Nat'l 1997 Std. Design Value:		0.073		0.076		0.078
National Year Coverage:		99		96		97
California:						
# Days Above State Standard:		5		14		7
California Designation Value:		0.084		0.087		0.090
Expected Peak Day Conc.:		0.083		0.088		0.090
California Year Coverage:		99		96		97

Go Backward One Year | New Top 4 Summary | Go Forward One Year

Notes: All averages are expressed in parts per million.
National exceedances are shown in **orange** . State exceedances are shown in **yellow** .
An exceedance is not necessarily a violation.
Year Coverage indicates the extent to which available monitoring data represent the time of the year when concentrations are expected to be highest. 0 means that data represent none of the high period; 100 means that data represent the entire high period.
* There was insufficient (or no) data available to determine the value.

Switch: Hourly Ozone | PM10 | PM2.5 | Carbon Monoxide | Nitrogen Dioxide | Sulfur Dioxide | Hydrogen Sulfide

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Highest 4 Daily Maximum Hourly Nitrogen Dioxide Measurements

Sacramento-T Street

FAQs

Year:	2005		2006		2007	
	Date	Measurement	Date	Measurement	Date	Measurement
First High:	Sep 29	0.071	Sep 12	0.077	Nov 7	0.064
Second High:	Sep 30	0.065	Oct 23	0.061	Sep 26	0.061
Third High:	Oct 13	0.061	Oct 9	0.058	Oct 23	0.061
Fourth High:	Nov 21	0.059	Oct 24	0.058	Jan 26	0.059
# Days Above State Standard:		0		0		0
Annual Average:		0.016		0.016		0.015
Year Coverage:		100		99		92

Go Backward One Year | New Top 4 Summary | Go Forward One Year

Notes: All concentrations are expressed in parts per million.
State exceedances are shown in yellow . National exceedances are shown in orange .
An exceedance is not necessarily a violation.
Year Coverage indicates the extent to which available monitoring data represent the time of the year when concentrations are expected to be highest. 0 means that data represent none of the high period; 100 means that data represent the entire high period. A high Year Coverage does not mean that there was sufficient data for annual statistics to be considered valid.
* There was insufficient (or no) data available to determine the value.

Switch: Hourly Ozone | 8-Hour Ozone | PM10 | PM2.5 | Carbon Monoxide | Sulfur Dioxide | Hydrogen Sulfide

Go to: Data Statistics Home Page | Top 4 Summaries Start Page

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Air Resources Board

iADAM

Highest 4 Daily Maximum 24-Hour Sulfur Dioxide Averages

Sacramento-Del Paso Manor

FAQs

Year:	2005		2006		2007	
	Date	Measurement	Date	Measurement	Date	Measurement
First High:	Jul 5	0.003	Jul 10	0.002	Jul 4	0.004
Second High:	Jul 2	0.003	Jun 9	0.002	Jan 25	0.003
Third High:	Jul 17	0.002	Jun 6	0.002	Jan 24	0.002
Fourth High:	Jul 6	0.002	May 15	0.002	Jun 16	0.002
# Days Above Nat'l Standard:		0		0		0
# Days Above State Standard:		0		0		0
Annual Average:		0.001		0.001		0.001
Year Coverage:		94		93		98

Go Backward One Year | New Top 4 Summary | Go Forward One Year

Notes: All averages are expressed in parts per million.
State exceedances are shown in yellow . National exceedances are shown in orange .
National exceedances are also state exceedances.
An exceedance is not necessarily a violation.
Year Coverage indicates the extent to which available monitoring data represent the time of the year when concentrations are expected to be highest. 0 means that data represent none of the high period; 100 means that data represent the entire high period.
* There was insufficient (or no) data available to determine the value.

Switch: Hourly Ozone | 8-Hour Ozone | PM10 | PM2.5 | Carbon Monoxide | Nitrogen Dioxide | Hydrogen Sulfide

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Air Resources Board

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Highest 4 Daily PM10 Measurements

Sacramento-T Street

FAQs

Year:	2005		2006		2007	
	Date	Measurement	Date	Measurement	Date	Measurement
National:						
First High:	Nov 18	53.0	Sep 20	109.0	Dec 14	53.4
Second High:	Dec 12	52.0	Oct 26	68.0	Jan 24	53.0
Third High:	Feb 3	50.0	Nov 1	60.0	Feb 5	53.0
Fourth High:	Nov 24	50.0	Dec 7	58.0	Nov 26	52.0
California:						
First High:	Nov 18	55.0	Sep 20	111.0	Dec 14	57.4
Second High:	Dec 12	55.0	Oct 26	71.0	Jan 24	56.0
Third High:	Feb 3	52.0	Nov 1	62.0	Feb 5	55.0
Fourth High:	Nov 24	52.0	Dec 7	62.0	Nov 26	55.0
Measured:						
# Days Above Nat'l Standard:		0		0		0
# Days Above State Standard:		4		8		5
Estimated:						
3-Yr Avg # Days Above Nat'l Std:		*		*		0.0
# Days Above Nat'l Standard:		0.0		0.0		0.0
# Days Above State Standard:		24.4		*		30.3
State 3-Yr Maximum Average:		23		21		21
State Annual Average:		21.5		*		20.5
National 3-Year Average:		*21*		*22*		*22*
National Annual Average:		*20.9*		*26.4*		*19.9*
Year Coverage:		95		98		100

Go Backward One Year | New Top 4 Summary | Go Forward One Year

Notes: All concentrations are expressed in micrograms per cubic meter.
The national annual average PM10 standard was revoked in December 2006 and is no longer in effect.
Statistics related to the revoked standard are shown in *italics* or *italics* .
State exceedances are shown in yellow . National exceedances are shown in **orange** .
An exceedance is not necessarily a violation.
Statistics may include data that are related to an exceptional event.
State and national statistics may differ for the following reasons:
State statistics are based on California approved samplers, whereas national statistics are based on samplers using federal reference or equivalent methods.
State and national statistics may therefore be based on different samplers.
State statistics for 1998 and later are based on *local* conditions (except for sites in the South Coast Air Basin, where State statistics for 2002 and later are based on *local* conditions).
National statistics are based on *standard* conditions.
State criteria for ensuring that data are sufficiently complete for calculating valid annual averages are more stringent than the national criteria.
Measurements are usually collected every six days. Measured days counts the days that a measurement was greater than the level of the standard; Estimated days mathematically estimates how many days concentrations would have been greater than the level of the standard had each day been monitored.
3-Year statistics represent the listed year and the 2 years before the listed year.
Year Coverage indicates the extent to which available monitoring data represent the time of the year when concentrations are expected to be highest. 0 means that data represent none of the high period; 100 means that data represent the entire high period. A high Year Coverage does not mean that there was sufficient data for annual statistics to be considered valid.
* There was insufficient (or no) data available to determine the value.

Switch: Hourly Ozone | 8-Hour Ozone | PM2.5 | Carbon Monoxide | Nitrogen Dioxide | Sulfur Dioxide | Hydrogen Sulfide

Welcome to California

Air Resources Board

iADAM

Highest 4 Daily PM2.5 Measurements

Sacramento-T Street

FAQs

Year:	2005		2006		2007	
	Date	Measurement	Date	Measurement	Date	Measurement
National:						
First High:	Dec 11	59.0	May 10	54.0	Jan 2	58.0
Second High:	Dec 14	56.0	Dec 31	46.0	Jan 23	47.0
Third High:	Dec 13	53.0	Dec 25	43.0	Jan 22	46.0
Fourth High:	Feb 3	50.0	Dec 20	42.0	Jan 9	45.0
California:						
First High:	Dec 11	63.8	May 10	54.0	Jan 2	58.0
Second High:	Dec 14	57.7	Dec 25	48.8	Apr 27	55.8
Third High:	Dec 13	56.3	Dec 20	46.7	Jan 22	49.0
Fourth High:	Feb 4	55.1	Dec 31	46.0	Jan 9	48.6
Est Days > Nat'l '97 24-Hr Std:		0.0		*		0.0
Measured Days > Nat'l '97 24-Hr Std:		0		0		0
Nat'l '97 24-Hour Std Design Value:		*		*		*
Nat'l '97 24-Hr Std 98th Percentile:		47.0		*		42.0
National Annual Std Design Value:		*		*		*
National Annual Average:		10.9		*		11.9
State Ann'l Std Designation Value:		13		13		13
State Annual Average:		12.5		12.9		*
Year Coverage:		90		95		54

Go Backward One Year New Top 4 Summary Go Forward One Year

Notes: All concentrations are expressed in micrograms per cubic meter.
State exceedances are shown in yellow . National exceedances are shown in orange .
An exceedance is not necessarily a violation.
State and national statistics may differ for the following reasons:
State statistics are based on California approved samplers, whereas national statistics are based on samplers using federal reference or equivalent methods.
State and national statistics may therefore be based on different samplers.
State criteria for ensuring that data are sufficiently complete for calculating valid annual averages are more stringent than the national criteria.
Year Coverage indicates the extent to which available monitoring data represent the time of the year when concentrations are expected to be highest. 0 means that data represent none of the high period; 100 means that data represent the entire high period. A high Year Coverage does not mean that there was sufficient data for annual statistics to be considered valid.
* There was insufficient data available throughout the year to determine the value.

Switch: Hourly Ozone | 8-Hour Ozone | PM10 | Carbon Monoxide | Nitrogen Dioxide | Sulfur Dioxide | Hydrogen Sulfide

Go to: Data Statistics Home Page | Top 4 Summaries Start Page

EMFAC2007 Output Files

Title : EMFAC 2008 & 2030
Version : Emfac2007 V2.3 Nov 1 2006
Run Date : 2008/07/07 15:48:52
Scen Year: 2008 -- All model years in the range 1965 to 2008 selected
Season : Annual
Area : Sacramento
****

Year: 2008 -- Model Years 1965 to 2008 Inclusive -- Annual
Emfac2007 Emission Factors: V2.3 Nov 1 2006

County Average Sacramento County Average

Table 1: Running Exhaust Emissions (grams/mile; grams/idle-hour)

Pollutant Name: Total Organic Gases Temperature: 60F Relative Humidity: 50%

Speed MPH	LDA	LDT	MDT	HDT	UBUS	MCY	ALL
0	0.000	0.000	4.398	10.541	0.000	0.000	1.201
20	0.224	0.250	0.334	1.364	1.122	3.263	0.333

Pollutant Name: Carbon Monoxide Temperature: 60F Relative Humidity: 50%

Speed MPH	LDA	LDT	MDT	HDT	UBUS	MCY	ALL
0	0.000	0.000	25.558	46.338	0.000	0.000	6.221
20	3.956	4.584	4.970	10.893	9.547	25.711	4.858

Pollutant Name: Oxides of Nitrogen Temperature: 60F Relative Humidity: 50%

Speed MPH	LDA	LDT	MDT	HDT	UBUS	MCY	ALL
0	0.000	0.000	5.892	74.459	0.000	0.000	4.676
20	0.362	0.569	1.092	12.777	11.106	1.220	1.194

Pollutant Name: Carbon Dioxide Temperature: 60F Relative Humidity: 50%

Speed MPH	LDA	LDT	MDT	HDT	UBUS	MCY	ALL
0	0.000	0.000	1091.616	4843.355	0.000	0.000	411.273
20	463.972	567.615	778.241	1679.937	1851.244	151.637	607.240

Pollutant Name: Sulfur Dioxide Temperature: 60F Relative Humidity: 50%

Speed MPH	LDA	LDT	MDT	HDT	UBUS	MCY	ALL
0	0.000	0.000	0.011	0.047	0.000	0.000	0.004
20	0.005	0.006	0.008	0.016	0.018	0.002	0.006

Pollutant Name: PM10 Temperature: 60F Relative Humidity: 50%

Speed MPH	LDA	LDT	MDT	HDT	UBUS	MCY	ALL
0	0.000	0.000	0.066	1.388	0.000	0.000	0.080
20	0.017	0.031	0.032	0.553	0.193	0.034	0.052

Pollutant Name: PM10 - Tire Wear Temperature: 60F Relative Humidity: 50%

Speed MPH	LDA	LDT	MDT	HDT	UBUS	MCY	ALL
0	0.000	0.000	0.000	0.000	0.000	0.000	0.000
20	0.008	0.008	0.009	0.022	0.010	0.004	0.009

Pollutant Name: PM10 - Break Wear Temperature: 60F Relative Humidity: 50%

Speed MPH	LDA	LDT	MDT	HDT	UBUS	MCY	ALL
0	0.000	0.000	0.000	0.000	0.000	0.000	0.000
20	0.013	0.013	0.013	0.020	0.013	0.006	0.013

Title : BURDEN 2008 & 2030
Version : Emfac2007 V2.3 Nov 1 2006
Run Date : 2008/07/07 15:48:52
Scen Year: 2008 -- All model years in the range 1965 to 2008 selected
Season : Annual
Area : Sacramento County
I/M Stat : Enhanced Interim (2005)
Emissions: Tons Per Day

	Light Duty Passenger Cars				Light Duty Trucks				Medium Duty Trucks				Heavy Duty Trucks: Gasoline Trucks			Heavy Duty Trucks: Diesel Trucks	Heavy Duty Trucks: Total HD Trucks	Urban Buses	Motor-cycles	All Vehicles
	Non-cat	Cat	Diesel	Total	Non-cat	Cat	Diesel	Total	Non-cat	Cat	Diesel	Total	Non-cat	Cat	Total					
Vehicles	9028.	470126.	1828.	480982.	6840.	298807.	8640.	314287.	1543.	114113.	8883.	124539.	1515.	11037.	12552.	17697.	30248.	363.	33674.	984091.
VMT/1000	118.	14782.	38.	14939.	98.	10100.	242.	10440.	32.	4220.	361.	4613.	13.	259.	272.	1278.	1550.	39.	250.	31831.
Trips	36370.	2965520.	10315.	3012210.	28059.	1890350.	53342.	1971750.	12850.	1242870.	108969.	1364690.	42386.	186932.	229318.	357180.	586499.	1450.	67340.	7003940.
Total Organic Gas Emissions																				
Run Exh	0.81	1.50	0.01	2.32	0.67	1.22	0.02	1.91	0.28	0.96	0.10	1.34	0.12	0.30	0.42	1.10	1.52	0.04	0.99	8.13
Idle Exh	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.00	0.03	0.00	0.01	0.01	0.14	0.15	0.00	0.00	0.18
Start Ex	0.24	2.12	0.00	2.37	0.18	1.44	0.00	1.62	0.11	1.10	0.00	1.21	0.63	0.42	1.04	0.00	1.04	0.00	0.21	6.45
Total Ex	1.05	3.63	0.01	4.69	0.86	2.65	0.02	3.53	0.39	2.09	0.10	2.58	0.75	0.73	1.48	1.24	2.72	0.04	1.20	14.75
Diurnal	0.06	0.48	0.00	0.54	0.05	0.28	0.00	0.32	0.00	0.08	0.00	0.09	0.00	0.00	0.00	0.00	0.00	0.00	0.08	1.04
Hot Soak	0.13	0.66	0.00	0.79	0.10	0.37	0.00	0.47	0.01	0.15	0.00	0.17	0.02	0.01	0.03	0.00	0.03	0.00	0.04	1.50
Running	0.75	1.91	0.00	2.66	0.37	1.95	0.00	2.32	0.05	1.20	0.00	1.25	0.20	0.14	0.34	0.00	0.34	0.00	0.21	6.79
Resting	0.04	0.24	0.00	0.28	0.03	0.14	0.00	0.17	0.00	0.05	0.00	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.54
Total	2.04	6.92	0.01	8.96	1.41	5.40	0.02	6.83	0.46	3.57	0.10	4.12	0.98	0.88	1.86	1.24	3.10	0.04	1.56	24.62
Carbon Monoxide Emissions																				
Run Exh	9.80	40.86	0.03	50.69	8.01	34.96	0.15	43.13	4.81	17.54	0.43	22.77	3.26	4.83	8.09	4.78	12.87	0.35	11.40	141.22
Idle Exh	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.17	0.01	0.18	0.01	0.06	0.07	0.47	0.54	0.00	0.00	0.72
Start Ex	1.24	22.05	0.00	23.29	0.96	16.76	0.00	17.71	0.70	12.70	0.00	13.40	5.18	7.02	12.20	0.00	12.20	0.03	0.75	67.39
Total Ex	11.04	62.91	0.03	73.98	8.97	51.72	0.15	60.84	5.51	30.40	0.43	36.35	8.44	11.91	20.36	5.25	25.61	0.39	12.15	209.32
Oxides of Nitrogen Emissions																				
Run Exh	0.61	4.10	0.06	4.77	0.50	4.69	0.37	5.55	0.24	2.93	1.99	5.16	0.10	1.19	1.29	19.87	21.15	0.47	0.37	37.47
Idle Exh	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.03	0.00	0.00	0.00	0.98	0.98	0.00	0.00	1.01
Start Ex	0.06	1.46	0.00	1.52	0.04	1.39	0.00	1.43	0.02	1.78	0.00	1.80	0.08	0.72	0.80	0.00	0.80	0.00	0.02	5.59
Total Ex	0.66	5.57	0.06	6.29	0.54	6.08	0.37	6.99	0.26	4.72	2.02	6.99	0.19	1.90	2.09	20.85	22.94	0.47	0.39	44.06
Carbon Dioxide Emissions (000)																				
Run Exh	0.06	6.01	0.02	6.08	0.05	5.08	0.09	5.22	0.02	3.20	0.21	3.43	0.01	0.19	0.20	2.36	2.56	0.08	0.03	17.40
Idle Exh	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.01	0.00	0.00	0.00	0.06	0.06	0.00	0.00	0.07
Start Ex	0.01	0.24	0.00	0.25	0.01	0.19	0.00	0.19	0.00	0.11	0.00	0.11	0.01	0.01	0.02	0.00	0.02	0.00	0.00	0.57
Total Ex	0.07	6.25	0.02	6.33	0.06	5.27	0.09	5.42	0.03	3.31	0.21	3.54	0.02	0.20	0.22	2.42	2.64	0.08	0.04	18.05
PM10 Emissions																				
Run Exh	0.00	0.16	0.00	0.17	0.00	0.20	0.01	0.22	0.00	0.09	0.02	0.11	0.00	0.00	0.00	0.68	0.69	0.01	0.01	1.21
Idle Exh	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.02	0.00	0.00	0.02
Start Ex	0.00	0.02	0.00	0.02	0.00	0.02	0.00	0.02	0.00	0.01	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.06
Total Ex	0.00	0.18	0.00	0.19	0.00	0.22	0.01	0.24	0.00	0.10	0.02	0.12	0.00	0.00	0.00	0.70	0.71	0.01	0.01	1.28
TireWear	0.00	0.13	0.00	0.13	0.00	0.09	0.00	0.09	0.00	0.04	0.00	0.05	0.00	0.00	0.00	0.03	0.04	0.00	0.00	0.31
BrakeWr	0.00	0.20	0.00	0.21	0.00	0.14	0.00	0.14	0.00	0.06	0.00	0.06	0.00	0.00	0.00	0.03	0.03	0.00	0.00	0.45
Total	0.01	0.52	0.01	0.53	0.01	0.45	0.02	0.48	0.00	0.20	0.03	0.23	0.00	0.01	0.01	0.77	0.78	0.01	0.01	2.04
Lead	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SOx	0.00	0.06	0.00	0.06	0.00	0.05	0.00	0.05	0.00	0.03	0.00	0.03	0.00	0.00	0.00	0.02	0.03	0.00	0.00	0.18
Fuel Consumption (000 gallons)																				
Gasoline	9.42	650.60	0.00	660.03	7.71	548.29	0.00	556.00	3.71	344.42	0.00	348.13	3.55	22.69	26.24	0.00	26.24	1.61	6.20	1598.22
Diesel	0.00	0.00	1.37	1.37	0.00	0.00	8.31	8.31	0.00	0.00	18.71	18.71	0.00	0.00	0.00	217.42	217.42	5.62	0.00	251.43

Title : EMFAC 2008 & 2030
Version : Emfac2007 V2.3 Nov 1 2006
Run Date : 2008/07/07 15:48:52
Scen Year: 2030 -- All model years in the range 1986 to 2030 selected
Season : Annual
Area : Sacramento
****

Year: 2030 -- Model Years 1986 to 2030 Inclusive -- Annual
Emfac2007 Emission Factors: V2.3 Nov 1 2006

County Average Sacramento County Average

Table 1: Running Exhaust Emissions (grams/mile; grams/idle-hour)

Pollutant Name: Total Organic Gases Temperature: 60F Relative Humidity: 50%

Speed MPH	LDA	LDT	MDT	HDT	UBUS	MCY	ALL
0	0.000	0.000	4.022	7.234	0.000	0.000	0.921
20	0.025	0.042	0.066	0.265	0.573	2.618	0.070

Pollutant Name: Carbon Monoxide Temperature: 60F Relative Humidity: 50%

Speed MPH	LDA	LDT	MDT	HDT	UBUS	MCY	ALL
0	0.000	0.000	24.084	41.165	0.000	0.000	5.407
20	0.709	1.129	1.456	1.528	5.094	16.326	1.124

Pollutant Name: Oxides of Nitrogen Temperature: 60F Relative Humidity: 50%

Speed MPH	LDA	LDT	MDT	HDT	UBUS	MCY	ALL
0	0.000	0.000	4.958	82.510	0.000	0.000	4.736
20	0.054	0.101	0.228	2.070	5.740	1.144	0.209

Pollutant Name: Carbon Dioxide Temperature: 60F Relative Humidity: 50%

Speed MPH	LDA	LDT	MDT	HDT	UBUS	MCY	ALL
0	0.000	0.000	1096.016	4887.530	0.000	0.000	393.591
20	455.356	573.941	780.904	1685.133	1686.682	168.679	599.522

Pollutant Name: Sulfur Dioxide Temperature: 60F Relative Humidity: 50%

Speed MPH	LDA	LDT	MDT	HDT	UBUS	MCY	ALL
0	0.000	0.000	0.011	0.047	0.000	0.000	0.004
20	0.004	0.006	0.008	0.016	0.016	0.002	0.006

Pollutant Name: PM10 Temperature: 60F Relative Humidity: 50%

Speed MPH	LDA	LDT	MDT	HDT	UBUS	MCY	ALL
0	0.000	0.000	0.050	0.432	0.000	0.000	0.028
20	0.017	0.035	0.040	0.107	0.111	0.017	0.030

Pollutant Name: PM10 - Tire Wear Temperature: 60F Relative Humidity: 50%

Speed MPH	LDA	LDT	MDT	HDT	UBUS	MCY	ALL
0	0.000	0.000	0.000	0.000	0.000	0.000	0.000
20	0.008	0.008	0.009	0.022	0.010	0.004	0.009

Pollutant Name: PM10 - Break Wear Temperature: 60F Relative Humidity: 50%

Speed MPH	LDA	LDT	MDT	HDT	UBUS	MCY	ALL
0	0.000	0.000	0.000	0.000	0.000	0.000	0.000
20	0.013	0.013	0.013	0.019	0.013	0.006	0.013

Title : BURDEN 2008 & 2030
Version : Emfac2007 V2.3 Nov 1 2006
Run Date : 2008/07/07 15:48:52
Scen Year: 2030 -- All model years in the range 1986 to 2030 selected
Season : Annual
Area : Sacramento County
I/M Stat : Enhanced Interim (2005)
Emissions: Tons Per Day

	Light Duty Passenger Cars				Light Duty Trucks				Medium Duty Trucks				Heavy Duty Trucks: Gasoline Trucks			Heavy Duty Trucks: Diesel Trucks	Heavy Duty Trucks: Total HD Trucks	Urban Buses	Motor-cycles	All Vehicles
	Non-cat	Cat	Diesel	Total	Non-cat	Cat	Diesel	Total	Non-cat	Cat	Diesel	Total	Non-cat	Cat	Total					
Vehicles	0.	645788.	86.	645874.	0.	425847.	1148.	426996.	0.	156012.	10083.	166095.	0.	14220.	14220.	23802.	38022.	441.	44343.	1321770.
VMT/1000	0.	19760.	1.	19761.	0.	13107.	19.	13126.	0.	5168.	349.	5517.	0.	293.	293.	1623.	1917.	48.	316.	40685.
Trips	0.	3992960.	415.	3993380.	0.	2593420.	5332.	2598750.	0.	1681030.	126075.	1807100.	0.	216656.	216656.	505231.	721886.	1763.	88678.	9211560.
Total Organic Gas Emissions																				
Run Exh	0.00	0.32	0.00	0.32	0.00	0.37	0.00	0.38	0.00	0.24	0.05	0.29	0.00	0.02	0.02	0.37	0.39	0.02	0.95	2.35
Idle Exh	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.00	0.04	0.00	0.01	0.01	0.09	0.10	0.00	0.00	0.14
Start Ex	0.00	0.31	0.00	0.31	0.00	0.38	0.00	0.38	0.00	0.41	0.00	0.41	0.00	0.13	0.13	0.00	0.13	0.00	0.23	1.47
Total Ex	0.00	0.63	0.00	0.63	0.00	0.75	0.00	0.75	0.00	0.69	0.05	0.74	0.00	0.17	0.17	0.46	0.63	0.03	1.18	3.96
Diurnal	0.00	0.17	0.00	0.17	0.00	0.21	0.00	0.21	0.00	0.08	0.00	0.08	0.00	0.00	0.00	0.00	0.00	0.00	0.09	0.55
Hot Soak	0.00	0.40	0.00	0.40	0.00	0.40	0.00	0.40	0.00	0.18	0.00	0.18	0.00	0.01	0.01	0.00	0.01	0.00	0.03	1.01
Running	0.00	0.96	0.00	0.96	0.00	1.53	0.00	1.53	0.00	1.02	0.00	1.02	0.00	0.10	0.10	0.00	0.10	0.00	0.12	3.73
Resting	0.00	0.13	0.00	0.13	0.00	0.17	0.00	0.17	0.00	0.07	0.00	0.07	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.41
Total	0.00	2.28	0.00	2.28	0.00	3.07	0.00	3.07	0.00	2.03	0.05	2.08	0.00	0.27	0.27	0.46	0.73	0.03	1.47	9.66
Carbon Monoxide Emissions																				
Run Exh	0.00	11.71	0.00	11.71	0.00	12.91	0.01	12.92	0.00	7.00	0.35	7.35	0.00	0.46	0.46	2.18	2.64	0.23	7.63	42.48
Idle Exh	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.21	0.01	0.22	0.00	0.06	0.06	0.46	0.52	0.00	0.00	0.74
Start Ex	0.00	4.72	0.00	4.72	0.00	5.50	0.00	5.50	0.00	5.55	0.00	5.55	0.00	2.21	2.21	0.00	2.21	0.04	1.11	19.13
Total Ex	0.00	16.43	0.00	16.43	0.00	18.41	0.01	18.43	0.00	12.76	0.36	13.12	0.00	2.74	2.74	2.64	5.37	0.27	8.74	62.35
Oxides of Nitrogen Emissions																				
Run Exh	0.00	0.90	0.00	0.90	0.00	1.15	0.03	1.18	0.00	0.75	0.51	1.26	0.00	0.13	0.13	3.52	3.66	0.29	0.40	7.69
Idle Exh	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.03	0.00	0.00	0.00	1.28	1.28	0.00	0.00	1.31
Start Ex	0.00	0.24	0.00	0.24	0.00	0.35	0.00	0.35	0.00	1.45	0.00	1.45	0.00	0.28	0.28	0.00	0.28	0.01	0.03	2.34
Total Ex	0.00	1.13	0.00	1.14	0.00	1.50	0.03	1.53	0.00	2.20	0.54	2.74	0.00	0.41	0.41	4.80	5.21	0.30	0.43	11.34
Carbon Dioxide Emissions (000)																				
Run Exh	0.00	7.71	0.00	7.71	0.00	6.53	0.01	6.54	0.00	3.90	0.20	4.10	0.00	0.22	0.22	2.98	3.20	0.09	0.06	21.69
Idle Exh	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.01	0.00	0.00	0.00	0.07	0.07	0.00	0.00	0.08
Start Ex	0.00	0.31	0.00	0.31	0.00	0.26	0.00	0.26	0.00	0.15	0.00	0.15	0.00	0.01	0.01	0.00	0.01	0.00	0.00	0.73
Total Ex	0.00	8.02	0.00	8.02	0.00	6.79	0.01	6.80	0.00	4.06	0.20	4.26	0.00	0.23	0.23	3.04	3.28	0.09	0.06	22.49
PM10 Emissions																				
Run Exh	0.00	0.22	0.00	0.22	0.00	0.30	0.00	0.30	0.00	0.15	0.01	0.16	0.00	0.00	0.00	0.19	0.19	0.00	0.01	0.88
Idle Exh	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Start Ex	0.00	0.03	0.00	0.03	0.00	0.04	0.00	0.04	0.00	0.02	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.08
Total Ex	0.00	0.24	0.00	0.24	0.00	0.34	0.00	0.34	0.00	0.16	0.01	0.18	0.00	0.00	0.00	0.20	0.20	0.00	0.01	0.97
TireWear	0.00	0.17	0.00	0.17	0.00	0.12	0.00	0.12	0.00	0.05	0.00	0.05	0.00	0.00	0.00	0.04	0.05	0.00	0.00	0.39
BrakeWr	0.00	0.27	0.00	0.27	0.00	0.18	0.00	0.18	0.00	0.07	0.00	0.08	0.00	0.00	0.00	0.04	0.04	0.00	0.00	0.57
Total	0.00	0.69	0.00	0.69	0.00	0.63	0.00	0.63	0.00	0.29	0.02	0.31	0.00	0.01	0.01	0.27	0.29	0.01	0.01	1.93
Lead	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SOx	0.00	0.08	0.00	0.08	0.00	0.07	0.00	0.07	0.00	0.04	0.00	0.04	0.00	0.00	0.00	0.03	0.03	0.00	0.00	0.22
Fuel Consumption (000 gallons)																				
Gasoline	0.00	823.43	0.00	823.43	0.00	698.19	0.00	698.19	0.00	417.71	0.00	417.71	0.00	24.22	24.22	0.00	24.22	1.93	7.99	1973.47
Diesel	0.00	0.00	0.05	0.05	0.00	0.00	0.64	0.64	0.00	0.00	18.08	18.08	0.00	0.00	0.00	273.93	273.93	6.04	0.00	298.75

Operational Emission Calculations

SOUTH SACRAMENTO PHASE II - REGIONAL EMISSIONS CALCULATIONS

Alternative	Regional VMT/day /a/	Emission Factor (grams/mile) /b/					
		CO	ROG	NOX	SOX	PM10	PM2.5
No-Action	75,551,000	1.025	0.057	0.192	0.005	0.024	0.02
TSM	75,539,000	1.025	0.057	0.192	0.005	0.024	0.02
LPAP2	75,512,000	1.025	0.057	0.192	0.005	0.024	0.02
		Dailly Emissions (pounds per day)					
		CO	ROG	NOX	SOX	PM10	PM2.5
No-Action		170,725.4	9,494.0	31,979.8	832.8	3,997.5	3,677.68
TSM		170,698.3	9,492.5	31,974.7	832.7	3,996.8	3,677.09
LPAP2		170,637.3	9,489.1	31,963.3	832.4	3,995.4	3,675.78
		Change over No Build					
		CO	ROG	NOX	SOX	PM10	PM2.5
No-Action							
TSM		(27.1)	(1.5)	(5.1)	(0.1)	(0.6)	(0.6)
LPAP2		(88.1)	(4.9)	(16.5)	(0.4)	(2.1)	(1.9)
LPAP2 vs. TSM		(61.01)	(3.39)	(11.43)	(0.30)	(1.43)	(1.31)

/a/ DKS Associates, 2002.

/b/ EMFAC2007.

Carbon Monoxide Hotspot Analysis Calculations and Output Files

Parking Lot Emissions Analysis
Calculations and Output Files

Concentrations of CO for Project

2030 No Project

	1-Hour Bckgrnd Conc.	8-Hour Bckgrnd Conc.	ISC 1-Hour Results	ISC 8-hour Results	CALROADS Results	Parts Per Million	
Intersection					1-hour	1-hour	8-hour
Bruceville & Old Calvine	1.91	1.34	0.31	0.04	0.4	2.6	1.6
Bruceville Rd & Main College	1.91	1.34	0.31	0.04	0.4	2.6	1.6

2030 LPAP2

	1-Hour Bckgrnd Conc.	8-Hour Bckgrnd Conc.	ISC Results	ISC Results	CALROADS Results	Parts Per Million	
Intersection					**1-hour**	**1-hour**	**8-hour**
Bruceville & Old Calvine	1.91	1.34	0.31	0.04	0.5	2.7	1.7
Bruceville Rd & Main College	1.91	1.34	0.31	0.04	0.5	2.7	1.7
South Lot Garage & Old Calvine	1.91	1.34	0.31	0.04	0.3	2.5	1.6

State Standard						20	9.0

JOB: D:\00Projects\South Sacramento\Parking C RUN: Bruceville & College Entrance ~ No Proje

DATE : 7/15/ 8
TIME : 16:37:36

The MODE flag has been set to C for calculating CO averages.

SITE & METEOROLOGICAL VARIABLES

VS = .0 CM/S VD = .0 CM/S Z0 = 100. CM
U = 1.0 M/S CLAS = 6 (F) ATIM = 60. MINUTES MIXH = 1000. M AMB = .0 PPM

LINK VARIABLES

LINK DESCRIPTION	LINK COORDINATES (FT) X1	Y1	X2	Y2	LENGTH (FT)	BRG (DEG)	TYPE	VPH	EF (G/MI)	H (FT)	W (FT)	V/C	QUEUE (VEH)
1. nba	530.0	.0	530.0	500.0	500.	360.	AG	2532.	1.1	.0	80.0		
2. nbd	530.0	500.0	530.0	1000.0	500.	360.	AG	2542.	1.1	.0	80.0		
3. nbq	530.0	464.0	530.0	450.2	14.	180.	AG	6.	100.0	.0	60.0	.38	.7
4. sba	470.0	1000.0	470.0	500.0	500.	180.	AG	2128.	1.1	.0	80.0		
5. sbd	470.0	500.0	470.0	.0	500.	180.	AG	1835.	1.1	.0	80.0		
6. sbq	470.0	536.0	470.0	524.4	12.	180.	AG	6.	100.0	.0	60.0	.32	.6
7. eba	.0	482.0	500.0	482.0	500.	90.	AG	185.	1.1	.0	56.0		
8. ebd	500.0	482.0	1000.0	482.0	500.	90.	AG	72.	1.1	.0	56.0		
9. ebq	440.0	482.0	412.8	482.0	27.	270.	AG	38.	100.0	.0	36.0	.77	1.4
10. wba	1000.0	518.0	500.0	518.0	500.	270.	AG	282.	1.1	.0	56.0		
11. wbd	500.0	518.0	.0	518.0	500.	270.	AG	678.	1.1	.0	56.0		
12. wbq	560.0	518.0	333.8	518.0	226.	270.	AG	38.	100.0	.0	36.0	1.19	11.5

JOB: D:\00Projects\South Sacramento\Parking C RUN: Bruceville & College Entrance ~ No Proje

DATE : 7/15/ 8
TIME : 16:37:36

ADDITIONAL QUEUE LINK PARAMETERS

LINK DESCRIPTION	CYCLE LENGTH (SEC)	RED TIME (SEC)	CLEARANCE LOST TIME (SEC)	APPROACH VOL (VPH)	SATURATION FLOW RATE (VPH)	IDLE EM FAC (gm/hr)	SIGNAL TYPE	ARRIVAL RATE
3. nbq	60	5	3.0	2532	1600	5.41	3	3
6. sbq	60	5	3.0	2128	1600	5.41	3	3
9. ebq	60	52	3.0	185	1600	5.41	3	3
12. wbq	60	52	3.0	282	1600	5.41	3	3

RECEPTOR LOCATIONS

RECEPTOR	COORDINATES (FT) X	Y	Z
1. nw	430.0	546.0	5.4
2. ne	570.0	546.0	5.4
3. sw	430.0	454.0	5.4
4. se	570.0	454.0	5.4

JOB: D:\00Projects\South Sacramento\Parking C RUN: Bruceville & College Entrance ~ No Proje

MODEL RESULTS

REMARKS : In search of the angle corresponding to the maximum concentration, only the first angle, of the angles with same maximum concentrations, is indicated as maximum.

WIND ANGLE RANGE: 0.-360.

WIND ANGLE (DEGR)	* CONCENTRATION (PPM) REC1	REC2	REC3	REC4
0.	.1	.1	.3	.1
10.	.2	.0	.4	.0
20.	.2	.0	.4	.0
30.	.2	.0	.3	.0
40.	.2	.0	.2	.0
50.	.2	.0	.3	.0
60.	.2	.0	.2	.0
70.	.2	.0	.1	.0
80.	.2	.0	.2	.0
90.	.2	.0	.2	.0
100.	.3	.0	.2	.0
110.	.3	.0	.2	.0
120.	.3	.0	.2	.0
130.	.4	.0	.2	.0
140.	.3	.0	.2	.0
150.	.3	.0	.2	.0
160.	.3	.0	.2	.0
170.	.3	.0	.1	.0
180.	.3	.1	.1	.1
190.	.2	.2	.0	.2
200.	.1	.4	.0	.3
210.	.1	.4	.0	.2
220.	.1	.3	.0	.2
230.	.2	.2	.0	.1
240.	.2	.3	.0	.1
250.	.2	.3	.0	.1
260.	.2	.3	.0	.1
270.	.0	.2	.0	.1
280.	.0	.1	.0	.1
290.	.0	.1	.0	.2
300.	.0	.2	.0	.2
310.	.0	.2	.1	.2
320.	.0	.2	.1	.4
330.	.0	.2	.2	.4
340.	.0	.3	.2	.3
350.	.0	.2	.2	.3
360.	.1	.1	.3	.1
MAX	.4	.4	.4	.4
DEGR.	130	200	10	320

THE HIGHEST CONCENTRATION OF .40 PPM OCCURRED AT RECEPTOR REC3 .

JOB: D:\00Projects\South Sacramento\Parking C RUN: Bruceville & College Entrance ~ WP

DATE : 7/15/ 8
TIME : 16:44:12

The MODE flag has been set to C for calculating CO averages.

SITE & METEOROLOGICAL VARIABLES

VS = .0 CM/S VD = .0 CM/S Z0 = 100. CM
U = 1.0 M/S CLAS = 6 (F) ATIM = 60. MINUTES MIXH = 1000. M AMB = .0 PPM

LINK VARIABLES

LINK DESCRIPTION	LINK COORDINATES (FT) X1	Y1	X2	Y2	LENGTH (FT)	BRG (DEG)	TYPE	VPH	EF (G/MI)	H (FT)	W (FT)	V/C	QUEUE (VEH)
1. nba	530.0	.0	530.0	500.0	500.	360.	AG	2674.	1.1	.0	80.0		
2. nbd	530.0	500.0	530.0	1000.0	500.	360.	AG	2386.	1.1	.0	80.0		
3. nbq	530.0	464.0	530.0	446.5	18.	180.	AG	7.	100.0	.0	60.0	.41	.9
4. sba	470.0	1000.0	470.0	500.0	500.	180.	AG	2253.	1.1	.0	80.0		
5. sbd	470.0	500.0	470.0	.0	500.	180.	AG	1818.	1.1	.0	80.0		
6. sbq	470.0	536.0	470.0	521.2	15.	180.	AG	7.	100.0	.0	60.0	.34	.8
7. eba	.0	482.0	500.0	482.0	500.	90.	AG	219.	1.1	.0	56.0		
8. ebd	500.0	482.0	1000.0	482.0	500.	90.	AG	66.	1.1	.0	56.0		
9. ebq	440.0	482.0	414.5	482.0	26.	270.	AG	37.	100.0	.0	36.0	.69	1.3
10. wba	1000.0	518.0	500.0	518.0	500.	270.	AG	403.	1.1	.0	56.0		
11. wbd	500.0	518.0	.0	518.0	500.	270.	AG	1279.	1.1	.0	56.0		
12. wbq	560.0	518.0	183.2	518.0	377.	270.	AG	37.	100.0	.0	36.0	1.26	19.1

JOB: D:\00Projects\South Sacramento\Parking C RUN: Bruceville & College Entrance ~ WP

DATE : 7/15/ 8
TIME : 16:44:12

ADDITIONAL QUEUE LINK PARAMETERS

LINK DESCRIPTION	CYCLE LENGTH (SEC)	RED TIME (SEC)	CLEARANCE LOST TIME (SEC)	APPROACH VOL (VPH)	SATURATION FLOW RATE (VPH)	IDLE EM FAC (gm/hr)	SIGNAL TYPE	ARRIVAL RATE
3. nbq	60	6	3.0	2674	1600	5.41	3	3
6. sbq	60	6	3.0	2253	1600	5.41	3	3
9. ebq	60	51	3.0	219	1600	5.41	3	3
12. wbq	60	51	3.0	403	1600	5.41	3	3

RECEPTOR LOCATIONS

RECEPTOR	COORDINATES (FT) X	Y	Z
1. nw	430.0	546.0	5.4
2. ne	570.0	546.0	5.4
3. sw	430.0	454.0	5.4
4. se	570.0	454.0	5.4

JOB: D:\00Projects\South Sacramento\Parking C RUN: Bruceville & College Entrance ~ WP

MODEL RESULTS

REMARKS : In search of the angle corresponding to the maximum concentration, only the first angle, of the angles with same maximum concentrations, is indicated as maximum.

WIND ANGLE RANGE: 0.-360.

WIND ANGLE (DEGR)	* CONCENTRATION (PPM) REC1	REC2	REC3	REC4
0.	.1	.1	.3	.1
10.	.2	.0	.5	.0
20.	.2	.0	.4	.0
30.	.2	.0	.3	.0
40.	.2	.0	.2	.0
50.	.2	.0	.3	.0
60.	.2	.0	.2	.0
70.	.2	.0	.1	.0
80.	.2	.0	.2	.0
90.	.2	.0	.2	.0
100.	.3	.0	.2	.0
110.	.4	.0	.2	.0
120.	.4	.0	.2	.0
130.	.5	.0	.2	.0
140.	.4	.0	.2	.0
150.	.3	.0	.2	.0
160.	.3	.0	.2	.0
170.	.3	.0	.1	.0
180.	.3	.1	.1	.1
190.	.2	.2	.0	.2
200.	.1	.3	.0	.3
210.	.1	.4	.0	.2
220.	.2	.3	.0	.2
230.	.3	.2	.0	.1
240.	.3	.3	.0	.1
250.	.3	.3	.0	.1
260.	.3	.5	.0	.1
270.	.2	.4	.0	.1
280.	.0	.1	.0	.3
290.	.0	.2	.2	.3
300.	.0	.2	.1	.2
310.	.0	.2	.1	.2
320.	.0	.2	.1	.3
330.	.0	.2	.2	.4
340.	.0	.3	.2	.4
350.	.0	.2	.2	.3
360.	.1	.1	.3	.1
MAX	.5	.5	.5	.4
DEGR.	130	260	10	330

THE HIGHEST CONCENTRATION OF .50 PPM OCCURRED AT RECEPTOR REC3 .

JOB: D:\00Projects\South Sacramento\Parking C RUN: Bruceville & Old Calvine - 2030 NP

DATE : 7/ 8/ 8
TIME : 9:39:53

The MODE flag has been set to C for calculating CO averages.

SITE & METEOROLOGICAL VARIABLES

VS = .0 CM/S VD = .0 CM/S Z0 = 100. CM
U = 1.0 M/S CLAS = 6 (F) ATIM = 60. MINUTES MIXH = 1000. M AMB = .0 PPM

LINK VARIABLES

LINK DESCRIPTION	LINK COORDINATES (FT) X1	Y1	X2	Y2	LENGTH (FT)	BRG (DEG)	TYPE	VPH	EF (G/MI)	H (FT)	W (FT)	V/C	QUEUE (VEH)
1. nba	524.0	.0	524.0	500.0	500.	360.	AG	2735.	1.1	.0	68.0		
2. nbd	524.0	500.0	524.0	1000.0	500.	360.	AG	3062.	1.1	.0	56.0		
3. nbq	524.0	464.0	524.0	441.6	22.	180.	AG	6.	100.0	.0	48.0	.52	1.1
4. sba	476.0	1000.0	476.0	500.0	500.	180.	AG	2175.	1.1	.0	68.0		
5. sbd	476.0	500.0	476.0	.0	500.	180.	AG	2171.	1.1	.0	56.0		
6. sbq	476.0	500.0	476.0	517.8	18.	360.	AG	6.	100.0	.0	48.0	.42	.9
7. eba	.0	482.0	500.0	482.0	500.	90.	AG	543.	1.1	.0	56.0		
8. ebq	452.0	482.0	-422.8	482.0	875.	270.	AG	37.	100.0	.0	36.0	1.71	44.4
9. wbd	500.0	500.0	.0	500.0	500.	270.	AG	220.	1.1	.0	44.0		

JOB: D:\00Projects\South Sacramento\Parking C RUN: Bruceville & Old Calvine - 2030 NP

DATE : 7/ 8/ 8
TIME : 9:39:53

ADDITIONAL QUEUE LINK PARAMETERS

LINK DESCRIPTION	CYCLE LENGTH (SEC)	RED TIME (SEC)	CLEARANCE LOST TIME (SEC)	APPROACH VOL (VPH)	SATURATION FLOW RATE (VPH)	IDLE EM FAC (gm/hr)	SIGNAL TYPE	ARRIVAL RATE
3. nbq	60	6	3.0	2735	1600	5.41	3	3
6. sbq	60	6	3.0	2175	1600	5.41	3	3
8. ebq	60	51	3.0	543	1600	5.41	3	3

RECEPTOR LOCATIONS

RECEPTOR	COORDINATES (FT) X	Y	Z
1. nw	442.0	510.0	5.4
2. ne	558.0	510.0	5.4
3. sw	442.0	454.0	5.4
4. se	558.0	454.0	5.4

JOB: D:\00Projects\South Sacramento\Parking C RUN: Bruceville & Old Calvine - 2030 NP

MODEL RESULTS

REMARKS : In search of the angle corresponding to the maximum concentration, only the first angle, of the angles with same maximum concentrations, is indicated as maximum.

WIND ANGLE RANGE: 0.-360.

WIND ANGLE (DEGR)	CONCENTRATION (PPM) REC1	REC2	REC3	REC4
0.	.1	.1	.2	.1
10.	.3	.0	.4	.0
20.	.2	.0	.3	.0
30.	.2	.0	.3	.0
40.	.2	.0	.2	.0
50.	.2	.0	.2	.0
60.	.2	.0	.1	.0
70.	.2	.0	.2	.0
80.	.2	.0	.2	.0
90.	.2	.0	.2	.0
100.	.1	.0	.2	.0
110.	.1	.0	.2	.0
120.	.2	.0	.2	.0
130.	.2	.0	.2	.0
140.	.2	.0	.2	.0
150.	.2	.0	.2	.0
160.	.3	.0	.2	.0
170.	.4	.0	.3	.0
180.	.2	.2	.1	.2
190.	.1	.3	.0	.3
200.	.1	.3	.0	.3
210.	.1	.2	.0	.2
220.	.1	.2	.0	.2
230.	.2	.2	.0	.2
240.	.2	.2	.0	.2
250.	.2	.3	.0	.2
260.	.4	.3	.0	.2
270.	.2	.3	.2	.4
280.	.0	.2	.4	.4
290.	.0	.2	.2	.2
300.	.0	.2	.2	.1
310.	.0	.2	.2	.1
320.	.0	.2	.1	.3
330.	.0	.3	.1	.3
340.	.0	.3	.1	.4
350.	.0	.4	.1	.4
360.	.1	.1	.2	.1
MAX	.4	.4	.4	.4
DEGR.	170	350	10	270

THE HIGHEST CONCENTRATION OF .40 PPM OCCURRED AT RECEPTOR REC3 .

JOB: D:\00Projects\South Sacramento\Parking C RUN: Bruceville & Old Calvine - 2030 LPAP2

DATE : 7/ 8/ 8
TIME : 9:52:31

The MODE flag has been set to C for calculating CO averages.

SITE & METEOROLOGICAL VARIABLES

VS = .0 CM/S VD = .0 CM/S Z0 = 100. CM
U = 1.0 M/S CLAS = 6 (F) ATIM = 60. MINUTES MIXH = 1000. M AMB = .0 PPM

LINK VARIABLES

LINK DESCRIPTION	LINK COORDINATES (FT) X1	Y1	X2	Y2	LENGTH (FT)	BRG (DEG)	TYPE	VPH	EF (G/MI)	H (FT)	W (FT)	V/C	QUEUE (VEH)
1. nba	524.0	.0	524.0	500.0	500.	360.	AG	3015.	1.1	.0	68.0		
2. nbd	524.0	500.0	524.0	1000.0	500.	360.	AG	2762.	1.1	.0	56.0		
3. nbq	524.0	464.0	524.0	435.2	29.	180.	AG	7.	100.0	.0	48.0	.59	1.5
4. sba	476.0	1000.0	476.0	500.0	500.	180.	AG	2036.	1.1	.0	68.0		
5. sbd	476.0	500.0	476.0	.0	500.	180.	AG	2112.	1.1	.0	56.0		
6. sbq	476.0	500.0	476.0	519.5	19.	360.	AG	7.	100.0	.0	48.0	.40	1.0
7. eba	.0	482.0	500.0	482.0	500.	90.	AG	684.	1.1	.0	56.0		
8. ebq	452.0	482.0	-642.3	482.0	1094.	270.	AG	36.	100.0	.0	36.0	1.71	55.6
9. wbd	500.0	500.0	.0	500.0	500.	270.	AG	861.	1.1	.0	44.0		

JOB: D:\00Projects\South Sacramento\Parking C RUN: Bruceville & Old Calvine - 2030 LPAP2

DATE : 7/ 8/ 8
TIME : 9:52:31

ADDITIONAL QUEUE LINK PARAMETERS

LINK DESCRIPTION	CYCLE LENGTH (SEC)	RED TIME (SEC)	CLEARANCE LOST TIME (SEC)	APPROACH VOL (VPH)	SATURATION FLOW RATE (VPH)	IDLE EM FAC (gm/hr)	SIGNAL TYPE	ARRIVAL RATE
3. nbq	60	7	3.0	3015	1600	5.41	3	3
6. sbq	60	7	3.0	2036	1600	5.41	3	3
8. ebq	60	50	3.0	684	1600	5.41	3	3

RECEPTOR LOCATIONS

RECEPTOR	COORDINATES (FT) X	Y	Z
1. nw	442.0	510.0	5.4
2. ne	558.0	510.0	5.4
3. sw	442.0	454.0	5.4
4. se	558.0	454.0	5.4

JOB: D:\00Projects\South Sacramento\Parking C RUN: Bruceville & Old Calvine - 2030 LPAP2

MODEL RESULTS

REMARKS : In search of the angle corresponding to the maximum concentration, only the first angle, of the angles with same maximum concentrations, is indicated as maximum.

WIND ANGLE RANGE: 0.-360.

WIND ANGLE (DEGR)	* CONCENTRATION (PPM) REC1	REC2	REC3	REC4
0.	.1	.1	.2	.1
10.	.3	.0	.3	.0
20.	.2	.0	.3	.0
30.	.2	.0	.2	.0
40.	.2	.0	.2	.0
50.	.2	.0	.2	.0
60.	.2	.0	.1	.0
70.	.2	.0	.2	.0
80.	.2	.0	.2	.0
90.	.2	.0	.2	.0
100.	.1	.0	.2	.0
110.	.1	.0	.2	.0
120.	.2	.0	.2	.0
130.	.2	.0	.2	.0
140.	.2	.0	.2	.0
150.	.2	.0	.2	.0
160.	.3	.0	.2	.0
170.	.4	.0	.3	.0
180.	.2	.2	.1	.2
190.	.1	.4	.0	.4
200.	.1	.3	.0	.3
210.	.1	.2	.0	.3
220.	.1	.2	.0	.2
230.	.1	.2	.0	.2
240.	.2	.2	.0	.2
250.	.4	.2	.0	.2
260.	.5	.5	.0	.1
270.	.3	.4	.2	.3
280.	.1	.1	.4	.5
290.	.0	.2	.3	.2
300.	.0	.2	.2	.1
310.	.0	.2	.1	.1
320.	.0	.2	.1	.2
330.	.0	.2	.1	.3
340.	.0	.3	.1	.3
350.	.0	.3	.1	.4
360.	.1	.1	.2	.1
MAX	.5	.5	.4	.5
DEGR.	260	260	280	280

THE HIGHEST CONCENTRATION OF .50 PPM OCCURRED AT RECEPTOR REC1 .

JOB: D:\00Projects\South Sacramento\Parking C RUN: Old Calvine/So. Garage ~ With Project

DATE : 7/15/ 8
TIME : 17: 9: 9

The MODE flag has been set to C for calculating CO averages.

SITE & METEOROLOGICAL VARIABLES

VS = .0 CM/S VD = .0 CM/S Z0 = 100. CM
U = 1.0 M/S CLAS = 6 (F) ATIM = 60. MINUTES MIXH = 1000. M AMB = .0 PPM

LINK VARIABLES

LINK DESCRIPTION	LINK COORDINATES (FT) X1	Y1	X2	Y2	LENGTH (FT)	BRG (DEG)	TYPE	VPH	EF (G/MI)	H (FT)	W (FT)	V/C	QUEUE (VEH)
1. nba	506.0	.0	506.0	500.0	500.	360.	AG	25.	1.1	.0	32.0		
2. nbd	506.0	500.0	506.0	1000.0	500.	360.	AG	50.	1.1	.0	32.0		
3. nbq	506.0	476.0	506.0	447.9	28.	180.	AG	13.	100.0	.0	12.0	.96	1.4
4. sba	488.0	1000.0	488.0	500.0	500.	180.	AG	80.	1.1	.0	44.0		
5. sbd	488.0	500.0	488.0	.0	500.	180.	AG	500.	1.1	.0	44.0		
6. sbq	488.0	524.0	488.0	335.9	188.	180.	AG	26.	100.0	.0	24.0	1.54	9.6
7. eba	.0	488.0	500.0	488.0	500.	90.	AG	956.	1.1	.0	44.0		
8. ebd	500.0	488.0	1000.0	488.0	500.	90.	AG	751.	1.1	.0	44.0		
9. ebq	476.0	488.0	475.3	488.0	1.	270.	AG	1.	100.0	.0	24.0	.03	.0
10. wba	1000.0	512.0	500.0	512.0	500.	270.	AG	931.	1.1	.0	44.0		
11. wbd	500.0	512.0	.0	512.0	500.	270.	AG	691.	1.1	.0	44.0		
12. wbq	512.0	512.0	509.8	512.0	2.	270.	AG	1.	100.0	.0	24.0	.10	.1

JOB: D:\00Projects\South Sacramento\Parking C RUN: Old Calvine/So. Garage ~ With Project

DATE : 7/15/ 8
TIME : 17: 9: 9

ADDITIONAL QUEUE LINK PARAMETERS

LINK DESCRIPTION	CYCLE LENGTH (SEC)	RED TIME (SEC)	CLEARANCE LOST TIME (SEC)	APPROACH VOL (VPH)	SATURATION FLOW RATE (VPH)	IDLE EM FAC (gm/hr)	SIGNAL TYPE	ARRIVAL RATE
3. nbq	60	54	3.0	25	1600	5.41	3	3
6. sbq	60	54	3.0	80	1600	5.41	3	3
9. ebq	60	3	3.0	90	1600	5.41	3	3
12. wbq	60	3	3.0	270	1600	5.41	3	3

RECEPTOR LOCATIONS

RECEPTOR	COORDINATES (FT) X	Y	Z
1. nw	466.0	534.0	5.4
2. ne	522.0	534.0	5.4
3. sw	466.0	466.0	5.4
4. se	522.0	466.0	5.4

JOB: D:\00Projects\South Sacramento\Parking C RUN: Old Calvine/So. Garage ~ With Project

MODEL RESULTS

REMARKS : In search of the angle corresponding to the maximum concentration, only the first angle, of the angles with same maximum concentrations, is indicated as maximum.

WIND ANGLE RANGE: 0.-360.

WIND ANGLE (DEGR)	* CONCENTRATION (PPM) REC1	REC2	REC3	REC4
0.	.0	.0	.0	.0
10.	.0	.0	.0	.0
20.	.0	.0	.1	.0
30.	.0	.0	.1	.0
40.	.0	.0	.1	.0
50.	.0	.0	.1	.0
60.	.0	.0	.1	.0
70.	.0	.0	.1	.1
80.	.0	.0	.3	.2
90.	.1	.1	.2	.1
100.	.1	.1	.1	.0
110.	.0	.1	.1	.0
120.	.1	.1	.1	.0
130.	.1	.0	.1	.0
140.	.1	.0	.1	.0
150.	.1	.0	.1	.0
160.	.2	.0	.1	.0
170.	.2	.0	.2	.0
180.	.1	.0	.0	.0
190.	.0	.1	.0	.0
200.	.0	.1	.0	.1
210.	.0	.1	.0	.1
220.	.0	.1	.0	.1
230.	.0	.1	.0	.1
240.	.0	.1	.0	.1
250.	.2	.1	.0	.1
260.	.2	.2	.0	.1
270.	.1	.1	.1	.2
280.	.0	.0	.1	.2
290.	.0	.0	.1	.2
300.	.0	.0	.1	.1
310.	.0	.0	.0	.1
320.	.0	.0	.0	.1
330.	.0	.0	.0	.1
340.	.0	.0	.0	.0
350.	.0	.0	.0	.0
360.	.0	.0	.0	.0
MAX	.2	.2	.3	.2
DEGR.	160	260	80	80

THE HIGHEST CONCENTRATION OF .30 PPM OCCURRED AT RECEPTOR REC3 .

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**
****************************************
**
** ISCST3 Input Produced by:
** ISC-AERMOD View Ver. 4.6.2
** Lakes Environmental Software Inc.
** Date: 7/16/2008
** File: D:\00Projects\South Sacramento\Parking CO\ISC\PrkLot.INP
**
****************************************
**
**
****************************************
** ISCST3 Control Pathway
****************************************
**
**
CO STARTING
   TITLEONE D:\00Projects\South Sacramento\Parking CO\ISC\PrkLot.isc
   MODELOPT CONC  URBAN NOSTD NOCALM
   AVERTIME 1 8 PERIOD
   POLLUTID CO
   TERRHGTS FLAT
   FLAGPOLE 1.60
   RUNORNOT RUN
CO FINISHED
**
****************************************
** ISCST3 Source Pathway
****************************************
**
**
SO STARTING
** Source Location **
** Source ID - Type - X Coord. - Y Coord. **
   LOCATION L1IN AREA 0.000 0.000
** DESCRSRC Level 1 In
   LOCATION L2IN AREA 0.000 0.000
** DESCRSRC Level 2 In
   LOCATION L3IN AREA 0.000 0.000
** DESCRSRC Level 3 In
   LOCATION L4IN AREA 0.000 0.000
** DESCRSRC Level 4 In
   LOCATION L1OUT AREA 0.000 0.000
** DESCRSRC Level 1 Out
   LOCATION L2OUT AREA 0.000 0.000
** DESCRSRC Level 2 Out
   LOCATION L3OUT AREA 0.000 0.000
** DESCRSRC Level 3 Out
   LOCATION L4OUT AREA 0.000 0.000
** DESCRSRC Level 4 Out
** Source Parameters **
   SRCPARAM L1IN 2.49E-5 3.050 137.000 183.000 0.000 0.000
   SRCPARAM L2IN 1.87E-5 6.100 137.000 183.000 0.000 0.000
   SRCPARAM L3IN 1.25E-5 9.140 137.000 183.000 0.000 0.000
   SRCPARAM L4IN 6.23E-6 12.190 137.000 183.000 0.000 0.000
   SRCPARAM L1OUT 5.18E-5 3.050 137.000 183.000 0.000 0.000
   SRCPARAM L2OUT 6.28E-5 6.100 137.000 183.000 0.000 0.000
   SRCPARAM L3OUT 4.19E-5 9.140 137.000 183.000 0.000 0.000
   SRCPARAM L4OUT 2.09E-5 12.190 137.000 183.000 0.000 0.000
   EMISFACT L1IN HROFDY 0.00 0.00 0.00 0.00 0.00 0.00
   EMISFACT L1IN HROFDY 0.00 0.00 0.00 0.00 0.00 0.00
   EMISFACT L1IN HROFDY 0.00 0.00 0.00 0.00 0.05 0.00
   EMISFACT L1IN HROFDY 0.00 0.00 0.00 0.00 0.00 0.00
   EMISFACT L2IN HROFDY 0.00 0.00 0.00 0.00 0.00 0.00
   EMISFACT L2IN HROFDY 0.00 0.00 0.00 0.00 0.00 0.00
   EMISFACT L2IN HROFDY 0.00 0.00 0.00 0.00 0.05 0.00
   EMISFACT L2IN HROFDY 0.00 0.00 0.00 0.00 0.00 0.00
   EMISFACT L3IN HROFDY 0.00 0.00 0.00 0.00 0.00 0.00
   EMISFACT L3IN HROFDY 0.00 0.00 0.00 0.00 0.00 0.00
   EMISFACT L3IN HROFDY 0.00 0.00 0.00 0.00 0.05 0.00
   EMISFACT L3IN HROFDY 0.00 0.00 0.00 0.00 0.00 0.00
   EMISFACT L4IN HROFDY 0.00 0.00 0.00 0.00 0.00 0.00
   EMISFACT L4IN HROFDY 0.00 0.00 0.00 0.00 0.00 0.00
   EMISFACT L4IN HROFDY 0.00 0.00 0.00 0.00 0.05 0.00
   EMISFACT L4IN HROFDY 0.00 0.00 0.00 0.00 0.00 0.00
   EMISFACT L1OUT HROFDY 0.00 0.00 0.00 0.00 0.00 0.00
   EMISFACT L1OUT HROFDY 0.00 0.00 0.00 0.00 0.00 0.00
   EMISFACT L1OUT HROFDY 0.00 0.00 0.00 0.00 0.25 0.00
   EMISFACT L1OUT HROFDY 0.00 0.00 0.00 0.00 0.00 0.00
   EMISFACT L2OUT HROFDY 0.00 0.00 0.00 0.00 0.00 0.00
   EMISFACT L2OUT HROFDY 0.00 0.00 0.00 0.00 0.00 0.00
   EMISFACT L2OUT HROFDY 0.00 0.00 0.00 0.00 0.05 0.00
   EMISFACT L2OUT HROFDY 0.00 0.00 0.00 0.00 0.00 0.00
   EMISFACT L3OUT HROFDY 0.00 0.00 0.00 0.00 0.00 0.00
   EMISFACT L3OUT HROFDY 0.00 0.00 0.00 0.00 0.00 0.00
   EMISFACT L3OUT HROFDY 0.00 0.00 0.00 0.00 0.05 0.00
   EMISFACT L3OUT HROFDY 0.00 0.00 0.00 0.00 0.00 0.00
   EMISFACT L4OUT HROFDY 0.00 0.00 0.00 0.00 0.00 0.00
   EMISFACT L4OUT HROFDY 0.00 0.00 0.00 0.00 0.00 0.00
   EMISFACT L4OUT HROFDY 0.00 0.00 0.00 0.00 0.05 0.00
   EMISFACT L4OUT HROFDY 0.00 0.00 0.00 0.00 0.00 0.00
   CONCUNIT 873.2 GRAMS/SEC PPM
   SRCGROUP ALL
SO FINISHED
**
****************************************
** ISCST3 Receptor Pathway
****************************************
**
**
RE STARTING
** Fenceline Grid Receptors
** DESCRREC "FENCEGRD" "Receptors generated from Fenceline Grid"
   DISCCART 155.84 -31.34 1.6
   DISCCART 168.34 -18.84 1.6
   DISCCART 147.00 -35.00 1.6
   DISCCART 137.19 -35.00 1.6
   DISCCART 127.38 -35.00 1.6
   DISCCART 117.56 -35.00 1.6
   DISCCART 107.75 -35.00 1.6
   DISCCART 97.94 -35.00 1.6
   DISCCART 88.13 -35.00 1.6
   DISCCART 78.31 -35.00 1.6
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DISCCART 68.50 -35.00 1.6
DISCCART 58.69 -35.00 1.6
DISCCART 48.88 -35.00 1.6
DISCCART 39.06 -35.00 1.6
DISCCART 29.25 -35.00 1.6
DISCCART 19.44 -35.00 1.6
DISCCART 9.63 -35.00 1.6
DISCCART -0.19 -35.00 1.6
DISCCART -10.00 -35.00 1.6
DISCCART 155.84 -56.34 1.6
DISCCART 164.68 -52.68 1.6
DISCCART 173.52 -49.02 1.6
DISCCART 186.02 -36.52 1.6
DISCCART 189.68 -27.68 1.6
DISCCART 193.34 -18.84 1.6
DISCCART 147.00 -60.00 1.6
DISCCART 137.19 -60.00 1.6
DISCCART 127.38 -60.00 1.6
DISCCART 117.56 -60.00 1.6
DISCCART 107.75 -60.00 1.6
DISCCART 97.94 -60.00 1.6
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DISCCART 78.31 -60.00 1.6
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DISCCART 29.25 -60.00 1.6
DISCCART 19.44 -60.00 1.6
DISCCART 9.63 -60.00 1.6
DISCCART -0.19 -60.00 1.6
DISCCART -10.00 -60.00 1.6
DISCCART 155.84 -81.34 1.6
DISCCART 164.68 -77.68 1.6
DISCCART 173.52 -74.02 1.6
DISCCART 182.36 -70.36 1.6
DISCCART 191.19 -66.69 1.6
DISCCART 203.69 -54.19 1.6
DISCCART 207.36 -45.36 1.6
DISCCART 211.02 -36.52 1.6
DISCCART 214.68 -27.68 1.6
DISCCART 218.34 -18.84 1.6
DISCCART 147.00 -85.00 1.6
DISCCART 137.19 -85.00 1.6
DISCCART 127.38 -85.00 1.6
DISCCART 117.56 -85.00 1.6
DISCCART 107.75 -85.00 1.6
DISCCART 97.94 -85.00 1.6
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DISCCART 29.25 -85.00 1.6
DISCCART 19.44 -85.00 1.6
DISCCART 9.63 -85.00 1.6
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DISCCART 239.68 -27.68 1.6
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DISCCART 137.19 -110.00 1.6
DISCCART 127.38 -110.00 1.6
DISCCART 117.56 -110.00 1.6
DISCCART 107.75 -110.00 1.6
DISCCART 97.94 -110.00 1.6
DISCCART 88.13 -110.00 1.6
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DISCCART 9.63 -110.00 1.6
DISCCART -0.19 -110.00 1.6
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DISCCART -35.00 80.00 1.6
DISCCART -35.00 90.00 1.6
DISCCART -35.00 100.00 1.6
DISCCART -35.00 110.00 1.6
DISCCART -35.00 120.00 1.6
DISCCART -35.00 130.00 1.6
DISCCART -35.00 140.00 1.6
DISCCART -35.00 150.00 1.6
DISCCART -35.00 160.00 1.6
DISCCART -35.00 170.00 1.6
DISCCART -35.00 180.00 1.6
DISCCART -35.00 190.00 1.6
DISCCART -56.34 -18.84 1.6
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DISCCART -60.00 20.00 1.6
DISCCART -60.00 30.00 1.6
DISCCART -60.00 40.00 1.6
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DISCCART -60.00 130.00 1.6
DISCCART -60.00 140.00 1.6
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DISCCART -60.00 160.00 1.6
DISCCART -60.00 170.00 1.6
DISCCART -60.00 180.00 1.6
DISCCART -60.00 190.00 1.6
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DISCCART -85.00 0.00 1.6
DISCCART -85.00 10.00 1.6
DISCCART -85.00 20.00 1.6
DISCCART -85.00 30.00 1.6
DISCCART -85.00 40.00 1.6
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DISCCART -85.00 160.00 1.6
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DISCCART -31.34 198.84 1.6
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DISCCART -0.19 215.00 1.6
DISCCART 9.63 215.00 1.6
DISCCART 19.44 215.00 1.6
DISCCART 29.25 215.00 1.6
DISCCART 39.06 215.00 1.6
DISCCART 48.88 215.00 1.6
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DISCCART 68.50 215.00 1.6
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DISCCART 88.13 215.00 1.6
DISCCART 97.94 215.00 1.6
DISCCART 107.75 215.00 1.6
DISCCART 117.56 215.00 1.6
DISCCART 127.38 215.00 1.6
DISCCART 137.19 215.00 1.6
DISCCART 147.00 215.00 1.6
DISCCART -18.84 236.34 1.6
DISCCART -27.68 232.68 1.6
DISCCART -36.52 229.02 1.6
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DISCCART -0.19 240.00 1.6
DISCCART 9.63 240.00 1.6
DISCCART 19.44 240.00 1.6
DISCCART 29.25 240.00 1.6
DISCCART 39.06 240.00 1.6
DISCCART 48.88 240.00 1.6
DISCCART 58.69 240.00 1.6
DISCCART 68.50 240.00 1.6
DISCCART 78.31 240.00 1.6
DISCCART 88.13 240.00 1.6
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DISCCART 107.75 240.00 1.6
DISCCART 117.56 240.00 1.6
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DISCCART -27.68 257.68 1.6
DISCCART -36.52 254.02 1.6
DISCCART -45.36 250.36 1.6
DISCCART -54.19 246.69 1.6
DISCCART -66.69 234.19 1.6
DISCCART -70.36 225.36 1.6
DISCCART -74.02 216.52 1.6
DISCCART -77.68 207.68 1.6
DISCCART -81.34 198.84 1.6
DISCCART -10.00 265.00 1.6
DISCCART -0.19 265.00 1.6
DISCCART 9.63 265.00 1.6
DISCCART 19.44 265.00 1.6
DISCCART 29.25 265.00 1.6
DISCCART 39.06 265.00 1.6
DISCCART 48.88 265.00 1.6
DISCCART 58.69 265.00 1.6
DISCCART 68.50 265.00 1.6
DISCCART 78.31 265.00 1.6
DISCCART 88.13 265.00 1.6
DISCCART 97.94 265.00 1.6
DISCCART 107.75 265.00 1.6
DISCCART 117.56 265.00 1.6
DISCCART 127.38 265.00 1.6
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DISCCART -27.68 282.68 1.6
DISCCART -36.52 279.02 1.6
DISCCART -45.36 275.36 1.6
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DISCCART -95.36 225.36 1.6
DISCCART -99.02 216.52 1.6
DISCCART -102.68 207.68 1.6
DISCCART -106.34 198.84 1.6
DISCCART -10.00 290.00 1.6
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DISCCART 39.06 290.00 1.6
DISCCART 48.88 290.00 1.6
DISCCART 58.69 290.00 1.6
DISCCART 68.50 290.00 1.6
DISCCART 78.31 290.00 1.6
DISCCART 88.13 290.00 1.6
DISCCART 97.94 290.00 1.6
DISCCART 107.75 290.00 1.6
DISCCART 117.56 290.00 1.6
DISCCART 127.38 290.00 1.6
DISCCART 137.19 290.00 1.6
DISCCART 147.00 290.00 1.6
DISCCART 168.34 198.84 1.6
DISCCART 155.84 211.34 1.6
DISCCART 172.00 190.00 1.6
DISCCART 172.00 180.00 1.6
DISCCART 172.00 170.00 1.6
DISCCART 172.00 160.00 1.6
DISCCART 172.00 150.00 1.6
DISCCART 172.00 140.00 1.6
DISCCART 172.00 130.00 1.6
DISCCART 172.00 120.00 1.6
DISCCART 172.00 110.00 1.6
DISCCART 172.00 100.00 1.6
DISCCART 172.00 90.00 1.6
DISCCART 172.00 80.00 1.6
DISCCART 172.00 70.00 1.6
DISCCART 172.00 60.00 1.6
DISCCART 172.00 50.00 1.6
DISCCART 172.00 40.00 1.6
DISCCART 172.00 30.00 1.6
DISCCART 172.00 20.00 1.6
DISCCART 172.00 10.00 1.6
DISCCART 172.00 0.00 1.6
DISCCART 172.00 -10.00 1.6
DISCCART 193.34 198.84 1.6
DISCCART 189.68 207.68 1.6
DISCCART 186.02 216.52 1.6
DISCCART 173.52 229.02 1.6
DISCCART 164.68 232.68 1.6
DISCCART 155.84 236.34 1.6
DISCCART 197.00 190.00 1.6
DISCCART 197.00 180.00 1.6
DISCCART 197.00 170.00 1.6
DISCCART 197.00 160.00 1.6
DISCCART 197.00 150.00 1.6
DISCCART 197.00 140.00 1.6
DISCCART 197.00 130.00 1.6
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   DISCCART 197.00 120.00 1.6
   DISCCART 197.00 110.00 1.6
   DISCCART 197.00 100.00 1.6
   DISCCART 197.00 90.00 1.6
   DISCCART 197.00 80.00 1.6
   DISCCART 197.00 70.00 1.6
   DISCCART 197.00 60.00 1.6
   DISCCART 197.00 50.00 1.6
   DISCCART 197.00 40.00 1.6
   DISCCART 197.00 30.00 1.6
   DISCCART 197.00 20.00 1.6
   DISCCART 197.00 10.00 1.6
   DISCCART 197.00 0.00 1.6
   DISCCART 197.00 -10.00 1.6
   DISCCART 218.34 198.84 1.6
   DISCCART 214.68 207.68 1.6
   DISCCART 211.02 216.52 1.6
   DISCCART 207.36 225.36 1.6
   DISCCART 203.69 234.19 1.6
   DISCCART 191.19 246.69 1.6
   DISCCART 182.36 250.36 1.6
   DISCCART 173.52 254.02 1.6
   DISCCART 164.68 257.68 1.6
   DISCCART 155.84 261.34 1.6
   DISCCART 222.00 190.00 1.6
   DISCCART 222.00 180.00 1.6
   DISCCART 222.00 170.00 1.6
   DISCCART 222.00 160.00 1.6
   DISCCART 222.00 150.00 1.6
   DISCCART 222.00 140.00 1.6
   DISCCART 222.00 130.00 1.6
   DISCCART 222.00 120.00 1.6
   DISCCART 222.00 110.00 1.6
   DISCCART 222.00 100.00 1.6
   DISCCART 222.00 90.00 1.6
   DISCCART 222.00 80.00 1.6
   DISCCART 222.00 70.00 1.6
   DISCCART 222.00 60.00 1.6
   DISCCART 222.00 50.00 1.6
   DISCCART 222.00 40.00 1.6
   DISCCART 222.00 30.00 1.6
   DISCCART 222.00 20.00 1.6
   DISCCART 222.00 10.00 1.6
   DISCCART 222.00 0.00 1.6
   DISCCART 222.00 -10.00 1.6
   DISCCART 243.34 198.84 1.6
   DISCCART 239.68 207.68 1.6
   DISCCART 236.02 216.52 1.6
   DISCCART 232.36 225.36 1.6
   DISCCART 228.69 234.19 1.6
   DISCCART 225.03 243.03 1.6
   DISCCART 221.37 251.87 1.6
   DISCCART 208.87 264.37 1.6
   DISCCART 200.03 268.03 1.6
   DISCCART 191.19 271.69 1.6
   DISCCART 182.36 275.36 1.6
   DISCCART 173.52 279.02 1.6
   DISCCART 164.68 282.68 1.6
   DISCCART 155.84 286.34 1.6
   DISCCART 247.00 190.00 1.6
   DISCCART 247.00 180.00 1.6
   DISCCART 247.00 170.00 1.6
   DISCCART 247.00 160.00 1.6
   DISCCART 247.00 150.00 1.6
   DISCCART 247.00 140.00 1.6
   DISCCART 247.00 130.00 1.6
   DISCCART 247.00 120.00 1.6
   DISCCART 247.00 110.00 1.6
   DISCCART 247.00 100.00 1.6
   DISCCART 247.00 90.00 1.6
   DISCCART 247.00 80.00 1.6
   DISCCART 247.00 70.00 1.6
   DISCCART 247.00 60.00 1.6
   DISCCART 247.00 50.00 1.6
   DISCCART 247.00 40.00 1.6
   DISCCART 247.00 30.00 1.6
   DISCCART 247.00 20.00 1.6
   DISCCART 247.00 10.00 1.6
   DISCCART 247.00 0.00 1.6
   DISCCART 247.00 -10.00 1.6
** Discrete Cartesian Plant Boundary - Primary Receptors
** DESCRREC "FENCEPRI" "Cartesian plant boundary Primary Receptors"
   DISCCART -10.00 190.00 1.6
   DISCCART -10.00 -10.00 1.6
   DISCCART 147.00 -10.00 1.6
   DISCCART 147.00 190.00 1.6
RE FINISHED
**
****************************************
** ISCST3 Meteorology Pathway
****************************************
**
**
ME STARTING
   INPUTFIL SacApt.met
   ANEMHGHT 10 METERS
   SURFDATA 23232 1990 SACRAMENTO/EXECUTIVE_ARPT
   UAIRDATA 23230 1990 OAKLAND/WSO_AP
ME FINISHED
**
****************************************
** ISCST3 Output Pathway
****************************************
**
**
OU STARTING
   RECTABLE ALLAVE FIRST
   RECTABLE 1 FIRST
   RECTABLE 8 FIRST
** Auto-Generated Plotfiles
   PLOTFILE 1 ALL 1ST PrkLot.IS\01H1GALL.PLT
   PLOTFILE 8 ALL 1ST PrkLot.IS\08H1GALL.PLT
   PLOTFILE PERIOD ALL PrkLot.IS\PE00GALL.PLT
OU FINISHED
```

```
***********************************
*** SETUP Finishes Successfully ***
***********************************

 *** ISCST3 - VERSION 02035 ***    *** D:\00Projects\South Sacramento\Parking CO\ISC\PrkLot.isc             ***        07/16/08
                                   ***                                                                      ***        09:40:46
**MODELOPTs:                                                                                                           PAGE   1
CONC                    URBAN FLAT  FLGPOL               NOSTD         NOCALM

                                          ***     MODEL SETUP OPTIONS SUMMARY       ***
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

**Intermediate Terrain Processing is Selected

**Model Is Setup For Calculation of Average CONCentration Values.

  --  SCAVENGING/DEPOSITION LOGIC --
**Model Uses NO DRY DEPLETION.  DDPLETE =  F
**Model Uses NO WET DEPLETION.  WDPLETE =  F
**NO WET SCAVENGING Data Provided.
**NO GAS DRY DEPOSITION Data Provided.
**Model Does NOT Use GRIDDED TERRAIN Data for Depletion Calculations

**Model Uses URBAN Dispersion.

**Model Uses User-Specified Options:
           1. Final Plume Rise.
           2. Not Use Stack-tip Downwash.
           3. Buoyancy-induced Dispersion.
           4. Not Use Calms Processing Routine.
           5. Not Use Missing Data Processing Routine.
           6. Default Wind Profile Exponents.
           7. Default Vertical Potential Temperature Gradients.

**Model Assumes Receptors on FLAT Terrain.

**Model Accepts FLAGPOLE Receptor Heights.

**Model Calculates  2 Short Term Average(s) of:   1-HR   8-HR
    and Calculates PERIOD Averages

**This Run Includes:     8 Source(s);      1 Source Group(s); and     436 Receptor(s)

**The Model Assumes A Pollutant Type of:  CO

**Model Set To Continue RUNning After the Setup Testing.

**Output Options Selected:
         Model Outputs Tables of PERIOD Averages by Receptor
         Model Outputs Tables of Highest Short Term Values by Receptor (RECTABLE Keyword)
         Model Outputs External File(s) of High Values for Plotting (PLOTFILE Keyword)

**Misc. Inputs:  Anem. Hgt. (m) =    10.00 ;    Decay Coef. =   0.0000E+00 ;    Rot. Angle =     0.0
                 Emission Units = GRAMS/SEC                                  ;  Emission Rate Unit Factor =    873.20
                 Output Units   = PPM

**Approximate Storage Requirements of Model =     1.2 MB of RAM.

**Input Runstream File:          PrkLot.INP
**Output Print File:             PrkLot.OUT
 *** ISCST3 - VERSION 02035 ***    *** D:\00Projects\South Sacramento\Parking CO\ISC\PrkLot.isc             ***        07/16/08
                                   ***                                                                      ***        09:40:46
**MODELOPTs:                                                                                                           PAGE   2
CONC                    URBAN FLAT  FLGPOL               NOSTD         NOCALM


                                                *** AREA SOURCE DATA ***

             NUMBER EMISSION RATE  COORD (SW CORNER)  BASE     RELEASE  X-DIM     Y-DIM    ORIENT.    INIT.  EMISSION RATE
   SOURCE     PART.  (GRAMS/SEC       X        Y      ELEV.    HEIGHT  OF AREA   OF AREA   OF AREA     SZ     SCALAR VARY
     ID       CATS.   /METER**2)   (METERS) (METERS) (METERS) (METERS) (METERS)  (METERS)   (DEG.)  (METERS)      BY
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

  L1IN          0   0.24900E-04       0.0       0.0     0.0     3.05    137.00    183.00      0.00     0.00     HROFDY
  L2IN          0   0.18700E-04       0.0       0.0     0.0     6.10    137.00    183.00      0.00     0.00     HROFDY
  L3IN          0   0.12500E-04       0.0       0.0     0.0     9.14    137.00    183.00      0.00     0.00     HROFDY
  L4IN          0   0.62300E-05       0.0       0.0     0.0    12.19    137.00    183.00      0.00     0.00     HROFDY
  L1OUT         0   0.51800E-04       0.0       0.0     0.0     3.05    137.00    183.00      0.00     0.00     HROFDY
  L2OUT         0   0.62800E-04       0.0       0.0     0.0     6.10    137.00    183.00      0.00     0.00     HROFDY
  L3OUT         0   0.41900E-04       0.0       0.0     0.0     9.14    137.00    183.00      0.00     0.00     HROFDY
  L4OUT         0   0.20900E-04       0.0       0.0     0.0    12.19    137.00    183.00      0.00     0.00     HROFDY
 *** ISCST3 - VERSION 02035 ***    *** D:\00Projects\South Sacramento\Parking CO\ISC\PrkLot.isc             ***        07/16/08
                                   ***                                                                      ***        09:40:46
**MODELOPTs:                                                                                                           PAGE   3
CONC                    URBAN FLAT  FLGPOL               NOSTD         NOCALM


                                          *** SOURCE IDs DEFINING SOURCE GROUPS ***

GROUP ID                                                 SOURCE IDs


 ALL       L1IN    , L2IN    , L3IN    , L4IN    , L1OUT   , L2OUT   , L3OUT   , L4OUT   ,
 *** ISCST3 - VERSION 02035 ***    *** D:\00Projects\South Sacramento\Parking CO\ISC\PrkLot.isc             ***        07/16/08
                                   ***                                                                      ***        09:40:46
**MODELOPTs:                                                                                                           PAGE   4
CONC                    URBAN FLAT  FLGPOL               NOSTD         NOCALM

                            * SOURCE EMISSION RATE SCALARS WHICH VARY FOR EACH HOUR OF THE DAY *

    HOUR    SCALAR      HOUR    SCALAR      HOUR    SCALAR      HOUR    SCALAR      HOUR    SCALAR      HOUR    SCALAR
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -


SOURCE ID = L1IN     ;  SOURCE TYPE = AREA     :
      1   .00000E+00      2   .00000E+00      3   .00000E+00      4   .00000E+00      5   .00000E+00      6   .00000E+00
      7   .00000E+00      8   .00000E+00      9   .00000E+00     10   .00000E+00     11   .00000E+00     12   .00000E+00
     13   .00000E+00     14   .00000E+00     15   .00000E+00     16   .00000E+00     17   .50000E-01     18   .00000E+00
     19   .00000E+00     20   .00000E+00     21   .00000E+00     22   .00000E+00     23   .00000E+00     24   .00000E+00
```

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SOURCE ID = L2IN     ;  SOURCE TYPE = AREA     :
      1   .00000E+00      2   .00000E+00      3   .00000E+00      4   .00000E+00      5   .00000E+00      6   .00000E+00
      7   .00000E+00      8   .00000E+00      9   .00000E+00     10   .00000E+00     11   .00000E+00     12   .00000E+00
     13   .00000E+00     14   .00000E+00     15   .00000E+00     16   .00000E+00     17   .50000E-01     18   .00000E+00
     19   .00000E+00     20   .00000E+00     21   .00000E+00     22   .00000E+00     23   .00000E+00     24   .00000E+00


SOURCE ID = L3IN     ;  SOURCE TYPE = AREA     :
      1   .00000E+00      2   .00000E+00      3   .00000E+00      4   .00000E+00      5   .00000E+00      6   .00000E+00
      7   .00000E+00      8   .00000E+00      9   .00000E+00     10   .00000E+00     11   .00000E+00     12   .00000E+00
     13   .00000E+00     14   .00000E+00     15   .00000E+00     16   .00000E+00     17   .50000E-01     18   .00000E+00
     19   .00000E+00     20   .00000E+00     21   .00000E+00     22   .00000E+00     23   .00000E+00     24   .00000E+00


SOURCE ID = L4IN     ;  SOURCE TYPE = AREA     :
      1   .00000E+00      2   .00000E+00      3   .00000E+00      4   .00000E+00      5   .00000E+00      6   .00000E+00
      7   .00000E+00      8   .00000E+00      9   .00000E+00     10   .00000E+00     11   .00000E+00     12   .00000E+00
     13   .00000E+00     14   .00000E+00     15   .00000E+00     16   .00000E+00     17   .50000E-01     18   .00000E+00
     19   .00000E+00     20   .00000E+00     21   .00000E+00     22   .00000E+00     23   .00000E+00     24   .00000E+00


SOURCE ID = L1OUT    ;  SOURCE TYPE = AREA     :
      1   .00000E+00      2   .00000E+00      3   .00000E+00      4   .00000E+00      5   .00000E+00      6   .00000E+00
      7   .00000E+00      8   .00000E+00      9   .00000E+00     10   .00000E+00     11   .00000E+00     12   .00000E+00
     13   .00000E+00     14   .00000E+00     15   .00000E+00     16   .00000E+00     17   .25000E+00     18   .00000E+00
     19   .00000E+00     20   .00000E+00     21   .00000E+00     22   .00000E+00     23   .00000E+00     24   .00000E+00

 *** ISCST3 - VERSION 02035 ***    *** D:\00Projects\South Sacramento\Parking CO\ISC\PrkLot.isc             ***        07/16/08
                                   ***                                                                      ***        09:40:46
**MODELOPTs:                                                                                                           PAGE   5
CONC                    URBAN FLAT  FLGPOL               NOSTD         NOCALM

                           * SOURCE EMISSION RATE SCALARS WHICH VARY FOR EACH HOUR OF THE DAY *

    HOUR    SCALAR      HOUR    SCALAR      HOUR    SCALAR      HOUR    SCALAR      HOUR    SCALAR      HOUR    SCALAR
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -


SOURCE ID = L2OUT    ;  SOURCE TYPE = AREA     :
      1   .00000E+00      2   .00000E+00      3   .00000E+00      4   .00000E+00      5   .00000E+00      6   .00000E+00
      7   .00000E+00      8   .00000E+00      9   .00000E+00     10   .00000E+00     11   .00000E+00     12   .00000E+00
     13   .00000E+00     14   .00000E+00     15   .00000E+00     16   .00000E+00     17   .50000E-01     18   .00000E+00
     19   .00000E+00     20   .00000E+00     21   .00000E+00     22   .00000E+00     23   .00000E+00     24   .00000E+00


SOURCE ID = L3OUT    ;  SOURCE TYPE = AREA     :
      1   .00000E+00      2   .00000E+00      3   .00000E+00      4   .00000E+00      5   .00000E+00      6   .00000E+00
      7   .00000E+00      8   .00000E+00      9   .00000E+00     10   .00000E+00     11   .00000E+00     12   .00000E+00
     13   .00000E+00     14   .00000E+00     15   .00000E+00     16   .00000E+00     17   .50000E-01     18   .00000E+00
     19   .00000E+00     20   .00000E+00     21   .00000E+00     22   .00000E+00     23   .00000E+00     24   .00000E+00


SOURCE ID = L4OUT    ;  SOURCE TYPE = AREA     :
      1   .00000E+00      2   .00000E+00      3   .00000E+00      4   .00000E+00      5   .00000E+00      6   .00000E+00
      7   .00000E+00      8   .00000E+00      9   .00000E+00     10   .00000E+00     11   .00000E+00     12   .00000E+00
     13   .00000E+00     14   .00000E+00     15   .00000E+00     16   .00000E+00     17   .50000E-01     18   .00000E+00
     19   .00000E+00     20   .00000E+00     21   .00000E+00     22   .00000E+00     23   .00000E+00     24   .00000E+00

 *** ISCST3 - VERSION 02035 ***    *** D:\00Projects\South Sacramento\Parking CO\ISC\PrkLot.isc             ***        07/16/08
                                   ***                                                                      ***        09:40:46
**MODELOPTs:                                                                                                           PAGE   6
CONC                    URBAN FLAT  FLGPOL               NOSTD         NOCALM


                                        *** DISCRETE CARTESIAN RECEPTORS ***
                                          (X-COORD, Y-COORD, ZELEV, ZFLAG)
                                                   (METERS)

    (    155.8,     -31.3,       0.0,       1.6);          (    168.3,     -18.8,       0.0,       1.6);
    (    147.0,     -35.0,       0.0,       1.6);          (    137.2,     -35.0,       0.0,       1.6);
    (    127.4,     -35.0,       0.0,       1.6);          (    117.6,     -35.0,       0.0,       1.6);
    (    107.8,     -35.0,       0.0,       1.6);          (     97.9,     -35.0,       0.0,       1.6);
    (     88.1,     -35.0,       0.0,       1.6);          (     78.3,     -35.0,       0.0,       1.6);
    (     68.5,     -35.0,       0.0,       1.6);          (     58.7,     -35.0,       0.0,       1.6);
    (     48.9,     -35.0,       0.0,       1.6);          (     39.1,     -35.0,       0.0,       1.6);
    (     29.2,     -35.0,       0.0,       1.6);          (     19.4,     -35.0,       0.0,       1.6);
    (      9.6,     -35.0,       0.0,       1.6);          (     -0.2,     -35.0,       0.0,       1.6);
    (    -10.0,     -35.0,       0.0,       1.6);          (    155.8,     -56.3,       0.0,       1.6);
    (    164.7,     -52.7,       0.0,       1.6);          (    173.5,     -49.0,       0.0,       1.6);
    (    186.0,     -36.5,       0.0,       1.6);          (    189.7,     -27.7,       0.0,       1.6);
    (    193.3,     -18.8,       0.0,       1.6);          (    147.0,     -60.0,       0.0,       1.6);
    (    137.2,     -60.0,       0.0,       1.6);          (    127.4,     -60.0,       0.0,       1.6);
    (    117.6,     -60.0,       0.0,       1.6);          (    107.8,     -60.0,       0.0,       1.6);
    (     97.9,     -60.0,       0.0,       1.6);          (     88.1,     -60.0,       0.0,       1.6);
    (     78.3,     -60.0,       0.0,       1.6);          (     68.5,     -60.0,       0.0,       1.6);
    (     58.7,     -60.0,       0.0,       1.6);          (     48.9,     -60.0,       0.0,       1.6);
    (     39.1,     -60.0,       0.0,       1.6);          (     29.2,     -60.0,       0.0,       1.6);
    (     19.4,     -60.0,       0.0,       1.6);          (      9.6,     -60.0,       0.0,       1.6);
    (     -0.2,     -60.0,       0.0,       1.6);          (    -10.0,     -60.0,       0.0,       1.6);
    (    155.8,     -81.3,       0.0,       1.6);          (    164.7,     -77.7,       0.0,       1.6);
    (    173.5,     -74.0,       0.0,       1.6);          (    182.4,     -70.4,       0.0,       1.6);
    (    191.2,     -66.7,       0.0,       1.6);          (    203.7,     -54.2,       0.0,       1.6);
    (    207.4,     -45.4,       0.0,       1.6);          (    211.0,     -36.5,       0.0,       1.6);
    (    214.7,     -27.7,       0.0,       1.6);          (    218.3,     -18.8,       0.0,       1.6);
    (    147.0,     -85.0,       0.0,       1.6);          (    137.2,     -85.0,       0.0,       1.6);
    (    127.4,     -85.0,       0.0,       1.6);          (    117.6,     -85.0,       0.0,       1.6);
    (    107.8,     -85.0,       0.0,       1.6);          (     97.9,     -85.0,       0.0,       1.6);
    (     88.1,     -85.0,       0.0,       1.6);          (     78.3,     -85.0,       0.0,       1.6);
    (     68.5,     -85.0,       0.0,       1.6);          (     58.7,     -85.0,       0.0,       1.6);
    (     48.9,     -85.0,       0.0,       1.6);          (     39.1,     -85.0,       0.0,       1.6);
    (     29.2,     -85.0,       0.0,       1.6);          (     19.4,     -85.0,       0.0,       1.6);
    (      9.6,     -85.0,       0.0,       1.6);          (     -0.2,     -85.0,       0.0,       1.6);
    (    -10.0,     -85.0,       0.0,       1.6);          (    155.8,    -106.3,       0.0,       1.6);
    (    164.7,    -102.7,       0.0,       1.6);          (    173.5,     -99.0,       0.0,       1.6);
    (    182.4,     -95.4,       0.0,       1.6);          (    191.2,     -91.7,       0.0,       1.6);
    (    200.0,     -88.0,       0.0,       1.6);          (    208.9,     -84.4,       0.0,       1.6);
    (    221.4,     -71.9,       0.0,       1.6);          (    225.0,     -63.0,       0.0,       1.6);
    (    228.7,     -54.2,       0.0,       1.6);          (    232.4,     -45.4,       0.0,       1.6);
    (    236.0,     -36.5,       0.0,       1.6);          (    239.7,     -27.7,       0.0,       1.6);
    (    243.3,     -18.8,       0.0,       1.6);          (    147.0,    -110.0,       0.0,       1.6);
    (    137.2,    -110.0,       0.0,       1.6);          (    127.4,    -110.0,       0.0,       1.6);
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```
    (    117.6,    -110.0,       0.0,       1.6);          (    107.8,    -110.0,       0.0,       1.6);
    (     97.9,    -110.0,       0.0,       1.6);          (     88.1,    -110.0,       0.0,       1.6);
 *** ISCST3 - VERSION 02035 ***    *** D:\00Projects\South Sacramento\Parking CO\ISC\PrkLot.isc              ***        07/16/08
                                   ***                                                                        ***        09:40:46
**MODELOPTs:                                                                                                             PAGE   7
CONC                    URBAN FLAT  FLGPOL               NOSTD         NOCALM

                                          *** DISCRETE CARTESIAN RECEPTORS ***
                                            (X-COORD, Y-COORD, ZELEV, ZFLAG)
                                                      (METERS)

    (     78.3,    -110.0,       0.0,       1.6);          (     68.5,    -110.0,       0.0,       1.6);
    (     58.7,    -110.0,       0.0,       1.6);          (     48.9,    -110.0,       0.0,       1.6);
    (     39.1,    -110.0,       0.0,       1.6);          (     29.2,    -110.0,       0.0,       1.6);
    (     19.4,    -110.0,       0.0,       1.6);          (      9.6,    -110.0,       0.0,       1.6);
    (     -0.2,    -110.0,       0.0,       1.6);          (    -10.0,    -110.0,       0.0,       1.6);
    (    -31.3,     -18.8,       0.0,       1.6);          (    -18.8,     -31.3,       0.0,       1.6);
    (    -35.0,     -10.0,       0.0,       1.6);          (    -35.0,       0.0,       0.0,       1.6);
    (    -35.0,      10.0,       0.0,       1.6);          (    -35.0,      20.0,       0.0,       1.6);
    (    -35.0,      30.0,       0.0,       1.6);          (    -35.0,      40.0,       0.0,       1.6);
    (    -35.0,      50.0,       0.0,       1.6);          (    -35.0,      60.0,       0.0,       1.6);
    (    -35.0,      70.0,       0.0,       1.6);          (    -35.0,      80.0,       0.0,       1.6);
    (    -35.0,      90.0,       0.0,       1.6);          (    -35.0,     100.0,       0.0,       1.6);
    (    -35.0,     110.0,       0.0,       1.6);          (    -35.0,     120.0,       0.0,       1.6);
    (    -35.0,     130.0,       0.0,       1.6);          (    -35.0,     140.0,       0.0,       1.6);
    (    -35.0,     150.0,       0.0,       1.6);          (    -35.0,     160.0,       0.0,       1.6);
    (    -35.0,     170.0,       0.0,       1.6);          (    -35.0,     180.0,       0.0,       1.6);
    (    -35.0,     190.0,       0.0,       1.6);          (    -56.3,     -18.8,       0.0,       1.6);
    (    -52.7,     -27.7,       0.0,       1.6);          (    -49.0,     -36.5,       0.0,       1.6);
    (    -36.5,     -49.0,       0.0,       1.6);          (    -27.7,     -52.7,       0.0,       1.6);
    (    -18.8,     -56.3,       0.0,       1.6);          (    -60.0,     -10.0,       0.0,       1.6);
    (    -60.0,       0.0,       0.0,       1.6);          (    -60.0,      10.0,       0.0,       1.6);
    (    -60.0,      20.0,       0.0,       1.6);          (    -60.0,      30.0,       0.0,       1.6);
    (    -60.0,      40.0,       0.0,       1.6);          (    -60.0,      50.0,       0.0,       1.6);
    (    -60.0,      60.0,       0.0,       1.6);          (    -60.0,      70.0,       0.0,       1.6);
    (    -60.0,      80.0,       0.0,       1.6);          (    -60.0,      90.0,       0.0,       1.6);
    (    -60.0,     100.0,       0.0,       1.6);          (    -60.0,     110.0,       0.0,       1.6);
    (    -60.0,     120.0,       0.0,       1.6);          (    -60.0,     130.0,       0.0,       1.6);
    (    -60.0,     140.0,       0.0,       1.6);          (    -60.0,     150.0,       0.0,       1.6);
    (    -60.0,     160.0,       0.0,       1.6);          (    -60.0,     170.0,       0.0,       1.6);
    (    -60.0,     180.0,       0.0,       1.6);          (    -60.0,     190.0,       0.0,       1.6);
    (    -81.3,     -18.8,       0.0,       1.6);          (    -77.7,     -27.7,       0.0,       1.6);
    (    -74.0,     -36.5,       0.0,       1.6);          (    -70.4,     -45.4,       0.0,       1.6);
    (    -66.7,     -54.2,       0.0,       1.6);          (    -54.2,     -66.7,       0.0,       1.6);
    (    -45.4,     -70.4,       0.0,       1.6);          (    -36.5,     -74.0,       0.0,       1.6);
    (    -27.7,     -77.7,       0.0,       1.6);          (    -18.8,     -81.3,       0.0,       1.6);
    (    -85.0,     -10.0,       0.0,       1.6);          (    -85.0,       0.0,       0.0,       1.6);
    (    -85.0,      10.0,       0.0,       1.6);          (    -85.0,      20.0,       0.0,       1.6);
    (    -85.0,      30.0,       0.0,       1.6);          (    -85.0,      40.0,       0.0,       1.6);
    (    -85.0,      50.0,       0.0,       1.6);          (    -85.0,      60.0,       0.0,       1.6);
    (    -85.0,      70.0,       0.0,       1.6);          (    -85.0,      80.0,       0.0,       1.6);
    (    -85.0,      90.0,       0.0,       1.6);          (    -85.0,     100.0,       0.0,       1.6);
    (    -85.0,     110.0,       0.0,       1.6);          (    -85.0,     120.0,       0.0,       1.6);
    (    -85.0,     130.0,       0.0,       1.6);          (    -85.0,     140.0,       0.0,       1.6);
    (    -85.0,     150.0,       0.0,       1.6);          (    -85.0,     160.0,       0.0,       1.6);
    (    -85.0,     170.0,       0.0,       1.6);          (    -85.0,     180.0,       0.0,       1.6);
 *** ISCST3 - VERSION 02035 ***    *** D:\00Projects\South Sacramento\Parking CO\ISC\PrkLot.isc              ***        07/16/08
                                   ***                                                                        ***        09:40:46
**MODELOPTs:                                                                                                             PAGE   8
CONC                    URBAN FLAT  FLGPOL               NOSTD         NOCALM

                                          *** DISCRETE CARTESIAN RECEPTORS ***
                                            (X-COORD, Y-COORD, ZELEV, ZFLAG)
                                                      (METERS)

    (    -85.0,     190.0,       0.0,       1.6);          (   -106.3,     -18.8,       0.0,       1.6);
    (   -102.7,     -27.7,       0.0,       1.6);          (    -99.0,     -36.5,       0.0,       1.6);
    (    -95.4,     -45.4,       0.0,       1.6);          (    -91.7,     -54.2,       0.0,       1.6);
    (    -88.0,     -63.0,       0.0,       1.6);          (    -84.4,     -71.9,       0.0,       1.6);
    (    -71.9,     -84.4,       0.0,       1.6);          (    -63.0,     -88.0,       0.0,       1.6);
    (    -54.2,     -91.7,       0.0,       1.6);          (    -45.4,     -95.4,       0.0,       1.6);
    (    -36.5,     -99.0,       0.0,       1.6);          (    -27.7,    -102.7,       0.0,       1.6);
    (    -18.8,    -106.3,       0.0,       1.6);          (   -110.0,     -10.0,       0.0,       1.6);
    (   -110.0,       0.0,       0.0,       1.6);          (   -110.0,      10.0,       0.0,       1.6);
    (   -110.0,      20.0,       0.0,       1.6);          (   -110.0,      30.0,       0.0,       1.6);
    (   -110.0,      40.0,       0.0,       1.6);          (   -110.0,      50.0,       0.0,       1.6);
    (   -110.0,      60.0,       0.0,       1.6);          (   -110.0,      70.0,       0.0,       1.6);
    (   -110.0,      80.0,       0.0,       1.6);          (   -110.0,      90.0,       0.0,       1.6);
    (   -110.0,     100.0,       0.0,       1.6);          (   -110.0,     110.0,       0.0,       1.6);
    (   -110.0,     120.0,       0.0,       1.6);          (   -110.0,     130.0,       0.0,       1.6);
    (   -110.0,     140.0,       0.0,       1.6);          (   -110.0,     150.0,       0.0,       1.6);
    (   -110.0,     160.0,       0.0,       1.6);          (   -110.0,     170.0,       0.0,       1.6);
    (   -110.0,     180.0,       0.0,       1.6);          (   -110.0,     190.0,       0.0,       1.6);
    (    -18.8,     211.3,       0.0,       1.6);          (    -31.3,     198.8,       0.0,       1.6);
    (    -10.0,     215.0,       0.0,       1.6);          (     -0.2,     215.0,       0.0,       1.6);
    (      9.6,     215.0,       0.0,       1.6);          (     19.4,     215.0,       0.0,       1.6);
    (     29.2,     215.0,       0.0,       1.6);          (     39.1,     215.0,       0.0,       1.6);
    (     48.9,     215.0,       0.0,       1.6);          (     58.7,     215.0,       0.0,       1.6);
    (     68.5,     215.0,       0.0,       1.6);          (     78.3,     215.0,       0.0,       1.6);
    (     88.1,     215.0,       0.0,       1.6);          (     97.9,     215.0,       0.0,       1.6);
    (    107.8,     215.0,       0.0,       1.6);          (    117.6,     215.0,       0.0,       1.6);
    (    127.4,     215.0,       0.0,       1.6);          (    137.2,     215.0,       0.0,       1.6);
    (    147.0,     215.0,       0.0,       1.6);          (    -18.8,     236.3,       0.0,       1.6);
    (    -27.7,     232.7,       0.0,       1.6);          (    -36.5,     229.0,       0.0,       1.6);
    (    -49.0,     216.5,       0.0,       1.6);          (    -52.7,     207.7,       0.0,       1.6);
    (    -56.3,     198.8,       0.0,       1.6);          (    -10.0,     240.0,       0.0,       1.6);
    (     -0.2,     240.0,       0.0,       1.6);          (      9.6,     240.0,       0.0,       1.6);
    (     19.4,     240.0,       0.0,       1.6);          (     29.2,     240.0,       0.0,       1.6);
    (     39.1,     240.0,       0.0,       1.6);          (     48.9,     240.0,       0.0,       1.6);
    (     58.7,     240.0,       0.0,       1.6);          (     68.5,     240.0,       0.0,       1.6);
    (     78.3,     240.0,       0.0,       1.6);          (     88.1,     240.0,       0.0,       1.6);
    (     97.9,     240.0,       0.0,       1.6);          (    107.8,     240.0,       0.0,       1.6);
    (    117.6,     240.0,       0.0,       1.6);          (    127.4,     240.0,       0.0,       1.6);
    (    137.2,     240.0,       0.0,       1.6);          (    147.0,     240.0,       0.0,       1.6);
    (    -18.8,     261.3,       0.0,       1.6);          (    -27.7,     257.7,       0.0,       1.6);
    (    -36.5,     254.0,       0.0,       1.6);          (    -45.4,     250.4,       0.0,       1.6);
    (    -54.2,     246.7,       0.0,       1.6);          (    -66.7,     234.2,       0.0,       1.6);
    (    -70.4,     225.4,       0.0,       1.6);          (    -74.0,     216.5,       0.0,       1.6);
    (    -77.7,     207.7,       0.0,       1.6);          (    -81.3,     198.8,       0.0,       1.6);
    (    -10.0,     265.0,       0.0,       1.6);          (     -0.2,     265.0,       0.0,       1.6);
 *** ISCST3 - VERSION 02035 ***    *** D:\00Projects\South Sacramento\Parking CO\ISC\PrkLot.isc              ***        07/16/08
                                   ***                                                                        ***        09:40:46
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**MODELOPTs:                                                                                  PAGE   9
CONC                 URBAN FLAT  FLGPOL              NOSTD         NOCALM


                                    *** DISCRETE CARTESIAN RECEPTORS ***
                                      (X-COORD, Y-COORD, ZELEV, ZFLAG)
                                                 (METERS)

    (      9.6,     265.0,       0.0,       1.6);         (     19.4,     265.0,       0.0,       1.6);
    (     29.2,     265.0,       0.0,       1.6);         (     39.1,     265.0,       0.0,       1.6);
    (     48.9,     265.0,       0.0,       1.6);         (     58.7,     265.0,       0.0,       1.6);
    (     68.5,     265.0,       0.0,       1.6);         (     78.3,     265.0,       0.0,       1.6);
    (     88.1,     265.0,       0.0,       1.6);         (     97.9,     265.0,       0.0,       1.6);
    (    107.8,     265.0,       0.0,       1.6);         (    117.6,     265.0,       0.0,       1.6);
    (    127.4,     265.0,       0.0,       1.6);         (    137.2,     265.0,       0.0,       1.6);
    (    147.0,     265.0,       0.0,       1.6);         (    -18.8,     286.3,       0.0,       1.6);
    (    -27.7,     282.7,       0.0,       1.6);         (    -36.5,     279.0,       0.0,       1.6);
    (    -45.4,     275.4,       0.0,       1.6);         (    -54.2,     271.7,       0.0,       1.6);
    (    -63.0,     268.0,       0.0,       1.6);         (    -71.9,     264.4,       0.0,       1.6);
    (    -84.4,     251.9,       0.0,       1.6);         (    -88.0,     243.0,       0.0,       1.6);
    (    -91.7,     234.2,       0.0,       1.6);         (    -95.4,     225.4,       0.0,       1.6);
    (    -99.0,     216.5,       0.0,       1.6);         (   -102.7,     207.7,       0.0,       1.6);
    (   -106.3,     198.8,       0.0,       1.6);         (    -10.0,     290.0,       0.0,       1.6);
    (     -0.2,     290.0,       0.0,       1.6);         (      9.6,     290.0,       0.0,       1.6);
    (     19.4,     290.0,       0.0,       1.6);         (     29.2,     290.0,       0.0,       1.6);
    (     39.1,     290.0,       0.0,       1.6);         (     48.9,     290.0,       0.0,       1.6);
    (     58.7,     290.0,       0.0,       1.6);         (     68.5,     290.0,       0.0,       1.6);
    (     78.3,     290.0,       0.0,       1.6);         (     88.1,     290.0,       0.0,       1.6);
    (     97.9,     290.0,       0.0,       1.6);         (    107.8,     290.0,       0.0,       1.6);
    (    117.6,     290.0,       0.0,       1.6);         (    127.4,     290.0,       0.0,       1.6);
    (    137.2,     290.0,       0.0,       1.6);         (    147.0,     290.0,       0.0,       1.6);
    (    168.3,     198.8,       0.0,       1.6);         (    155.8,     211.3,       0.0,       1.6);
    (    172.0,     190.0,       0.0,       1.6);         (    172.0,     180.0,       0.0,       1.6);
    (    172.0,     170.0,       0.0,       1.6);         (    172.0,     160.0,       0.0,       1.6);
    (    172.0,     150.0,       0.0,       1.6);         (    172.0,     140.0,       0.0,       1.6);
    (    172.0,     130.0,       0.0,       1.6);         (    172.0,     120.0,       0.0,       1.6);
    (    172.0,     110.0,       0.0,       1.6);         (    172.0,     100.0,       0.0,       1.6);
    (    172.0,      90.0,       0.0,       1.6);         (    172.0,      80.0,       0.0,       1.6);
    (    172.0,      70.0,       0.0,       1.6);         (    172.0,      60.0,       0.0,       1.6);
    (    172.0,      50.0,       0.0,       1.6);         (    172.0,      40.0,       0.0,       1.6);
    (    172.0,      30.0,       0.0,       1.6);         (    172.0,      20.0,       0.0,       1.6);
    (    172.0,      10.0,       0.0,       1.6);         (    172.0,       0.0,       0.0,       1.6);
    (    172.0,     -10.0,       0.0,       1.6);         (    193.3,     198.8,       0.0,       1.6);
    (    189.7,     207.7,       0.0,       1.6);         (    186.0,     216.5,       0.0,       1.6);
    (    173.5,     229.0,       0.0,       1.6);         (    164.7,     232.7,       0.0,       1.6);
    (    155.8,     236.3,       0.0,       1.6);         (    197.0,     190.0,       0.0,       1.6);
    (    197.0,     180.0,       0.0,       1.6);         (    197.0,     170.0,       0.0,       1.6);
    (    197.0,     160.0,       0.0,       1.6);         (    197.0,     150.0,       0.0,       1.6);
    (    197.0,     140.0,       0.0,       1.6);         (    197.0,     130.0,       0.0,       1.6);
    (    197.0,     120.0,       0.0,       1.6);         (    197.0,     110.0,       0.0,       1.6);
    (    197.0,     100.0,       0.0,       1.6);         (    197.0,      90.0,       0.0,       1.6);
    (    197.0,      80.0,       0.0,       1.6);         (    197.0,      70.0,       0.0,       1.6);
    (    197.0,      60.0,       0.0,       1.6);         (    197.0,      50.0,       0.0,       1.6);
 *** ISCST3 - VERSION 02035 ***    *** D:\00Projects\South Sacramento\Parking CO\ISC\PrkLot.isc            ***        07/16/08
                                   ***                                                                    ***        09:40:46
**MODELOPTs:                                                                                             PAGE  10
CONC                 URBAN FLAT  FLGPOL              NOSTD         NOCALM


                                    *** DISCRETE CARTESIAN RECEPTORS ***
                                      (X-COORD, Y-COORD, ZELEV, ZFLAG)
                                                 (METERS)

    (    197.0,      40.0,       0.0,       1.6);         (    197.0,      30.0,       0.0,       1.6);
    (    197.0,      20.0,       0.0,       1.6);         (    197.0,      10.0,       0.0,       1.6);
    (    197.0,       0.0,       0.0,       1.6);         (    197.0,     -10.0,       0.0,       1.6);
    (    218.3,     198.8,       0.0,       1.6);         (    214.7,     207.7,       0.0,       1.6);
    (    211.0,     216.5,       0.0,       1.6);         (    207.4,     225.4,       0.0,       1.6);
    (    203.7,     234.2,       0.0,       1.6);         (    191.2,     246.7,       0.0,       1.6);
    (    182.4,     250.4,       0.0,       1.6);         (    173.5,     254.0,       0.0,       1.6);
    (    164.7,     257.7,       0.0,       1.6);         (    155.8,     261.3,       0.0,       1.6);
    (    222.0,     190.0,       0.0,       1.6);         (    222.0,     180.0,       0.0,       1.6);
    (    222.0,     170.0,       0.0,       1.6);         (    222.0,     160.0,       0.0,       1.6);
    (    222.0,     150.0,       0.0,       1.6);         (    222.0,     140.0,       0.0,       1.6);
    (    222.0,     130.0,       0.0,       1.6);         (    222.0,     120.0,       0.0,       1.6);
    (    222.0,     110.0,       0.0,       1.6);         (    222.0,     100.0,       0.0,       1.6);
    (    222.0,      90.0,       0.0,       1.6);         (    222.0,      80.0,       0.0,       1.6);
    (    222.0,      70.0,       0.0,       1.6);         (    222.0,      60.0,       0.0,       1.6);
    (    222.0,      50.0,       0.0,       1.6);         (    222.0,      40.0,       0.0,       1.6);
    (    222.0,      30.0,       0.0,       1.6);         (    222.0,      20.0,       0.0,       1.6);
    (    222.0,      10.0,       0.0,       1.6);         (    222.0,       0.0,       0.0,       1.6);
    (    222.0,     -10.0,       0.0,       1.6);         (    243.3,     198.8,       0.0,       1.6);
    (    239.7,     207.7,       0.0,       1.6);         (    236.0,     216.5,       0.0,       1.6);
    (    232.4,     225.4,       0.0,       1.6);         (    228.7,     234.2,       0.0,       1.6);
    (    225.0,     243.0,       0.0,       1.6);         (    221.4,     251.9,       0.0,       1.6);
    (    208.9,     264.4,       0.0,       1.6);         (    200.0,     268.0,       0.0,       1.6);
    (    191.2,     271.7,       0.0,       1.6);         (    182.4,     275.4,       0.0,       1.6);
    (    173.5,     279.0,       0.0,       1.6);         (    164.7,     282.7,       0.0,       1.6);
    (    155.8,     286.3,       0.0,       1.6);         (    247.0,     190.0,       0.0,       1.6);
    (    247.0,     180.0,       0.0,       1.6);         (    247.0,     170.0,       0.0,       1.6);
    (    247.0,     160.0,       0.0,       1.6);         (    247.0,     150.0,       0.0,       1.6);
    (    247.0,     140.0,       0.0,       1.6);         (    247.0,     130.0,       0.0,       1.6);
    (    247.0,     120.0,       0.0,       1.6);         (    247.0,     110.0,       0.0,       1.6);
    (    247.0,     100.0,       0.0,       1.6);         (    247.0,      90.0,       0.0,       1.6);
    (    247.0,      80.0,       0.0,       1.6);         (    247.0,      70.0,       0.0,       1.6);
    (    247.0,      60.0,       0.0,       1.6);         (    247.0,      50.0,       0.0,       1.6);
    (    247.0,      40.0,       0.0,       1.6);         (    247.0,      30.0,       0.0,       1.6);
    (    247.0,      20.0,       0.0,       1.6);         (    247.0,      10.0,       0.0,       1.6);
    (    247.0,       0.0,       0.0,       1.6);         (    247.0,     -10.0,       0.0,       1.6);
    (    -10.0,     190.0,       0.0,       1.6);         (    -10.0,     -10.0,       0.0,       1.6);
    (    147.0,     -10.0,       0.0,       1.6);         (    147.0,     190.0,       0.0,       1.6);
 *** ISCST3 - VERSION 02035 ***    *** D:\00Projects\South Sacramento\Parking CO\ISC\PrkLot.isc            ***        07/16/08
                                   ***                                                                    ***        09:40:46
**MODELOPTs:                                                                                             PAGE  11
CONC                 URBAN FLAT  FLGPOL              NOSTD         NOCALM


                                   *** METEOROLOGICAL DAYS SELECTED FOR PROCESSING ***
                                                     (1=YES; 0=NO)

          1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1
          1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1
          1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1
          1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1
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1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1

NOTE: METEOROLOGICAL DATA ACTUALLY PROCESSED WILL ALSO DEPEND ON WHAT IS INCLUDED IN THE DATA FILE.

*** UPPER BOUND OF FIRST THROUGH FIFTH WIND SPEED CATEGORIES ***
(METERS/SEC)

1.54,   3.09,   5.14,   8.23, 10.80,

*** WIND PROFILE EXPONENTS ***

STABILITY CATEGORY	WIND SPEED CATEGORY 1	2	3	4	5	6
A	.15000E+00	.15000E+00	.15000E+00	.15000E+00	.15000E+00	.15000E+00
B	.15000E+00	.15000E+00	.15000E+00	.15000E+00	.15000E+00	.15000E+00
C	.20000E+00	.20000E+00	.20000E+00	.20000E+00	.20000E+00	.20000E+00
D	.25000E+00	.25000E+00	.25000E+00	.25000E+00	.25000E+00	.25000E+00
E	.30000E+00	.30000E+00	.30000E+00	.30000E+00	.30000E+00	.30000E+00
F	.30000E+00	.30000E+00	.30000E+00	.30000E+00	.30000E+00	.30000E+00

*** VERTICAL POTENTIAL TEMPERATURE GRADIENTS ***
(DEGREES KELVIN PER METER)

STABILITY CATEGORY	WIND SPEED CATEGORY 1	2	3	4	5	6
A	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00
B	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00
C	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00
D	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00
E	.20000E-01	.20000E-01	.20000E-01	.20000E-01	.20000E-01	.20000E-01
F	.35000E-01	.35000E-01	.35000E-01	.35000E-01	.35000E-01	.35000E-01

*** ISCST3 - VERSION 02035 ***   *** D:\00Projects\South Sacramento\Parking CO\ISC\PrkLot.isc   ***   07/16/08
***   ***   09:40:46
**MODELOPTs: PAGE 12
CONC   URBAN FLAT FLGPOL   NOSTD   NOCALM

*** THE FIRST 24 HOURS OF METEOROLOGICAL DATA ***

FILE: SacApt.met
FORMAT: (4I2,2F9.4,F6.1,I2,2F7.1,f9.4,f10.1,f8.4,i4,f7.2)
SURFACE STATION NO.: 23232   UPPER AIR STATION NO.: 23230
NAME: SACRAMENTO/EXECUTIVE_ARPT   NAME: OAKLAND/WSO_AP
YEAR: 1990   YEAR: 1990

YR MN DY HR	FLOW VECTOR	SPEED (M/S)	TEMP (K)	STAB CLASS	MIXING HEIGHT (M) RURAL	URBAN	USTAR (M/S)	M-O LENGTH (M)	Z-0 (M)	IPCODE	PRATE (mm/HR)
90 01 01 01	321.0	2.57	280.4	4	88.0	88.0	0.0000	0.0	0.0000	0	0.00
90 01 01 02	318.0	2.57	281.5	4	88.0	88.0	0.0000	0.0	0.0000	0	0.00
90 01 01 03	334.0	3.09	282.0	4	88.0	88.0	0.0000	0.0	0.0000	0	0.00
90 01 01 04	333.0	3.60	282.6	4	88.0	88.0	0.0000	0.0	0.0000	0	0.00
90 01 01 05	343.0	4.12	281.5	4	88.0	88.0	0.0000	0.0	0.0000	0	0.00
90 01 01 06	342.0	4.12	281.5	4	88.0	88.0	0.0000	0.0	0.0000	0	0.00
90 01 01 07	345.0	4.12	282.0	4	88.0	88.0	0.0000	0.0	0.0000	0	0.00
90 01 01 08	333.0	3.60	281.5	4	88.0	88.0	0.0000	0.0	0.0000	0	0.00
90 01 01 09	337.0	4.12	281.5	4	88.0	88.0	0.0000	0.0	0.0000	0	0.00
90 01 01 10	341.0	3.60	282.0	4	88.0	88.0	0.0000	0.0	0.0000	0	0.00
90 01 01 11	354.0	3.09	283.2	4	88.0	88.0	0.0000	0.0	0.0000	0	0.00
90 01 01 12	336.0	2.57	284.3	4	88.0	88.0	0.0000	0.0	0.0000	0	0.00
90 01 01 13	13.0	2.57	284.8	4	88.0	88.0	0.0000	0.0	0.0000	0	0.00
90 01 01 14	309.0	2.57	283.7	4	88.0	88.0	0.0000	0.0	0.0000	0	0.00
90 01 01 15	2.0	2.06	283.7	4	88.0	88.0	0.0000	0.0	0.0000	0	0.00
90 01 01 16	354.0	2.57	283.7	4	88.0	88.0	0.0000	0.0	0.0000	0	0.00
90 01 01 17	351.0	4.63	282.6	4	100.4	100.4	0.0000	0.0	0.0000	0	0.00
90 01 01 18	317.0	3.60	282.6	4	175.7	175.7	0.0000	0.0	0.0000	0	0.00
90 01 01 19	324.0	6.17	282.6	4	251.0	251.0	0.0000	0.0	0.0000	0	0.00
90 01 01 20	307.0	3.09	282.6	4	326.2	326.2	0.0000	0.0	0.0000	0	0.00
90 01 01 21	310.0	0.00	282.0	4	401.5	401.5	0.0000	0.0	0.0000	0	0.00
90 01 01 22	252.0	2.57	281.5	4	476.8	476.8	0.0000	0.0	0.0000	0	0.00
90 01 01 23	140.0	2.06	281.5	4	552.0	552.0	0.0000	0.0	0.0000	0	0.00
90 01 01 24	140.0	4.12	281.5	4	627.3	627.3	0.0000	0.0	0.0000	0	0.00

*** NOTES: STABILITY CLASS 1=A, 2=B, 3=C, 4=D, 5=E AND 6=F.
FLOW VECTOR IS DIRECTION TOWARD WHICH WIND IS BLOWING.

*** ISCST3 - VERSION 02035 ***   *** D:\00Projects\South Sacramento\Parking CO\ISC\PrkLot.isc   ***   07/16/08
***   ***   09:40:46
**MODELOPTs: PAGE 13
CONC   URBAN FLAT FLGPOL   NOSTD   NOCALM

*** THE PERIOD (8760 HRS) AVERAGE CONCENTRATION   VALUES FOR SOURCE GROUP: ALL   ***
INCLUDING SOURCE(S):   L1IN   , L2IN   , L3IN   , L4IN   , L1OUT   , L2OUT   , L3OUT   ,
L4OUT   ,

*** DISCRETE CARTESIAN RECEPTOR POINTS ***

** CONC OF CO   IN PPM   **

X-COORD (M)	Y-COORD (M)	CONC	X-COORD (M)	Y-COORD (M)	CONC
155.84	-31.34	0.00070	168.34	-18.84	0.00066
147.00	-35.00	0.00073	137.19	-35.00	0.00075
127.38	-35.00	0.00075	117.56	-35.00	0.00074
107.75	-35.00	0.00072	97.94	-35.00	0.00069
88.13	-35.00	0.00065	78.31	-35.00	0.00061
68.50	-35.00	0.00056	58.69	-35.00	0.00050
48.88	-35.00	0.00044	39.06	-35.00	0.00037
29.25	-35.00	0.00029	19.44	-35.00	0.00021
9.63	-35.00	0.00014	-0.19	-35.00	0.00008
-10.00	-35.00	0.00006	155.84	-56.34	0.00055
164.68	-52.68	0.00054	173.52	-49.02	0.00052
186.02	-36.52	0.00049	189.68	-27.68	0.00049

193.34	-18.84	0.00047	147.00	-60.00	0.00054
137.19	-60.00	0.00055	127.38	-60.00	0.00054
117.56	-60.00	0.00052	107.75	-60.00	0.00050
97.94	-60.00	0.00047	88.13	-60.00	0.00044
78.31	-60.00	0.00040	68.50	-60.00	0.00036
58.69	-60.00	0.00032	48.88	-60.00	0.00027
39.06	-60.00	0.00023	29.25	-60.00	0.00018
19.44	-60.00	0.00013	9.63	-60.00	0.00009
-0.19	-60.00	0.00007	-10.00	-60.00	0.00005
155.84	-81.34	0.00042	164.68	-77.68	0.00042
173.52	-74.02	0.00042	182.36	-70.36	0.00041
191.19	-66.69	0.00040	203.69	-54.19	0.00038
207.36	-45.36	0.00038	211.02	-36.52	0.00037
214.68	-27.68	0.00036	218.34	-18.84	0.00035
147.00	-85.00	0.00041	137.19	-85.00	0.00041
127.38	-85.00	0.00039	117.56	-85.00	0.00038
107.75	-85.00	0.00036	97.94	-85.00	0.00033
88.13	-85.00	0.00031	78.31	-85.00	0.00028
68.50	-85.00	0.00025	58.69	-85.00	0.00022
48.88	-85.00	0.00019	39.06	-85.00	0.00015
29.25	-85.00	0.00012	19.44	-85.00	0.00009
9.63	-85.00	0.00007	-0.19	-85.00	0.00005
-10.00	-85.00	0.00004	155.84	-106.34	0.00033
164.68	-102.68	0.00034	173.52	-99.02	0.00034
182.36	-95.36	0.00034	191.19	-91.69	0.00033
200.03	-88.03	0.00032	208.87	-84.37	0.00032
221.37	-71.87	0.00031	225.03	-63.03	0.00031
228.69	-54.19	0.00030	232.36	-45.36	0.00030

*** ISCST3 - VERSION 02035 *** *** D:\00Projects\South Sacramento\Parking CO\ISC\PrkLot.isc *** 07/16/08
*** *** 09:40:46
**MODELOPTs: PAGE 14
CONC URBAN FLAT FLGPOL NOSTD NOCALM

*** THE PERIOD (8760 HRS) AVERAGE CONCENTRATION VALUES FOR SOURCE GROUP: ALL ***
INCLUDING SOURCE(S): L1IN , L2IN , L3IN , L4IN , L1OUT , L2OUT , L3OUT ,
L4OUT ,

*** DISCRETE CARTESIAN RECEPTOR POINTS ***

** CONC OF CO IN PPM **

X-COORD (M)	Y-COORD (M)	CONC	X-COORD (M)	Y-COORD (M)	CONC
236.02	-36.52	0.00029	239.68	-27.68	0.00027
243.34	-18.84	0.00026	147.00	-110.00	0.00032
137.19	-110.00	0.00031	127.38	-110.00	0.00030
117.56	-110.00	0.00028	107.75	-110.00	0.00027
97.94	-110.00	0.00025	88.13	-110.00	0.00023
78.31	-110.00	0.00021	68.50	-110.00	0.00018
58.69	-110.00	0.00016	48.88	-110.00	0.00014
39.06	-110.00	0.00011	29.25	-110.00	0.00009
19.44	-110.00	0.00007	9.63	-110.00	0.00005
-0.19	-110.00	0.00004	-10.00	-110.00	0.00004
-31.34	-18.84	0.00004	-18.84	-31.34	0.00005
-35.00	-10.00	0.00003	-35.00	0.00	0.00004
-35.00	10.00	0.00004	-35.00	20.00	0.00005
-35.00	30.00	0.00006	-35.00	40.00	0.00008
-35.00	50.00	0.00009	-35.00	60.00	0.00010
-35.00	70.00	0.00012	-35.00	80.00	0.00013
-35.00	90.00	0.00014	-35.00	100.00	0.00015
-35.00	110.00	0.00016	-35.00	120.00	0.00017
-35.00	130.00	0.00018	-35.00	140.00	0.00019
-35.00	150.00	0.00019	-35.00	160.00	0.00020
-35.00	170.00	0.00020	-35.00	180.00	0.00021
-35.00	190.00	0.00021	-56.34	-18.84	0.00002
-52.68	-27.68	0.00002	-49.02	-36.52	0.00002
-36.52	-49.02	0.00003	-27.68	-52.68	0.00004
-18.84	-56.34	0.00004	-60.00	-10.00	0.00002
-60.00	0.00	0.00002	-60.00	10.00	0.00002
-60.00	20.00	0.00003	-60.00	30.00	0.00003
-60.00	40.00	0.00004	-60.00	50.00	0.00005
-60.00	60.00	0.00006	-60.00	70.00	0.00007
-60.00	80.00	0.00007	-60.00	90.00	0.00008
-60.00	100.00	0.00009	-60.00	110.00	0.00010
-60.00	120.00	0.00011	-60.00	130.00	0.00011
-60.00	140.00	0.00012	-60.00	150.00	0.00012
-60.00	160.00	0.00013	-60.00	170.00	0.00013
-60.00	180.00	0.00014	-60.00	190.00	0.00014
-81.34	-18.84	0.00001	-77.68	-27.68	0.00001
-74.02	-36.52	0.00002	-70.36	-45.36	0.00002
-66.69	-54.19	0.00002	-54.19	-66.69	0.00002
-45.36	-70.36	0.00002	-36.52	-74.02	0.00003
-27.68	-77.68	0.00003	-18.84	-81.34	0.00004

*** ISCST3 - VERSION 02035 *** *** D:\00Projects\South Sacramento\Parking CO\ISC\PrkLot.isc *** 07/16/08
*** *** 09:40:46
**MODELOPTs: PAGE 15
CONC URBAN FLAT FLGPOL NOSTD NOCALM

*** THE PERIOD (8760 HRS) AVERAGE CONCENTRATION VALUES FOR SOURCE GROUP: ALL ***
INCLUDING SOURCE(S): L1IN , L2IN , L3IN , L4IN , L1OUT , L2OUT , L3OUT ,
L4OUT ,

*** DISCRETE CARTESIAN RECEPTOR POINTS ***

** CONC OF CO IN PPM **

X-COORD (M)	Y-COORD (M)	CONC	X-COORD (M)	Y-COORD (M)	CONC
-85.00	-10.00	0.00001	-85.00	0.00	0.00001
-85.00	10.00	0.00002	-85.00	20.00	0.00002
-85.00	30.00	0.00002	-85.00	40.00	0.00002
-85.00	50.00	0.00003	-85.00	60.00	0.00003
-85.00	70.00	0.00004	-85.00	80.00	0.00005
-85.00	90.00	0.00005	-85.00	100.00	0.00006
-85.00	110.00	0.00006	-85.00	120.00	0.00007
-85.00	130.00	0.00008	-85.00	140.00	0.00008
-85.00	150.00	0.00009	-85.00	160.00	0.00009
-85.00	170.00	0.00009	-85.00	180.00	0.00010
-85.00	190.00	0.00010	-106.34	-18.84	0.00001
-102.68	-27.68	0.00001	-99.02	-36.52	0.00001
-95.36	-45.36	0.00001	-91.69	-54.19	0.00001
-88.03	-63.03	0.00001	-84.37	-71.87	0.00001
-71.87	-84.37	0.00002	-63.03	-88.03	0.00002
-54.19	-91.69	0.00002	-45.36	-95.36	0.00002

-36.52	-99.02	0.00002	-27.68	-102.68	0.00003
-18.84	-106.34	0.00003	-110.00	-10.00	0.00001
-110.00	0.00	0.00001	-110.00	10.00	0.00001
-110.00	20.00	0.00001	-110.00	30.00	0.00001
-110.00	40.00	0.00002	-110.00	50.00	0.00002
-110.00	60.00	0.00002	-110.00	70.00	0.00003
-110.00	80.00	0.00003	-110.00	90.00	0.00004
-110.00	100.00	0.00004	-110.00	110.00	0.00004
-110.00	120.00	0.00005	-110.00	130.00	0.00005
-110.00	140.00	0.00006	-110.00	150.00	0.00006
-110.00	160.00	0.00007	-110.00	170.00	0.00007
-110.00	180.00	0.00007	-110.00	190.00	0.00007
-18.84	211.34	0.00025	-31.34	198.84	0.00022
-10.00	215.00	0.00028	-0.19	215.00	0.00033
9.63	215.00	0.00037	19.44	215.00	0.00043
29.25	215.00	0.00051	39.06	215.00	0.00058
48.88	215.00	0.00064	58.69	215.00	0.00069
68.50	215.00	0.00073	78.31	215.00	0.00076
88.13	215.00	0.00078	97.94	215.00	0.00079
107.75	215.00	0.00079	117.56	215.00	0.00078
127.38	215.00	0.00076	137.19	215.00	0.00073
147.00	215.00	0.00070	-18.84	236.34	0.00021
-27.68	232.68	0.00019	-36.52	229.02	0.00017
-49.02	216.52	0.00016	-52.68	207.68	0.00015

*** THE PERIOD (8760 HRS) AVERAGE CONCENTRATION VALUES FOR SOURCE GROUP: ALL ***
INCLUDING SOURCE(S): L1IN , L2IN , L3IN , L4IN , L1OUT , L2OUT , L3OUT ,
L4OUT ,

*** DISCRETE CARTESIAN RECEPTOR POINTS ***

** CONC OF CO IN PPM **

X-COORD (M)	Y-COORD (M)	CONC	X-COORD (M)	Y-COORD (M)	CONC
-56.34	198.84	0.00015	-10.00	240.00	0.00022
-0.19	240.00	0.00024	9.63	240.00	0.00027
19.44	240.00	0.00029	29.25	240.00	0.00032
39.06	240.00	0.00036	48.88	240.00	0.00040
58.69	240.00	0.00043	68.50	240.00	0.00047
78.31	240.00	0.00049	88.13	240.00	0.00051
97.94	240.00	0.00053	107.75	240.00	0.00053
117.56	240.00	0.00053	127.38	240.00	0.00053
137.19	240.00	0.00052	147.00	240.00	0.00051
-18.84	261.34	0.00017	-27.68	257.68	0.00016
-36.52	254.02	0.00015	-45.36	250.36	0.00014
-54.19	246.69	0.00013	-66.69	234.19	0.00012
-70.36	225.36	0.00012	-74.02	216.52	0.00011
-77.68	207.68	0.00011	-81.34	198.84	0.00010
-10.00	265.00	0.00018	-0.19	265.00	0.00019
9.63	265.00	0.00020	19.44	265.00	0.00022
29.25	265.00	0.00023	39.06	265.00	0.00025
48.88	265.00	0.00027	58.69	265.00	0.00029
68.50	265.00	0.00031	78.31	265.00	0.00033
88.13	265.00	0.00035	97.94	265.00	0.00036
107.75	265.00	0.00037	117.56	265.00	0.00038
127.38	265.00	0.00038	137.19	265.00	0.00038
147.00	265.00	0.00038	-18.84	286.34	0.00014
-27.68	282.68	0.00013	-36.52	279.02	0.00012
-45.36	275.36	0.00012	-54.19	271.69	0.00011
-63.03	268.03	0.00011	-71.87	264.37	0.00010
-84.37	251.87	0.00009	-88.03	243.03	0.00009
-91.69	234.19	0.00009	-95.36	225.36	0.00009
-99.02	216.52	0.00009	-102.68	207.68	0.00008
-106.34	198.84	0.00008	-10.00	290.00	0.00014
-0.19	290.00	0.00015	9.63	290.00	0.00016
19.44	290.00	0.00017	29.25	290.00	0.00018
39.06	290.00	0.00019	48.88	290.00	0.00020
58.69	290.00	0.00021	68.50	290.00	0.00022
78.31	290.00	0.00024	88.13	290.00	0.00025
97.94	290.00	0.00026	107.75	290.00	0.00027
117.56	290.00	0.00027	127.38	290.00	0.00028
137.19	290.00	0.00029	147.00	290.00	0.00029
168.34	198.84	0.00061	155.84	211.34	0.00068
172.00	190.00	0.00060	172.00	180.00	0.00062

*** THE PERIOD (8760 HRS) AVERAGE CONCENTRATION VALUES FOR SOURCE GROUP: ALL ***
INCLUDING SOURCE(S): L1IN , L2IN , L3IN , L4IN , L1OUT , L2OUT , L3OUT ,
L4OUT ,

*** DISCRETE CARTESIAN RECEPTOR POINTS ***

** CONC OF CO IN PPM **

X-COORD (M)	Y-COORD (M)	CONC	X-COORD (M)	Y-COORD (M)	CONC
172.00	170.00	0.00063	172.00	160.00	0.00065
172.00	150.00	0.00068	172.00	140.00	0.00071
172.00	130.00	0.00074	172.00	120.00	0.00076
172.00	110.00	0.00078	172.00	100.00	0.00079
172.00	90.00	0.00079	172.00	80.00	0.00079
172.00	70.00	0.00078	172.00	60.00	0.00077
172.00	50.00	0.00075	172.00	40.00	0.00073
172.00	30.00	0.00071	172.00	20.00	0.00070
172.00	10.00	0.00068	172.00	0.00	0.00067
172.00	-10.00	0.00065	193.34	198.84	0.00042
189.68	207.68	0.00044	186.02	216.52	0.00045
173.52	229.02	0.00048	164.68	232.68	0.00051
155.84	236.34	0.00052	197.00	190.00	0.00040
197.00	180.00	0.00041	197.00	170.00	0.00041
197.00	160.00	0.00041	197.00	150.00	0.00042
197.00	140.00	0.00042	197.00	130.00	0.00043
197.00	120.00	0.00044	197.00	110.00	0.00044
197.00	100.00	0.00045	197.00	90.00	0.00046
197.00	80.00	0.00046	197.00	70.00	0.00046
197.00	60.00	0.00046	197.00	50.00	0.00046

197.00	40.00	0.00046	197.00	30.00	0.00046
197.00	20.00	0.00046	197.00	10.00	0.00046
197.00	0.00	0.00046	197.00	-10.00	0.00045
218.34	198.84	0.00030	214.68	207.68	0.00031
211.02	216.52	0.00032	207.36	225.36	0.00033
203.69	234.19	0.00034	191.19	246.69	0.00037
182.36	250.36	0.00039	173.52	254.02	0.00040
164.68	257.68	0.00040	155.84	261.34	0.00039
222.00	190.00	0.00028	222.00	180.00	0.00028
222.00	170.00	0.00028	222.00	160.00	0.00028
222.00	150.00	0.00027	222.00	140.00	0.00027
222.00	130.00	0.00027	222.00	120.00	0.00027
222.00	110.00	0.00027	222.00	100.00	0.00028
222.00	90.00	0.00028	222.00	80.00	0.00029
222.00	70.00	0.00029	222.00	60.00	0.00030
222.00	50.00	0.00031	222.00	40.00	0.00031
222.00	30.00	0.00032	222.00	20.00	0.00032
222.00	10.00	0.00033	222.00	0.00	0.00033
222.00	-10.00	0.00033	243.34	198.84	0.00021
239.68	207.68	0.00023	236.02	216.52	0.00024

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 *** ISCST3 - VERSION 02035 ***    *** D:\00Projects\South Sacramento\Parking CO\ISC\PrkLot.isc              ***        07/16/08
                                   ***                                                                       ***        09:40:46
**MODELOPTs:                                                                                                            PAGE  18
CONC                    URBAN FLAT  FLGPOL               NOSTD         NOCALM

                            *** THE PERIOD (  8760 HRS) AVERAGE CONCENTRATION   VALUES FOR SOURCE GROUP: ALL      ***
                                INCLUDING SOURCE(S):      L1IN    , L2IN    , L3IN    , L4IN    , L1OUT   , L2OUT   , L3OUT   ,
        L4OUT   ,

                                        *** DISCRETE CARTESIAN RECEPTOR POINTS ***

                                    ** CONC OF CO       IN PPM                                      **
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X-COORD (M)	Y-COORD (M)	CONC	X-COORD (M)	Y-COORD (M)	CONC
232.36	225.36	0.00025	228.69	234.19	0.00026
225.03	243.03	0.00027	221.37	251.87	0.00027
208.87	264.37	0.00029	200.03	268.03	0.00030
191.19	271.69	0.00031	182.36	275.36	0.00032
173.52	279.02	0.00032	164.68	282.68	0.00031
155.84	286.34	0.00030	247.00	190.00	0.00020
247.00	180.00	0.00020	247.00	170.00	0.00020
247.00	160.00	0.00019	247.00	150.00	0.00019
247.00	140.00	0.00019	247.00	130.00	0.00018
247.00	120.00	0.00018	247.00	110.00	0.00018
247.00	100.00	0.00019	247.00	90.00	0.00019
247.00	80.00	0.00019	247.00	70.00	0.00020
247.00	60.00	0.00021	247.00	50.00	0.00021
247.00	40.00	0.00022	247.00	30.00	0.00023
247.00	20.00	0.00023	247.00	10.00	0.00024
247.00	0.00	0.00024	247.00	-10.00	0.00025
-10.00	190.00	0.00035	-10.00	-10.00	0.00007
147.00	-10.00	0.00096	147.00	190.00	0.00094

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 *** ISCST3 - VERSION 02035 ***    *** D:\00Projects\South Sacramento\Parking CO\ISC\PrkLot.isc              ***        07/16/08
                                   ***                                                                       ***        09:40:46
**MODELOPTs:                                                                                                            PAGE  19
CONC                    URBAN FLAT  FLGPOL               NOSTD         NOCALM

                            *** THE   1ST HIGHEST  1-HR AVERAGE CONCENTRATION   VALUES FOR SOURCE GROUP:  ALL      ***
                                INCLUDING SOURCE(S):      L1IN    , L2IN    , L3IN    , L4IN    , L1OUT   , L2OUT   , L3OUT   ,
        L4OUT   ,

                                        *** DISCRETE CARTESIAN RECEPTOR POINTS ***

                                    ** CONC OF CO       IN PPM                                      **
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X-COORD (M)	Y-COORD (M)	CONC	(YYMMDDHH)	X-COORD (M)	Y-COORD (M)	CONC	(YYMMDDHH)
155.84	-31.34	0.26953	(90120317)	168.34	-18.84	0.26430	(90120617)
147.00	-35.00	0.27598	(90110817)	137.19	-35.00	0.27972	(90110817)
127.38	-35.00	0.27877	(90110817)	117.56	-35.00	0.27686	(90110817)
107.75	-35.00	0.27492	(90112217)	97.94	-35.00	0.27366	(90112217)
88.13	-35.00	0.27237	(90112317)	78.31	-35.00	0.27064	(90112317)
68.50	-35.00	0.26683	(90112317)	58.69	-35.00	0.25922	(90112317)
48.88	-35.00	0.24535	(90112317)	39.06	-35.00	0.22207	(90112317)
29.25	-35.00	0.18567	(90112317)	19.44	-35.00	0.15435	(90010317)
9.63	-35.00	0.12840	(90010317)	-0.19	-35.00	0.12159	(90012017)
-10.00	-35.00	0.12069	(90012017)	155.84	-56.34	0.24134	(90110817)
164.68	-52.68	0.22512	(90120317)	173.52	-49.02	0.23901	(90120317)
186.02	-36.52	0.23100	(90120617)	189.68	-27.68	0.21954	(90120617)
193.34	-18.84	0.20995	(90111117)	147.00	-60.00	0.24574	(90110817)
137.19	-60.00	0.24530	(90110817)	127.38	-60.00	0.24400	(90112217)
117.56	-60.00	0.24346	(90112217)	107.75	-60.00	0.24247	(90112317)
97.94	-60.00	0.24180	(90112317)	88.13	-60.00	0.24027	(90112317)
78.31	-60.00	0.23709	(90112317)	68.50	-60.00	0.23109	(90112317)
58.69	-60.00	0.22055	(90112317)	48.88	-60.00	0.20325	(90112317)
39.06	-60.00	0.17652	(90112317)	29.25	-60.00	0.13714	(90112317)
19.44	-60.00	0.11945	(90010317)	9.63	-60.00	0.09811	(90102417)
-0.19	-60.00	0.09427	(90102417)	-10.00	-60.00	0.09111	(90012017)
155.84	-81.34	0.21907	(90110817)	164.68	-77.68	0.21143	(90110817)
173.52	-74.02	0.18734	(90120317)	182.36	-70.36	0.20273	(90120317)
191.19	-66.69	0.21072	(90120317)	203.69	-54.19	0.20286	(90120617)
207.36	-45.36	0.19333	(90120617)	211.02	-36.52	0.18120	(90120617)
214.68	-27.68	0.18626	(90111117)	218.34	-18.84	0.18491	(90111117)
147.00	-85.00	0.21641	(90110817)	137.19	-85.00	0.21617	(90112217)
127.38	-85.00	0.21619	(90112217)	117.56	-85.00	0.21569	(90112317)
107.75	-85.00	0.21519	(90112317)	97.94	-85.00	0.21384	(90112317)
88.13	-85.00	0.21116	(90112317)	78.31	-85.00	0.20628	(90112317)
68.50	-85.00	0.19800	(90112317)	58.69	-85.00	0.18466	(90112317)
48.88	-85.00	0.16444	(90112317)	39.06	-85.00	0.13514	(90112317)
29.25	-85.00	0.10732	(90010317)	19.44	-85.00	0.09515	(90010317)
9.63	-85.00	0.07900	(90102417)	-0.19	-85.00	0.07688	(90102417)
-10.00	-85.00	0.07229	(90102417)	155.84	-106.34	0.19548	(90110817)
164.68	-102.68	0.19578	(90110817)	173.52	-99.02	0.18692	(90110817)
182.36	-95.36	0.16644	(90110817)	191.19	-91.69	0.17113	(90120317)
200.03	-88.03	0.18261	(90120317)	208.87	-84.37	0.18681	(90120317)
221.37	-71.87	0.17967	(90120617)	225.03	-63.03	0.17177	(90120617)
228.69	-54.19	0.16103	(90120617)	232.36	-45.36	0.16089	(90111117)

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 *** ISCST3 - VERSION 02035 ***    *** D:\00Projects\South Sacramento\Parking CO\ISC\PrkLot.isc              ***        07/16/08
                                   ***                                                                       ***        09:40:46
**MODELOPTs:                                                                                                            PAGE  20
CONC                    URBAN FLAT  FLGPOL               NOSTD         NOCALM

                            *** THE   1ST HIGHEST  1-HR AVERAGE CONCENTRATION   VALUES FOR SOURCE GROUP:  ALL      ***
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INCLUDING SOURCE(S): L1IN , L2IN , L3IN , L4IN , L1OUT , L2OUT , L3OUT ,
L4OUT ,

*** DISCRETE CARTESIAN RECEPTOR POINTS ***

** CONC OF CO IN PPM **

X-COORD (M)	Y-COORD (M)	CONC	(YYMMDDHH)	X-COORD (M)	Y-COORD (M)	CONC	(YYMMDDHH)
236.02	-36.52	0.16676	(90111117)	239.68	-27.68	0.16643	(90111117)
243.34	-18.84	0.16390	(90111117)	147.00	-110.00	0.19139	(90112217)
137.19	-110.00	0.19338	(90112217)	127.38	-110.00	0.19296	(90112317)
117.56	-110.00	0.19318	(90112317)	107.75	-110.00	0.19214	(90112317)
97.94	-110.00	0.18986	(90112317)	88.13	-110.00	0.18582	(90112317)
78.31	-110.00	0.17911	(90112317)	68.50	-110.00	0.16857	(90112317)
58.69	-110.00	0.15281	(90112317)	48.88	-110.00	0.13043	(90112317)
39.06	-110.00	0.10085	(90112317)	29.25	-110.00	0.08904	(90010317)
19.44	-110.00	0.07833	(90010317)	9.63	-110.00	0.06504	(90102417)
-0.19	-110.00	0.06406	(90102417)	-10.00	-110.00	0.06150	(90102417)
-31.34	-18.84	0.09226	(90012017)	-18.84	-31.34	0.11589	(90012017)
-35.00	-10.00	0.08264	(90012017)	-35.00	0.00	0.07940	(90012017)
-35.00	10.00	0.07587	(90012017)	-35.00	20.00	0.07200	(90012017)
-35.00	30.00	0.06780	(90012017)	-35.00	40.00	0.07029	(90121217)
-35.00	50.00	0.07810	(90110717)	-35.00	60.00	0.09585	(90110717)
-35.00	70.00	0.11050	(90110717)	-35.00	80.00	0.12245	(90110717)
-35.00	90.00	0.13196	(90110717)	-35.00	100.00	0.13932	(90110717)
-35.00	110.00	0.14489	(90110717)	-35.00	120.00	0.14897	(90110717)
-35.00	130.00	0.15188	(90110717)	-35.00	140.00	0.15390	(90110717)
-35.00	150.00	0.15528	(90110717)	-35.00	160.00	0.15620	(90110717)
-35.00	170.00	0.15679	(90110717)	-35.00	180.00	0.15717	(90110717)
-35.00	190.00	0.15720	(90110717)	-56.34	-18.84	0.05430	(90012017)
-52.68	-27.68	0.06110	(90012017)	-49.02	-36.52	0.06793	(90012017)
-36.52	-49.02	0.08406	(90012017)	-27.68	-52.68	0.09131	(90012017)
-18.84	-56.34	0.09352	(90012017)	-60.00	-10.00	0.04773	(90012017)
-60.00	0.00	0.04702	(90102017)	-60.00	10.00	0.04799	(90102017)
-60.00	20.00	0.04818	(90102017)	-60.00	30.00	0.04981	(90121217)
-60.00	40.00	0.05469	(90121217)	-60.00	50.00	0.05732	(90121217)
-60.00	60.00	0.05869	(90121217)	-60.00	70.00	0.06552	(90110717)
-60.00	80.00	0.07824	(90110717)	-60.00	90.00	0.08895	(90110717)
-60.00	100.00	0.09776	(90110717)	-60.00	110.00	0.10487	(90110717)
-60.00	120.00	0.11049	(90110717)	-60.00	130.00	0.11482	(90110717)
-60.00	140.00	0.11809	(90110717)	-60.00	150.00	0.12051	(90110717)
-60.00	160.00	0.12226	(90110717)	-60.00	170.00	0.12351	(90110717)
-60.00	180.00	0.12439	(90110717)	-60.00	190.00	0.12486	(90110717)
-81.34	-18.84	0.03431	(90102017)	-77.68	-27.68	0.03806	(90020217)
-74.02	-36.52	0.04212	(90012017)	-70.36	-45.36	0.04730	(90012017)
-66.69	-54.19	0.05227	(90012017)	-54.19	-66.69	0.06407	(90012017)
-45.36	-70.36	0.07031	(90012017)	-36.52	-74.02	0.07425	(90012017)
-27.68	-77.68	0.07530	(90012017)	-18.84	-81.34	0.07357	(90012017)

*** ISCST3 - VERSION 02035 *** *** D:\00Projects\South Sacramento\Parking CO\ISC\PrkLot.isc *** 07/16/08
*** *** 09:40:46
**MODELOPTs: PAGE 21
CONC URBAN FLAT FLGPOL NOSTD NOCALM

*** THE 1ST HIGHEST 1-HR AVERAGE CONCENTRATION VALUES FOR SOURCE GROUP: ALL ***
INCLUDING SOURCE(S): L1IN , L2IN , L3IN , L4IN , L1OUT , L2OUT , L3OUT ,
L4OUT ,

*** DISCRETE CARTESIAN RECEPTOR POINTS ***

** CONC OF CO IN PPM **

X-COORD (M)	Y-COORD (M)	CONC	(YYMMDDHH)	X-COORD (M)	Y-COORD (M)	CONC	(YYMMDDHH)
-85.00	-10.00	0.03727	(90102017)	-85.00	0.00	0.03930	(90102017)
-85.00	10.00	0.04002	(90102017)	-85.00	20.00	0.04020	(90102017)
-85.00	30.00	0.04021	(90102017)	-85.00	40.00	0.04311	(90121217)
-85.00	50.00	0.04629	(90121217)	-85.00	60.00	0.04812	(90121217)
-85.00	70.00	0.04913	(90121217)	-85.00	80.00	0.05032	(90111517)
-85.00	90.00	0.06018	(90111517)	-85.00	100.00	0.06831	(90111517)
-85.00	110.00	0.07471	(90111517)	-85.00	120.00	0.08118	(90110717)
-85.00	130.00	0.08671	(90110717)	-85.00	140.00	0.09115	(90110717)
-85.00	150.00	0.09465	(90110717)	-85.00	160.00	0.09736	(90110717)
-85.00	170.00	0.09943	(90110717)	-85.00	180.00	0.10097	(90110717)
-85.00	190.00	0.10207	(90110717)	-106.34	-18.84	0.03084	(90102017)
-102.68	-27.68	0.02784	(90102017)	-99.02	-36.52	0.02845	(90020217)
-95.36	-45.36	0.03194	(90020217)	-91.69	-54.19	0.03529	(90020217)
-88.03	-63.03	0.03844	(90020217)	-84.37	-71.87	0.04150	(90012017)
-71.87	-84.37	0.05054	(90012017)	-63.03	-88.03	0.05564	(90012017)
-54.19	-91.69	0.05956	(90012017)	-45.36	-95.36	0.06181	(90012017)
-36.52	-99.02	0.06217	(90012017)	-27.68	-102.68	0.06072	(90012017)
-18.84	-106.34	0.05899	(90102417)	-110.00	-10.00	0.03244	(90102017)
-110.00	0.00	0.03374	(90102017)	-110.00	10.00	0.03427	(90102017)
-110.00	20.00	0.03441	(90102017)	-110.00	30.00	0.03437	(90102017)
-110.00	40.00	0.03452	(90121217)	-110.00	50.00	0.03791	(90121217)
-110.00	60.00	0.04010	(90121217)	-110.00	70.00	0.04144	(90121217)
-110.00	80.00	0.04222	(90121217)	-110.00	90.00	0.04266	(90121217)
-110.00	100.00	0.04960	(90111517)	-110.00	110.00	0.05720	(90111517)
-110.00	120.00	0.06334	(90111517)	-110.00	130.00	0.06812	(90111517)
-110.00	140.00	0.07167	(90111517)	-110.00	150.00	0.07418	(90111517)
-110.00	160.00	0.07756	(90110717)	-110.00	170.00	0.08046	(90110717)
-110.00	180.00	0.08276	(90110717)	-110.00	190.00	0.08454	(90110717)
-18.84	211.34	0.17470	(90112817)	-31.34	198.84	0.16257	(90120817)
-10.00	215.00	0.18065	(90122617)	-0.19	215.00	0.18394	(90122617)
9.63	215.00	0.18338	(90122617)	19.44	215.00	0.18227	(90122617)
29.25	215.00	0.18019	(90122617)	39.06	215.00	0.17660	(90122617)
48.88	215.00	0.17156	(90111717)	58.69	215.00	0.17662	(90111717)
68.50	215.00	0.17953	(90111717)	78.31	215.00	0.18114	(90111717)
88.13	215.00	0.18192	(90111717)	97.94	215.00	0.18208	(90111717)
107.75	215.00	0.18150	(90111717)	117.56	215.00	0.17934	(90111717)
127.38	215.00	0.17255	(90111717)	137.19	215.00	0.17647	(90122017)
147.00	215.00	0.17879	(90122017)	-18.84	236.34	0.15762	(90122617)
-27.68	232.68	0.13742	(90112817)	-36.52	229.02	0.13967	(90112817)
-49.02	216.52	0.13253	(90120817)	-52.68	207.68	0.12815	(90110717)

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**MODELOPTs: PAGE 22
CONC URBAN FLAT FLGPOL NOSTD NOCALM

*** THE 1ST HIGHEST 1-HR AVERAGE CONCENTRATION VALUES FOR SOURCE GROUP: ALL ***
INCLUDING SOURCE(S): L1IN , L2IN , L3IN , L4IN , L1OUT , L2OUT , L3OUT ,
L4OUT ,

*** DISCRETE CARTESIAN RECEPTOR POINTS ***

** CONC OF CO IN PPM **

X-COORD (M)	Y-COORD (M)	CONC	(YYMMDDHH)	X-COORD (M)	Y-COORD (M)	CONC	(YYMMDDHH)
-56.34	198.84	0.12855	(90110717)	-10.00	240.00	0.16165	(90122617)
-0.19	240.00	0.16153	(90122617)	9.63	240.00	0.16023	(90122617)
19.44	240.00	0.15797	(90122617)	29.25	240.00	0.15434	(90122617)
39.06	240.00	0.14884	(90122617)	48.88	240.00	0.14096	(90122617)
58.69	240.00	0.14111	(90111717)	68.50	240.00	0.14490	(90111717)
78.31	240.00	0.14715	(90111717)	88.13	240.00	0.14835	(90111717)
97.94	240.00	0.14871	(90111717)	107.75	240.00	0.14809	(90111717)
117.56	240.00	0.14569	(90111717)	127.38	240.00	0.13889	(90111717)
137.19	240.00	0.13358	(90122017)	147.00	240.00	0.13782	(90122017)
-18.84	261.34	0.14382	(90122617)	-27.68	257.68	0.13780	(90122617)
-36.52	254.02	0.12059	(90122617)	-45.36	250.36	0.11493	(90112817)
-54.19	246.69	0.11446	(90112817)	-66.69	234.19	0.11019	(90120817)
-70.36	225.36	0.10652	(90120817)	-74.02	216.52	0.10739	(90110717)
-77.68	207.68	0.10791	(90110717)	-81.34	198.84	0.10554	(90110717)
-10.00	265.00	0.14238	(90122617)	-0.19	265.00	0.14111	(90122617)
9.63	265.00	0.13874	(90122617)	19.44	265.00	0.13511	(90122617)
29.25	265.00	0.12985	(90122617)	39.06	265.00	0.12256	(90122617)
48.88	265.00	0.11293	(90122617)	58.69	265.00	0.11468	(90111717)
68.50	265.00	0.11929	(90111717)	78.31	265.00	0.12218	(90111717)
88.13	265.00	0.12384	(90111717)	97.94	265.00	0.12445	(90111717)
107.75	265.00	0.12388	(90111717)	117.56	265.00	0.12141	(90111717)
127.38	265.00	0.11532	(90111717)	137.19	265.00	0.10335	(90111717)
147.00	265.00	0.10673	(90122017)	-18.84	286.34	0.12844	(90122617)
-27.68	282.68	0.12826	(90122617)	-36.52	279.02	0.12164	(90122617)
-45.36	275.36	0.10728	(90122617)	-54.19	271.69	0.09536	(90120417)
-63.03	268.03	0.09736	(90112817)	-71.87	264.37	0.09602	(90112817)
-84.37	251.87	0.09337	(90120817)	-88.03	243.03	0.09115	(90120817)
-91.69	234.19	0.08842	(90110717)	-95.36	225.36	0.09210	(90110717)
-99.02	216.52	0.09253	(90110717)	-102.68	207.68	0.09081	(90110717)
-106.34	198.84	0.08791	(90110717)	-10.00	290.00	0.12541	(90122617)
-0.19	290.00	0.12305	(90122617)	9.63	290.00	0.11945	(90122617)
19.44	290.00	0.11441	(90122617)	29.25	290.00	0.10763	(90122617)
39.06	290.00	0.09886	(90122617)	48.88	290.00	0.09436	(90122517)
58.69	290.00	0.09443	(90111717)	68.50	290.00	0.09973	(90111717)
78.31	290.00	0.10324	(90111717)	88.13	290.00	0.10535	(90111717)
97.94	290.00	0.10625	(90111717)	107.75	290.00	0.10582	(90111717)
117.56	290.00	0.10354	(90111717)	127.38	290.00	0.09841	(90111717)
137.19	290.00	0.08953	(90111717)	147.00	290.00	0.08219	(90122017)
168.34	198.84	0.17043	(90111917)	155.84	211.34	0.17502	(90122017)
172.00	190.00	0.16447	(90111917)	172.00	180.00	0.16219	(90111917)

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**MODELOPTs:
CONC URBAN FLAT FLGPOL NOSTD NOCALM

*** THE 1ST HIGHEST 1-HR AVERAGE CONCENTRATION VALUES FOR SOURCE GROUP: ALL ***
INCLUDING SOURCE(S): L1IN , L2IN , L3IN , L4IN , L1OUT , L2OUT , L3OUT ,
L4OUT ,

*** DISCRETE CARTESIAN RECEPTOR POINTS ***

** CONC OF CO IN PPM **

X-COORD (M)	Y-COORD (M)	CONC	(YYMMDDHH)	X-COORD (M)	Y-COORD (M)	CONC	(YYMMDDHH)
172.00	170.00	0.15904	(90111917)	172.00	160.00	0.15483	(90111917)
172.00	150.00	0.15335	(90112917)	172.00	140.00	0.15335	(90112917)
172.00	130.00	0.15331	(90112917)	172.00	120.00	0.16717	(90111117)
172.00	110.00	0.19029	(90111117)	172.00	100.00	0.20791	(90111117)
172.00	90.00	0.22028	(90111117)	172.00	80.00	0.22823	(90111117)
172.00	70.00	0.23289	(90111117)	172.00	60.00	0.23540	(90111117)
172.00	50.00	0.23662	(90111117)	172.00	40.00	0.23718	(90111117)
172.00	30.00	0.23742	(90111117)	172.00	20.00	0.23749	(90111117)
172.00	10.00	0.23770	(90120617)	172.00	0.00	0.24518	(90120617)
172.00	-10.00	0.25120	(90120617)	193.34	198.84	0.13947	(90111917)
189.68	207.68	0.14569	(90111917)	186.02	216.52	0.15081	(90111917)
173.52	229.02	0.14516	(90111917)	164.68	232.68	0.14401	(90122017)
155.84	236.34	0.14454	(90122017)	197.00	190.00	0.13216	(90111917)
197.00	180.00	0.12799	(90111917)	197.00	170.00	0.12368	(90112917)
197.00	160.00	0.12396	(90112917)	197.00	150.00	0.12398	(90112917)
197.00	140.00	0.12391	(90112917)	197.00	130.00	0.12374	(90112917)
197.00	120.00	0.12349	(90122417)	197.00	110.00	0.13598	(90111117)
197.00	100.00	0.15702	(90111117)	197.00	90.00	0.17363	(90111117)
197.00	80.00	0.18596	(90111117)	197.00	70.00	0.19453	(90111117)
197.00	60.00	0.20006	(90111117)	197.00	50.00	0.20340	(90111117)
197.00	40.00	0.20529	(90111117)	197.00	30.00	0.20628	(90111117)
197.00	20.00	0.20677	(90111117)	197.00	10.00	0.20700	(90111117)
197.00	0.00	0.20709	(90111117)	197.00	-10.00	0.20710	(90111117)
218.34	198.84	0.11068	(90111917)	214.68	207.68	0.11807	(90111917)
211.02	216.52	0.12444	(90111917)	207.36	225.36	0.12995	(90111917)
203.69	234.19	0.13336	(90111917)	191.19	246.69	0.12721	(90111917)
182.36	250.36	0.11730	(90111917)	173.52	254.02	0.12045	(90122017)
164.68	257.68	0.11967	(90122017)	155.84	261.34	0.11433	(90122017)
222.00	190.00	0.10228	(90111917)	222.00	180.00	0.10190	(90112917)
222.00	170.00	0.10316	(90112917)	222.00	160.00	0.10344	(90112917)
222.00	150.00	0.10339	(90112917)	222.00	140.00	0.10324	(90122417)
222.00	130.00	0.10324	(90122417)	222.00	120.00	0.10312	(90122417)
222.00	110.00	0.10285	(90122417)	222.00	100.00	0.11001	(90111117)
222.00	90.00	0.12924	(90111117)	222.00	80.00	0.14490	(90111117)
222.00	70.00	0.15701	(90111117)	222.00	60.00	0.16590	(90111117)
222.00	50.00	0.17208	(90111117)	222.00	40.00	0.17613	(90111117)
222.00	30.00	0.17864	(90111117)	222.00	20.00	0.18013	(90111117)
222.00	10.00	0.18095	(90111117)	222.00	0.00	0.18139	(90111117)
222.00	-10.00	0.18161	(90111117)	243.34	198.84	0.08417	(90111917)
239.68	207.68	0.09247	(90111917)	236.02	216.52	0.09993	(90111917)

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**MODELOPTs:
CONC URBAN FLAT FLGPOL NOSTD NOCALM

*** THE 1ST HIGHEST 1-HR AVERAGE CONCENTRATION VALUES FOR SOURCE GROUP: ALL ***
INCLUDING SOURCE(S): L1IN , L2IN , L3IN , L4IN , L1OUT , L2OUT , L3OUT ,
L4OUT ,

*** DISCRETE CARTESIAN RECEPTOR POINTS ***

** CONC OF CO IN PPM **

X-COORD (M)	Y-COORD (M)	CONC	(YYMMDDHH)	X-COORD (M)	Y-COORD (M)	CONC	(YYMMDDHH)

232.36	225.36	0.10644	(90111917)	228.69	234.19	0.11200	(90111917)
225.03	243.03	0.11654	(90111917)	221.37	251.87	0.11853	(90111917)
208.87	264.37	0.11237	(90111917)	200.03	268.03	0.10437	(90111917)
191.19	271.69	0.09971	(90122017)	182.36	275.36	0.10244	(90122017)
173.52	279.02	0.10102	(90122017)	164.68	282.68	0.09638	(90122017)
155.84	286.34	0.08986	(90122017)	247.00	190.00	0.08472	(90112917)
247.00	180.00	0.08735	(90112917)	247.00	170.00	0.08832	(90112917)
247.00	160.00	0.08851	(90112917)	247.00	150.00	0.08834	(90112917)
247.00	140.00	0.08852	(90122417)	247.00	130.00	0.08847	(90122417)
247.00	120.00	0.08822	(90122417)	247.00	110.00	0.08771	(90122417)
247.00	100.00	0.08807	(90112017)	247.00	90.00	0.08946	(90111117)
247.00	80.00	0.10706	(90111117)	247.00	70.00	0.12179	(90111117)
247.00	60.00	0.13358	(90111117)	247.00	50.00	0.14262	(90111117)
247.00	40.00	0.14923	(90111117)	247.00	30.00	0.15386	(90111117)
247.00	20.00	0.15694	(90111117)	247.00	10.00	0.15891	(90111117)
247.00	0.00	0.16011	(90111117)	247.00	-10.00	0.16082	(90111117)
-10.00	190.00	0.21455	(90112817)	-10.00	-10.00	0.15127	(90012017)
147.00	-10.00	0.31059	(90120317)	147.00	190.00	0.20891	(90122017)

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*** *** 09:40:46
**MODELOPTs: PAGE 25
CONC URBAN FLAT FLGPOL NOSTD NOCALM

*** THE 1ST HIGHEST 8-HR AVERAGE CONCENTRATION VALUES FOR SOURCE GROUP: ALL ***
INCLUDING SOURCE(S): L1IN , L2IN , L3IN , L4IN , L1OUT , L2OUT , L3OUT ,
L4OUT ,

*** DISCRETE CARTESIAN RECEPTOR POINTS ***

** CONC OF CO IN PPM **

X-COORD (M)	Y-COORD (M)	CONC	(YYMMDDHH)	X-COORD (M)	Y-COORD (M)	CONC	(YYMMDDHH)
155.84	-31.34	0.03369	(90120324)	168.34	-18.84	0.03304	(90120624)
147.00	-35.00	0.03450	(90110824)	137.19	-35.00	0.03496	(90110824)
127.38	-35.00	0.03485	(90110824)	117.56	-35.00	0.03461	(90110824)
107.75	-35.00	0.03436	(90112224)	97.94	-35.00	0.03421	(90112224)
88.13	-35.00	0.03405	(90112324)	78.31	-35.00	0.03383	(90112324)
68.50	-35.00	0.03335	(90112324)	58.69	-35.00	0.03240	(90112324)
48.88	-35.00	0.03067	(90112324)	39.06	-35.00	0.02776	(90112324)
29.25	-35.00	0.02321	(90112324)	19.44	-35.00	0.01929	(90010324)
9.63	-35.00	0.01605	(90010324)	-0.19	-35.00	0.01520	(90012024)
-10.00	-35.00	0.01509	(90012024)	155.84	-56.34	0.03017	(90110824)
164.68	-52.68	0.02814	(90120324)	173.52	-49.02	0.02988	(90120324)
186.02	-36.52	0.02887	(90120624)	189.68	-27.68	0.02744	(90120624)
193.34	-18.84	0.02624	(90111124)	147.00	-60.00	0.03072	(90110824)
137.19	-60.00	0.03066	(90110824)	127.38	-60.00	0.03050	(90112224)
117.56	-60.00	0.03043	(90112224)	107.75	-60.00	0.03031	(90112324)
97.94	-60.00	0.03022	(90112324)	88.13	-60.00	0.03003	(90112324)
78.31	-60.00	0.02964	(90112324)	68.50	-60.00	0.02889	(90112324)
58.69	-60.00	0.02757	(90112324)	48.88	-60.00	0.02541	(90112324)
39.06	-60.00	0.02206	(90112324)	29.25	-60.00	0.01714	(90112324)
19.44	-60.00	0.01493	(90010324)	9.63	-60.00	0.01226	(90102424)
-0.19	-60.00	0.01178	(90102424)	-10.00	-60.00	0.01139	(90012024)
155.84	-81.34	0.02738	(90110824)	164.68	-77.68	0.02643	(90110824)
173.52	-74.02	0.02342	(90120324)	182.36	-70.36	0.02534	(90120324)
191.19	-66.69	0.02634	(90120324)	203.69	-54.19	0.02536	(90120624)
207.36	-45.36	0.02417	(90120624)	211.02	-36.52	0.02265	(90120624)
214.68	-27.68	0.02328	(90111124)	218.34	-18.84	0.02311	(90111124)
147.00	-85.00	0.02705	(90110824)	137.19	-85.00	0.02702	(90112224)
127.38	-85.00	0.02702	(90112224)	117.56	-85.00	0.02696	(90112324)
107.75	-85.00	0.02690	(90112324)	97.94	-85.00	0.02673	(90112324)
88.13	-85.00	0.02639	(90112324)	78.31	-85.00	0.02579	(90112324)
68.50	-85.00	0.02475	(90112324)	58.69	-85.00	0.02308	(90112324)
48.88	-85.00	0.02055	(90112324)	39.06	-85.00	0.01689	(90112324)
29.25	-85.00	0.01342	(90010324)	19.44	-85.00	0.01189	(90010324)
9.63	-85.00	0.00987	(90102424)	-0.19	-85.00	0.00961	(90102424)
-10.00	-85.00	0.00904	(90102424)	155.84	-106.34	0.02444	(90110824)
164.68	-102.68	0.02447	(90110824)	173.52	-99.02	0.02337	(90110824)
182.36	-95.36	0.02081	(90110824)	191.19	-91.69	0.02139	(90120324)
200.03	-88.03	0.02283	(90120324)	208.87	-84.37	0.02335	(90120324)
221.37	-71.87	0.02246	(90120624)	225.03	-63.03	0.02147	(90120624)
228.69	-54.19	0.02013	(90120624)	232.36	-45.36	0.02011	(90111124)

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*** *** 09:40:46
**MODELOPTs: PAGE 26
CONC URBAN FLAT FLGPOL NOSTD NOCALM

*** THE 1ST HIGHEST 8-HR AVERAGE CONCENTRATION VALUES FOR SOURCE GROUP: ALL ***
INCLUDING SOURCE(S): L1IN , L2IN , L3IN , L4IN , L1OUT , L2OUT , L3OUT ,
L4OUT ,

*** DISCRETE CARTESIAN RECEPTOR POINTS ***

** CONC OF CO IN PPM **

X-COORD (M)	Y-COORD (M)	CONC	(YYMMDDHH)	X-COORD (M)	Y-COORD (M)	CONC	(YYMMDDHH)
236.02	-36.52	0.02085	(90111124)	239.68	-27.68	0.02080	(90111124)
243.34	-18.84	0.02049	(90111124)	147.00	-110.00	0.02392	(90112224)
137.19	-110.00	0.02417	(90112224)	127.38	-110.00	0.02412	(90112324)
117.56	-110.00	0.02415	(90112324)	107.75	-110.00	0.02402	(90112324)
97.94	-110.00	0.02373	(90112324)	88.13	-110.00	0.02323	(90112324)
78.31	-110.00	0.02239	(90112324)	68.50	-110.00	0.02107	(90112324)
58.69	-110.00	0.01910	(90112324)	48.88	-110.00	0.01630	(90112324)
39.06	-110.00	0.01261	(90112324)	29.25	-110.00	0.01113	(90010324)
19.44	-110.00	0.00979	(90010324)	9.63	-110.00	0.00813	(90102424)
-0.19	-110.00	0.00801	(90102424)	-10.00	-110.00	0.00769	(90102424)
-31.34	-18.84	0.01153	(90012024)	-18.84	-31.34	0.01449	(90012024)
-35.00	-10.00	0.01033	(90012024)	-35.00	0.00	0.00992	(90012024)
-35.00	10.00	0.00948	(90012024)	-35.00	20.00	0.00900	(90012024)
-35.00	30.00	0.00847	(90012024)	-35.00	40.00	0.00879	(90121224)
-35.00	50.00	0.00976	(90110724)	-35.00	60.00	0.01198	(90110724)
-35.00	70.00	0.01381	(90110724)	-35.00	80.00	0.01531	(90110724)
-35.00	90.00	0.01649	(90110724)	-35.00	100.00	0.01742	(90110724)
-35.00	110.00	0.01811	(90110724)	-35.00	120.00	0.01862	(90110724)
-35.00	130.00	0.01898	(90110724)	-35.00	140.00	0.01924	(90110724)
-35.00	150.00	0.01941	(90110724)	-35.00	160.00	0.01952	(90110724)
-35.00	170.00	0.01960	(90110724)	-35.00	180.00	0.01965	(90110724)
-35.00	190.00	0.01965	(90110724)	-56.34	-18.84	0.00679	(90012024)
-52.68	-27.68	0.00764	(90012024)	-49.02	-36.52	0.00849	(90012024)
-36.52	-49.02	0.01051	(90012024)	-27.68	-52.68	0.01141	(90012024)
-18.84	-56.34	0.01169	(90012024)	-60.00	-10.00	0.00597	(90012024)

-60.00	0.00	0.00588	(90102024)	-60.00	10.00	0.00600	(90102024)
-60.00	20.00	0.00602	(90102024)	-60.00	30.00	0.00623	(90121224)
-60.00	40.00	0.00684	(90121224)	-60.00	50.00	0.00717	(90121224)
-60.00	60.00	0.00734	(90121224)	-60.00	70.00	0.00819	(90110724)
-60.00	80.00	0.00978	(90110724)	-60.00	90.00	0.01112	(90110724)
-60.00	100.00	0.01222	(90110724)	-60.00	110.00	0.01311	(90110724)
-60.00	120.00	0.01381	(90110724)	-60.00	130.00	0.01435	(90110724)
-60.00	140.00	0.01476	(90110724)	-60.00	150.00	0.01506	(90110724)
-60.00	160.00	0.01528	(90110724)	-60.00	170.00	0.01544	(90110724)
-60.00	180.00	0.01555	(90110724)	-60.00	190.00	0.01561	(90110724)
-81.34	-18.84	0.00429	(90102024)	-77.68	-27.68	0.00476	(90020224)
-74.02	-36.52	0.00526	(90012024)	-70.36	-45.36	0.00591	(90012024)
-66.69	-54.19	0.00653	(90012024)	-54.19	-66.69	0.00801	(90012024)
-45.36	-70.36	0.00879	(90012024)	-36.52	-74.02	0.00928	(90012024)
-27.68	-77.68	0.00941	(90012024)	-18.84	-81.34	0.00920	(90012024)

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*** *** 09:40:46
**MODELOPTs: PAGE 27
CONC URBAN FLAT FLGPOL NOSTD NOCALM

*** THE 1ST HIGHEST 8-HR AVERAGE CONCENTRATION VALUES FOR SOURCE GROUP: ALL ***
INCLUDING SOURCE(S): L1IN , L2IN , L3IN , L4IN , L1OUT , L2OUT , L3OUT ,
L4OUT ,

*** DISCRETE CARTESIAN RECEPTOR POINTS ***

** CONC OF CO IN PPM **

X-COORD (M)	Y-COORD (M)	CONC	(YYMMDDHH)	X-COORD (M)	Y-COORD (M)	CONC	(YYMMDDHH)
-85.00	-10.00	0.00466	(90102024)	-85.00	0.00	0.00491	(90102024)
-85.00	10.00	0.00500	(90102024)	-85.00	20.00	0.00502	(90102024)
-85.00	30.00	0.00503	(90102024)	-85.00	40.00	0.00539	(90121224)
-85.00	50.00	0.00579	(90121224)	-85.00	60.00	0.00601	(90121224)
-85.00	70.00	0.00614	(90121224)	-85.00	80.00	0.00629	(90111524)
-85.00	90.00	0.00752	(90111524)	-85.00	100.00	0.00854	(90111524)
-85.00	110.00	0.00934	(90111524)	-85.00	120.00	0.01015	(90110724)
-85.00	130.00	0.01084	(90110724)	-85.00	140.00	0.01139	(90110724)
-85.00	150.00	0.01183	(90110724)	-85.00	160.00	0.01217	(90110724)
-85.00	170.00	0.01243	(90110724)	-85.00	180.00	0.01262	(90110724)
-85.00	190.00	0.01276	(90110724)	-106.34	-18.84	0.00386	(90102024)
-102.68	-27.68	0.00348	(90102024)	-99.02	-36.52	0.00356	(90020224)
-95.36	-45.36	0.00399	(90020224)	-91.69	-54.19	0.00441	(90020224)
-88.03	-63.03	0.00480	(90020224)	-84.37	-71.87	0.00519	(90012024)
-71.87	-84.37	0.00632	(90012024)	-63.03	-88.03	0.00695	(90012024)
-54.19	-91.69	0.00744	(90012024)	-45.36	-95.36	0.00773	(90012024)
-36.52	-99.02	0.00777	(90012024)	-27.68	-102.68	0.00759	(90012024)
-18.84	-106.34	0.00737	(90102424)	-110.00	-10.00	0.00406	(90102024)
-110.00	0.00	0.00422	(90102024)	-110.00	10.00	0.00428	(90102024)
-110.00	20.00	0.00430	(90102024)	-110.00	30.00	0.00430	(90102024)
-110.00	40.00	0.00431	(90121224)	-110.00	50.00	0.00474	(90121224)
-110.00	60.00	0.00501	(90121224)	-110.00	70.00	0.00518	(90121224)
-110.00	80.00	0.00528	(90121224)	-110.00	90.00	0.00533	(90121224)
-110.00	100.00	0.00620	(90111524)	-110.00	110.00	0.00715	(90111524)
-110.00	120.00	0.00792	(90111524)	-110.00	130.00	0.00852	(90111524)
-110.00	140.00	0.00896	(90111524)	-110.00	150.00	0.00927	(90111524)
-110.00	160.00	0.00969	(90110724)	-110.00	170.00	0.01006	(90110724)
-110.00	180.00	0.01035	(90110724)	-110.00	190.00	0.01057	(90110724)
-18.84	211.34	0.02184	(90112824)	-31.34	198.84	0.02032	(90120824)
-10.00	215.00	0.02258	(90122624)	-0.19	215.00	0.02299	(90122624)
9.63	215.00	0.02292	(90122624)	19.44	215.00	0.02278	(90122624)
29.25	215.00	0.02252	(90122624)	39.06	215.00	0.02207	(90122624)
48.88	215.00	0.02144	(90111724)	58.69	215.00	0.02208	(90111724)
68.50	215.00	0.02244	(90111724)	78.31	215.00	0.02264	(90111724)
88.13	215.00	0.02274	(90111724)	97.94	215.00	0.02276	(90111724)
107.75	215.00	0.02269	(90111724)	117.56	215.00	0.02242	(90111724)
127.38	215.00	0.02157	(90111724)	137.19	215.00	0.02206	(90122024)
147.00	215.00	0.02235	(90122024)	-18.84	236.34	0.01970	(90122624)
-27.68	232.68	0.01718	(90112824)	-36.52	229.02	0.01746	(90112824)
-49.02	216.52	0.01657	(90120824)	-52.68	207.68	0.01602	(90110724)

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CONC URBAN FLAT FLGPOL NOSTD NOCALM

*** THE 1ST HIGHEST 8-HR AVERAGE CONCENTRATION VALUES FOR SOURCE GROUP: ALL ***
INCLUDING SOURCE(S): L1IN , L2IN , L3IN , L4IN , L1OUT , L2OUT , L3OUT ,
L4OUT ,

*** DISCRETE CARTESIAN RECEPTOR POINTS ***

** CONC OF CO IN PPM **

X-COORD (M)	Y-COORD (M)	CONC	(YYMMDDHH)	X-COORD (M)	Y-COORD (M)	CONC	(YYMMDDHH)
-56.34	198.84	0.01607	(90110724)	-10.00	240.00	0.02021	(90122624)
-0.19	240.00	0.02019	(90122624)	9.63	240.00	0.02003	(90122624)
19.44	240.00	0.01975	(90122624)	29.25	240.00	0.01929	(90122624)
39.06	240.00	0.01860	(90122624)	48.88	240.00	0.01762	(90122624)
58.69	240.00	0.01764	(90111724)	68.50	240.00	0.01811	(90111724)
78.31	240.00	0.01839	(90111724)	88.13	240.00	0.01854	(90111724)
97.94	240.00	0.01859	(90111724)	107.75	240.00	0.01851	(90111724)
117.56	240.00	0.01821	(90111724)	127.38	240.00	0.01736	(90111724)
137.19	240.00	0.01670	(90122024)	147.00	240.00	0.01723	(90122024)
-18.84	261.34	0.01798	(90122624)	-27.68	257.68	0.01723	(90122624)
-36.52	254.02	0.01507	(90122624)	-45.36	250.36	0.01437	(90112824)
-54.19	246.69	0.01431	(90112824)	-66.69	234.19	0.01377	(90120824)
-70.36	225.36	0.01331	(90120824)	-74.02	216.52	0.01342	(90110724)
-77.68	207.68	0.01349	(90110724)	-81.34	198.84	0.01319	(90110724)
-10.00	265.00	0.01780	(90122624)	-0.19	265.00	0.01764	(90122624)
9.63	265.00	0.01734	(90122624)	19.44	265.00	0.01689	(90122624)
29.25	265.00	0.01623	(90122624)	39.06	265.00	0.01532	(90122624)
48.88	265.00	0.01412	(90122624)	58.69	265.00	0.01433	(90111724)
68.50	265.00	0.01491	(90111724)	78.31	265.00	0.01527	(90111724)
88.13	265.00	0.01548	(90111724)	97.94	265.00	0.01556	(90111724)
107.75	265.00	0.01549	(90111724)	117.56	265.00	0.01518	(90111724)
127.38	265.00	0.01441	(90111724)	137.19	265.00	0.01292	(90111724)
147.00	265.00	0.01334	(90122024)	-18.84	286.34	0.01605	(90122624)
-27.68	282.68	0.01603	(90122624)	-36.52	279.02	0.01521	(90122624)
-45.36	275.36	0.01341	(90122624)	-54.19	271.69	0.01192	(90120424)
-63.03	268.03	0.01217	(90112824)	-71.87	264.37	0.01200	(90112824)
-84.37	251.87	0.01167	(90120824)	-88.03	243.03	0.01139	(90120824)
-91.69	234.19	0.01105	(90110724)	-95.36	225.36	0.01151	(90110724)
-99.02	216.52	0.01157	(90110724)	-102.68	207.68	0.01135	(90110724)

-106.34	198.84	0.01099	(90110724)	-10.00	290.00	0.01568	(90122624)
-0.19	290.00	0.01538	(90122624)	9.63	290.00	0.01493	(90122624)
19.44	290.00	0.01430	(90122624)	29.25	290.00	0.01345	(90122624)
39.06	290.00	0.01236	(90122624)	48.88	290.00	0.01180	(90122524)
58.69	290.00	0.01180	(90111724)	68.50	290.00	0.01247	(90111724)
78.31	290.00	0.01291	(90111724)	88.13	290.00	0.01317	(90111724)
97.94	290.00	0.01328	(90111724)	107.75	290.00	0.01323	(90111724)
117.56	290.00	0.01294	(90111724)	127.38	290.00	0.01230	(90111724)
137.19	290.00	0.01119	(90111724)	147.00	290.00	0.01027	(90122024)
168.34	198.84	0.02130	(90111924)	155.84	211.34	0.02188	(90122024)
172.00	190.00	0.02056	(90111924)	172.00	180.00	0.02027	(90111924)

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*** *** 09:40:46
**MODELOPTs: PAGE 29
CONC URBAN FLAT FLGPOL NOSTD NOCALM

*** THE 1ST HIGHEST 8-HR AVERAGE CONCENTRATION VALUES FOR SOURCE GROUP: ALL ***
INCLUDING SOURCE(S): L1IN , L2IN , L3IN , L4IN , L1OUT , L2OUT , L3OUT ,
L4OUT ,

*** DISCRETE CARTESIAN RECEPTOR POINTS ***

** CONC OF CO IN PPM **

X-COORD (M)	Y-COORD (M)	CONC	(YYMMDDHH)	X-COORD (M)	Y-COORD (M)	CONC	(YYMMDDHH)
172.00	170.00	0.01988	(90111924)	172.00	160.00	0.01935	(90111924)
172.00	150.00	0.01917	(90112924)	172.00	140.00	0.01917	(90112924)
172.00	130.00	0.01916	(90112924)	172.00	120.00	0.02090	(90111124)
172.00	110.00	0.02379	(90111124)	172.00	100.00	0.02599	(90111124)
172.00	90.00	0.02753	(90111124)	172.00	80.00	0.02853	(90111124)
172.00	70.00	0.02911	(90111124)	172.00	60.00	0.02942	(90111124)
172.00	50.00	0.02958	(90111124)	172.00	40.00	0.02965	(90111124)
172.00	30.00	0.02968	(90111124)	172.00	20.00	0.02969	(90111124)
172.00	10.00	0.02971	(90120624)	172.00	0.00	0.03065	(90120624)
172.00	-10.00	0.03140	(90120624)	193.34	198.84	0.01743	(90111924)
189.68	207.68	0.01821	(90111924)	186.02	216.52	0.01885	(90111924)
173.52	229.02	0.01814	(90111924)	164.68	232.68	0.01800	(90122024)
155.84	236.34	0.01807	(90122024)	197.00	190.00	0.01652	(90111924)
197.00	180.00	0.01600	(90111924)	197.00	170.00	0.01546	(90112924)
197.00	160.00	0.01550	(90112924)	197.00	150.00	0.01550	(90112924)
197.00	140.00	0.01549	(90112924)	197.00	130.00	0.01547	(90112924)
197.00	120.00	0.01544	(90122424)	197.00	110.00	0.01700	(90111124)
197.00	100.00	0.01963	(90111124)	197.00	90.00	0.02170	(90111124)
197.00	80.00	0.02325	(90111124)	197.00	70.00	0.02432	(90111124)
197.00	60.00	0.02501	(90111124)	197.00	50.00	0.02543	(90111124)
197.00	40.00	0.02566	(90111124)	197.00	30.00	0.02578	(90111124)
197.00	20.00	0.02585	(90111124)	197.00	10.00	0.02587	(90111124)
197.00	0.00	0.02589	(90111124)	197.00	-10.00	0.02589	(90111124)
218.34	198.84	0.01383	(90111924)	214.68	207.68	0.01476	(90111924)
211.02	216.52	0.01555	(90111924)	207.36	225.36	0.01624	(90111924)
203.69	234.19	0.01667	(90111924)	191.19	246.69	0.01590	(90111924)
182.36	250.36	0.01466	(90111924)	173.52	254.02	0.01506	(90122024)
164.68	257.68	0.01496	(90122024)	155.84	261.34	0.01429	(90122024)
222.00	190.00	0.01278	(90111924)	222.00	180.00	0.01274	(90112924)
222.00	170.00	0.01289	(90112924)	222.00	160.00	0.01293	(90112924)
222.00	150.00	0.01292	(90112924)	222.00	140.00	0.01290	(90122424)
222.00	130.00	0.01291	(90122424)	222.00	120.00	0.01289	(90122424)
222.00	110.00	0.01286	(90122424)	222.00	100.00	0.01375	(90111124)
222.00	90.00	0.01615	(90111124)	222.00	80.00	0.01811	(90111124)
222.00	70.00	0.01963	(90111124)	222.00	60.00	0.02074	(90111124)
222.00	50.00	0.02151	(90111124)	222.00	40.00	0.02202	(90111124)
222.00	30.00	0.02233	(90111124)	222.00	20.00	0.02252	(90111124)
222.00	10.00	0.02262	(90111124)	222.00	0.00	0.02267	(90111124)
222.00	-10.00	0.02270	(90111124)	243.34	198.84	0.01052	(90111924)
239.68	207.68	0.01156	(90111924)	236.02	216.52	0.01249	(90111924)

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**MODELOPTs: PAGE 30
CONC URBAN FLAT FLGPOL NOSTD NOCALM

*** THE 1ST HIGHEST 8-HR AVERAGE CONCENTRATION VALUES FOR SOURCE GROUP: ALL ***
INCLUDING SOURCE(S): L1IN , L2IN , L3IN , L4IN , L1OUT , L2OUT , L3OUT ,
L4OUT ,

*** DISCRETE CARTESIAN RECEPTOR POINTS ***

** CONC OF CO IN PPM **

X-COORD (M)	Y-COORD (M)	CONC	(YYMMDDHH)	X-COORD (M)	Y-COORD (M)	CONC	(YYMMDDHH)
232.36	225.36	0.01331	(90111924)	228.69	234.19	0.01400	(90111924)
225.03	243.03	0.01457	(90111924)	221.37	251.87	0.01482	(90111924)
208.87	264.37	0.01405	(90111924)	200.03	268.03	0.01305	(90111924)
191.19	271.69	0.01246	(90122024)	182.36	275.36	0.01280	(90122024)
173.52	279.02	0.01263	(90122024)	164.68	282.68	0.01205	(90122024)
155.84	286.34	0.01123	(90122024)	247.00	190.00	0.01059	(90112924)
247.00	180.00	0.01092	(90112924)	247.00	170.00	0.01104	(90112924)
247.00	160.00	0.01106	(90112924)	247.00	150.00	0.01104	(90112924)
247.00	140.00	0.01107	(90122424)	247.00	130.00	0.01106	(90122424)
247.00	120.00	0.01103	(90122424)	247.00	110.00	0.01096	(90122424)
247.00	100.00	0.01101	(90112024)	247.00	90.00	0.01118	(90111124)
247.00	80.00	0.01338	(90111124)	247.00	70.00	0.01522	(90111124)
247.00	60.00	0.01670	(90111124)	247.00	50.00	0.01783	(90111124)
247.00	40.00	0.01865	(90111124)	247.00	30.00	0.01923	(90111124)
247.00	20.00	0.01962	(90111124)	247.00	10.00	0.01986	(90111124)
247.00	0.00	0.02001	(90111124)	247.00	-10.00	0.02010	(90111124)
-10.00	190.00	0.02682	(90112824)	-10.00	-10.00	0.01891	(90012024)
147.00	-10.00	0.03882	(90120324)	147.00	190.00	0.02611	(90122024)

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CONC URBAN FLAT FLGPOL NOSTD NOCALM

*** THE SUMMARY OF MAXIMUM PERIOD (8760 HRS) RESULTS ***

** CONC OF CO IN PPM **

GROUP ID		AVERAGE CONC	RECEPTOR (XR, YR, ZELEV, ZFLAG)	OF TYPE	NETWORK GRID-ID
ALL	1ST HIGHEST VALUE IS	0.00096 AT	(147.00, -10.00, 0.00, 1.60)	DC	NA

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         2ND HIGHEST VALUE IS       0.00094 AT (     147.00,      190.00,      0.00,      1.60)  DC      NA
         3RD HIGHEST VALUE IS       0.00079 AT (     172.00,       90.00,      0.00,      1.60)  DC      NA
         4TH HIGHEST VALUE IS       0.00079 AT (     172.00,       80.00,      0.00,      1.60)  DC      NA
         5TH HIGHEST VALUE IS       0.00079 AT (     107.75,      215.00,      0.00,      1.60)  DC      NA
         6TH HIGHEST VALUE IS       0.00079 AT (      97.94,      215.00,      0.00,      1.60)  DC      NA
         7TH HIGHEST VALUE IS       0.00079 AT (     172.00,      100.00,      0.00,      1.60)  DC      NA
         8TH HIGHEST VALUE IS       0.00078 AT (     172.00,       70.00,      0.00,      1.60)  DC      NA
         9TH HIGHEST VALUE IS       0.00078 AT (     117.56,      215.00,      0.00,      1.60)  DC      NA
        10TH HIGHEST VALUE IS       0.00078 AT (      88.13,      215.00,      0.00,      1.60)  DC      NA


 *** RECEPTOR TYPES:  GC = GRIDCART
                      GP = GRIDPOLR
                      DC = DISCCART
                      DP = DISCPOLR
                      BD = BOUNDARY
 *** ISCST3 - VERSION 02035 ***    *** D:\00Projects\South Sacramento\Parking CO\ISC\PrkLot.isc             ***        07/16/08
                                   ***                                                                      ***        09:40:46
**MODELOPTs:                                                                                                           PAGE  32
CONC                    URBAN FLAT  FLGPOL               NOSTD         NOCALM

                                             *** THE SUMMARY OF HIGHEST  1-HR RESULTS ***


                                       ** CONC OF CO       IN PPM                                      **

                                                   DATE                                                          NETWORK
GROUP ID                        AVERAGE CONC     (YYMMDDHH)             RECEPTOR  (XR, YR, ZELEV, ZFLAG)     OF TYPE  GRID-ID
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

ALL      HIGH  1ST HIGH VALUE IS       0.31059  ON 90120317: AT (     147.00,      -10.00,      0.00,      1.60)  DC      NA


 *** RECEPTOR TYPES:  GC = GRIDCART
                      GP = GRIDPOLR
                      DC = DISCCART
                      DP = DISCPOLR
                      BD = BOUNDARY
 *** ISCST3 - VERSION 02035 ***    *** D:\00Projects\South Sacramento\Parking CO\ISC\PrkLot.isc             ***        07/16/08
                                   ***                                                                      ***        09:40:46
**MODELOPTs:                                                                                                           PAGE  33
CONC                    URBAN FLAT  FLGPOL               NOSTD         NOCALM

                                             *** THE SUMMARY OF HIGHEST  8-HR RESULTS ***


                                       ** CONC OF CO       IN PPM                                      **

                                                   DATE                                                          NETWORK
GROUP ID                        AVERAGE CONC     (YYMMDDHH)             RECEPTOR  (XR, YR, ZELEV, ZFLAG)     OF TYPE  GRID-ID
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

ALL      HIGH  1ST HIGH VALUE IS       0.03882  ON 90120324: AT (     147.00,      -10.00,      0.00,      1.60)  DC      NA


 *** RECEPTOR TYPES:  GC = GRIDCART
                      GP = GRIDPOLR
                      DC = DISCCART
                      DP = DISCPOLR
                      BD = BOUNDARY
 *** ISCST3 - VERSION 02035 ***    *** D:\00Projects\South Sacramento\Parking CO\ISC\PrkLot.isc             ***        07/16/08
                                   ***                                                                      ***        09:40:46
**MODELOPTs:                                                                                                           PAGE  34
CONC                    URBAN FLAT  FLGPOL               NOSTD         NOCALM


*** Message Summary : ISCST3 Model Execution ***

 --------- Summary of Total Messages --------

A Total of            0 Fatal Error Message(s)
A Total of            0 Warning Message(s)
A Total of         1568 Informational Message(s)

A Total of         1568 Calm Hours Identified


   ******** FATAL ERROR MESSAGES ********
              ***  NONE  ***


   ********   WARNING MESSAGES   ********
              ***  NONE  ***


   ************************************
   *** ISCST3 Finishes Successfully ***
   ************************************
```

PM_{10} and $PM_{2.5}$ Hotspot Analysis Calculations and Output Files

BUS ~ IDLE EMISSIONS CALCULATIONS

AREA CALCULATION	
Project Site Sq. Meters	**1,310 meters**

Bus Idle - 0 mph		
		2030
PM10 - gr/hour		26.3000

- Emission rate from EMFAC2007.
- 30 Seconds of idle time total per bus
- Assume annual average of 80 bus trips past any one sensitive receptor per day

Bus Idle - 0 mph					
26.3 gr/hr x 0.5 min/1 day x 1 day/1440 min x 1 hr/3600 sec x 80 trips	=	**0.0002**	**gr/sec**	**1.549E-07**	**gr/sec/m2**

Bus Idle - 0 mph		
		2030
PM2.5 - gr/hour		24.1960

- Emission rate from EMFAC2007.
- 30 Seconds of idle time total per bus
- Assume annual average of 80 bus trips past any one sensitive receptor per day
- Assumes that PM2.5 is 92% of PM10

Bus Idle - 0 mph					
24.1960 gr/hr x 0.5 min/1 day x 1 day/1440 min x 1 hr/3600 sec x 80 trips	=	**0.0002**	**gr/sec**	**1.425E-07**	**gr/sec/m2**

TAHA AIR QUALITY ASSUMPTIONS & INPUTS

Project:	South Sacramento Corridor Phase II
Existing Year:	2008
Analysis Year:	2030
2008 VMT (from EMFAC2007):	31,831,000
2030 VMT (from EMFAC2007):	40,685,000
EMFAC Model:	EMFAC2007
2008 PM10 Emissions:	2.040
2030 PM10 Emissions:	1.930
Existing 24-Hr Ambient Concentration (ug/m3):	111.00

Project Year:	2008	2030
24-Hr PM10 Concentration (ug/m3):	111.00	134.23

TAHA AIR QUALITY ASSUMPTIONS & INPUTS

Project:	South Sacramento Corridor Phase II
Existing Year:	2008
Analysis Year:	2030
2008 VMT (from EMFAC2007):	31,831,000
2030 VMT (from EMFAC2007):	40,685,000
EMFAC Model:	EMFAC2007
2008 PM2.5 Emissions:	1.877
2030 PM2.5 Emissions:	1.776
Existing 24-Hr Ambient Concentration (ug/m3):	63.80

Project Year:	2008	2030
24-Hr PM2.5 Concentration (ug/m3):	63.80	77.15

BUS EMISSIONS ~ PM_{10}

```
**
****************************************
**
** ISCST3 Input Produced by:
** ISC-AERMOD View Ver. 4.6.2
** Lakes Environmental Software Inc.
** Date: 7/16/2008
** File: D:\00Projects\South Sacramento\ISC\PM10Bus.INP
**
****************************************
**
**
****************************************
** ISCST3 Control Pathway
****************************************
**
**
CO STARTING
   TITLEONE South Sacramento Corridor Phase II
   TITLETWO Cosumnes River College - Bus PM10 - Baseline
   MODELOPT DFAULT CONC  URBAN
   AVERTIME 24
   POLLUTID OTHER
   TERRHGTS FLAT
   FLAGPOLE 1.60
   RUNORNOT RUN
CO FINISHED
**
****************************************
** ISCST3 Source Pathway
****************************************
**
**
SO STARTING
** Source Location **
** Source ID - Type - X Coord. - Y Coord. **
   LOCATION PNR AREA 0.000 0.000
** DESCRSRC Cosumnes River College Station
** Source Parameters **
   SRCPARAM PNR 1.549E-7 3.000 91.440 14.326 0.000
   SRCGROUP ALL
SO FINISHED
**
****************************************
** ISCST3 Receptor Pathway
****************************************
**
**
RE STARTING
   GRIDCART UCART1 STA
                     XYINC -60.00 24 15.00 -60.00 24 15.00
                     FLAG  1 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6
                     FLAG  1 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6
                     FLAG  2 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6
                     FLAG  2 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6
                     FLAG  3 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6
                     FLAG  3 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6
                     FLAG  4 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6
                     FLAG  4 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6
                     FLAG  5 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6
                     FLAG  5 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6
                     FLAG  6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6
                     FLAG  6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6
                     FLAG  7 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6
                     FLAG  7 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6
                     FLAG  8 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6
                     FLAG  8 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6
                     FLAG  9 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6
                     FLAG  9 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6
                     FLAG  10 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6
                     FLAG  10 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6
                     FLAG  11 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6
                     FLAG  11 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6
                     FLAG  12 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6
                     FLAG  12 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6
                     FLAG  13 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6
                     FLAG  13 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6
                     FLAG  14 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6
                     FLAG  14 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6
                     FLAG  15 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6
                     FLAG  15 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6
                     FLAG  16 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6
                     FLAG  16 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6
                     FLAG  17 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6
                     FLAG  17 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6
                     FLAG  18 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6
                     FLAG  18 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6
                     FLAG  19 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6
                     FLAG  19 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6
                     FLAG  20 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6
                     FLAG  20 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6
                     FLAG  21 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6
                     FLAG  21 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6
                     FLAG  22 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6
                     FLAG  22 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6
                     FLAG  23 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6
                     FLAG  23 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6
                     FLAG  24 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6
                     FLAG  24 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6
   GRIDCART UCART1 END
RE FINISHED
**
****************************************
** ISCST3 Meteorology Pathway
****************************************
**
**
ME STARTING
   INPUTFIL 53123.ASC
   ANEMHGHT 10 METERS
   SURFDATA 54144 1981
   UAIRDATA 99999 1981
ME FINISHED
**
```

```
****************************************
** ISCST3 Output Pathway
****************************************
**
**
OU STARTING
   RECTABLE ALLAVE FIRST
   RECTABLE 24 FIRST
** Auto-Generated Plotfiles
   PLOTFILE 24 ALL 1ST PM10Bus.IS\24H1GALL.PLT
OU FINISHED

***********************************
*** SETUP Finishes Successfully ***
***********************************

 *** ISCST3 - VERSION 02035 ***    *** South Sacramento Corridor Phase II                                  ***        07/16/08
                                   *** Cosumnes River College - Bus PM10 - Baseline                        ***        15:49:08
**MODELOPTs:                                                                                                            PAGE   1
CONC                    URBAN FLAT  FLGPOL DFAULT

                                          ***     MODEL SETUP OPTIONS SUMMARY       ***
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

**Intermediate Terrain Processing is Selected

**Model Is Setup For Calculation of Average CONCentration Values.

  --  SCAVENGING/DEPOSITION LOGIC --
**Model Uses NO DRY DEPLETION.  DDPLETE =  F
**Model Uses NO WET DEPLETION.  WDPLETE =  F
**NO WET SCAVENGING Data Provided.
**NO GAS DRY DEPOSITION Data Provided.
**Model Does NOT Use GRIDDED TERRAIN Data for Depletion Calculations

**Model Uses URBAN Dispersion.

**Model Uses Regulatory DEFAULT Options:
           1. Final Plume Rise.
           2. Stack-tip Downwash.
           3. Buoyancy-induced Dispersion.
           4. Use Calms Processing Routine.
           5. Not Use Missing Data Processing Routine.
           6. Default Wind Profile Exponents.
           7. Default Vertical Potential Temperature Gradients.
           8. "Upper Bound" Values for Supersquat Buildings.
           9. No Exponential Decay for URBAN/Non-SO2

**Model Assumes Receptors on FLAT Terrain.

**Model Accepts FLAGPOLE Receptor Heights.

**Model Calculates  1 Short Term Average(s) of:  24-HR

**This Run Includes:     1 Source(s);      1 Source Group(s); and     576 Receptor(s)

**The Model Assumes A Pollutant Type of:  OTHER

**Model Set To Continue RUNning After the Setup Testing.

**Output Options Selected:
         Model Outputs Tables of Highest Short Term Values by Receptor (RECTABLE Keyword)
         Model Outputs External File(s) of High Values for Plotting (PLOTFILE Keyword)

**NOTE:  The Following Flags May Appear Following CONC Values:  c for Calm Hours
                                                                m for Missing Hours
                                                                b for Both Calm and Missing Hours

**Misc. Inputs:  Anem. Hgt. (m) =    10.00 ;    Decay Coef. =   0.0000E+00 ;    Rot. Angle =     0.0
                 Emission Units = GRAMS/SEC                                  ;  Emission Rate Unit Factor =   0.10000E+07
                 Output Units   = MICROGRAMS/M**3

**Approximate Storage Requirements of Model =     1.2 MB of RAM.

**Input Runstream File:          PM10Bus.INP
**Output Print File:             PM10Bus.OUT
 *** ISCST3 - VERSION 02035 ***    *** South Sacramento Corridor Phase II                                  ***        07/16/08
                                   *** Cosumnes River College - Bus PM10 - Baseline                        ***        15:49:08
**MODELOPTs:                                                                                                            PAGE   2
CONC                    URBAN FLAT  FLGPOL DFAULT


                                                *** AREA SOURCE DATA ***

             NUMBER EMISSION RATE  COORD (SW CORNER)  BASE     RELEASE  X-DIM     Y-DIM    ORIENT.    INIT.  EMISSION RATE
   SOURCE     PART.  (GRAMS/SEC       X        Y      ELEV.    HEIGHT  OF AREA   OF AREA   OF AREA     SZ     SCALAR VARY
     ID       CATS.   /METER**2)   (METERS) (METERS) (METERS) (METERS) (METERS)  (METERS)   (DEG.)  (METERS)      BY
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

  PNR           0   0.15490E-06       0.0       0.0     0.0     3.00     91.44     14.33      0.00     0.00
 *** ISCST3 - VERSION 02035 ***    *** South Sacramento Corridor Phase II                                  ***        07/16/08
                                   *** Cosumnes River College - Bus PM10 - Baseline                        ***        15:49:08
**MODELOPTs:                                                                                                            PAGE   3
CONC                    URBAN FLAT  FLGPOL DFAULT


                                             *** SOURCE IDs DEFINING SOURCE GROUPS ***

GROUP ID                                                SOURCE IDs


 ALL       PNR     ,
 *** ISCST3 - VERSION 02035 ***    *** South Sacramento Corridor Phase II                                  ***        07/16/08
                                   *** Cosumnes River College - Bus PM10 - Baseline                        ***        15:49:08
**MODELOPTs:                                                                                                            PAGE   4
CONC                    URBAN FLAT  FLGPOL DFAULT


                                          *** GRIDDED RECEPTOR NETWORK SUMMARY ***

                                  *** NETWORK ID: UCART1   ;  NETWORK TYPE: GRIDCART ***
```

BUS EMISSIONS ~ PM_{10}

```
                                    *** X-COORDINATES OF GRID ***
                                              (METERS)

        -60.0,     -45.0,     -30.0,     -15.0,       0.0,      15.0,      30.0,      45.0,      60.0,      75.0,
         90.0,     105.0,     120.0,     135.0,     150.0,     165.0,     180.0,     195.0,     210.0,     225.0,
        240.0,     255.0,     270.0,     285.0,

                                    *** Y-COORDINATES OF GRID ***
                                              (METERS)

        -60.0,     -45.0,     -30.0,     -15.0,       0.0,      15.0,      30.0,      45.0,      60.0,      75.0,
         90.0,     105.0,     120.0,     135.0,     150.0,     165.0,     180.0,     195.0,     210.0,     225.0,
        240.0,     255.0,     270.0,     285.0,
 *** ISCST3 - VERSION 02035 ***    *** South Sacramento Corridor Phase II                                  ***        07/16/08
                                   *** Cosumnes River College - Bus PM10 - Baseline                        ***        15:49:08
**MODELOPTs:                                                                                                            PAGE   5
CONC                    URBAN FLAT  FLGPOL DFAULT


                              *** NETWORK ID: UCART1   ;  NETWORK TYPE: GRIDCART ***

                                     * RECEPTOR FLAGPOLE HEIGHTS IN METERS *

   Y-COORD  |                                          X-COORD (METERS)
   (METERS) |        -60.00       -45.00       -30.00       -15.00         0.00        15.00        30.00        45.00        60.00
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

     285.00 |          1.60        1.60        1.60        1.60        1.60        1.60        1.60        1.60        1.60
     270.00 |          1.60        1.60        1.60        1.60        1.60        1.60        1.60        1.60        1.60
     255.00 |          1.60        1.60        1.60        1.60        1.60        1.60        1.60        1.60        1.60
     240.00 |          1.60        1.60        1.60        1.60        1.60        1.60        1.60        1.60        1.60
     225.00 |          1.60        1.60        1.60        1.60        1.60        1.60        1.60        1.60        1.60
     210.00 |          1.60        1.60        1.60        1.60        1.60        1.60        1.60        1.60        1.60
     195.00 |          1.60        1.60        1.60        1.60        1.60        1.60        1.60        1.60        1.60
     180.00 |          1.60        1.60        1.60        1.60        1.60        1.60        1.60        1.60        1.60
     165.00 |          1.60        1.60        1.60        1.60        1.60        1.60        1.60        1.60        1.60
     150.00 |          1.60        1.60        1.60        1.60        1.60        1.60        1.60        1.60        1.60
     135.00 |          1.60        1.60        1.60        1.60        1.60        1.60        1.60        1.60        1.60
     120.00 |          1.60        1.60        1.60        1.60        1.60        1.60        1.60        1.60        1.60
     105.00 |          1.60        1.60        1.60        1.60        1.60        1.60        1.60        1.60        1.60
      90.00 |          1.60        1.60        1.60        1.60        1.60        1.60        1.60        1.60        1.60
      75.00 |          1.60        1.60        1.60        1.60        1.60        1.60        1.60        1.60        1.60
      60.00 |          1.60        1.60        1.60        1.60        1.60        1.60        1.60        1.60        1.60
      45.00 |          1.60        1.60        1.60        1.60        1.60        1.60        1.60        1.60        1.60
      30.00 |          1.60        1.60        1.60        1.60        1.60        1.60        1.60        1.60        1.60
      15.00 |          1.60        1.60        1.60        1.60        1.60        1.60        1.60        1.60        1.60
       0.00 |          1.60        1.60        1.60        1.60        1.60        1.60        1.60        1.60        1.60
     -15.00 |          1.60        1.60        1.60        1.60        1.60        1.60        1.60        1.60        1.60
     -30.00 |          1.60        1.60        1.60        1.60        1.60        1.60        1.60        1.60        1.60
     -45.00 |          1.60        1.60        1.60        1.60        1.60        1.60        1.60        1.60        1.60
     -60.00 |          1.60        1.60        1.60        1.60        1.60        1.60        1.60        1.60        1.60
 *** ISCST3 - VERSION 02035 ***    *** South Sacramento Corridor Phase II                                  ***        07/16/08
                                   *** Cosumnes River College - Bus PM10 - Baseline                        ***        15:49:08
**MODELOPTs:                                                                                                            PAGE   6
CONC                    URBAN FLAT  FLGPOL DFAULT


                              *** NETWORK ID: UCART1   ;  NETWORK TYPE: GRIDCART ***

                                     * RECEPTOR FLAGPOLE HEIGHTS IN METERS *

   Y-COORD  |                                          X-COORD (METERS)
   (METERS) |         75.00        90.00       105.00       120.00       135.00       150.00       165.00       180.00       195.00
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

     285.00 |          1.60        1.60        1.60        1.60        1.60        1.60        1.60        1.60        1.60
     270.00 |          1.60        1.60        1.60        1.60        1.60        1.60        1.60        1.60        1.60
     255.00 |          1.60        1.60        1.60        1.60        1.60        1.60        1.60        1.60        1.60
     240.00 |          1.60        1.60        1.60        1.60        1.60        1.60        1.60        1.60        1.60
     225.00 |          1.60        1.60        1.60        1.60        1.60        1.60        1.60        1.60        1.60
     210.00 |          1.60        1.60        1.60        1.60        1.60        1.60        1.60        1.60        1.60
     195.00 |          1.60        1.60        1.60        1.60        1.60        1.60        1.60        1.60        1.60
     180.00 |          1.60        1.60        1.60        1.60        1.60        1.60        1.60        1.60        1.60
     165.00 |          1.60        1.60        1.60        1.60        1.60        1.60        1.60        1.60        1.60
     150.00 |          1.60        1.60        1.60        1.60        1.60        1.60        1.60        1.60        1.60
     135.00 |          1.60        1.60        1.60        1.60        1.60        1.60        1.60        1.60        1.60
     120.00 |          1.60        1.60        1.60        1.60        1.60        1.60        1.60        1.60        1.60
     105.00 |          1.60        1.60        1.60        1.60        1.60        1.60        1.60        1.60        1.60
      90.00 |          1.60        1.60        1.60        1.60        1.60        1.60        1.60        1.60        1.60
      75.00 |          1.60        1.60        1.60        1.60        1.60        1.60        1.60        1.60        1.60
      60.00 |          1.60        1.60        1.60        1.60        1.60        1.60        1.60        1.60        1.60
      45.00 |          1.60        1.60        1.60        1.60        1.60        1.60        1.60        1.60        1.60
      30.00 |          1.60        1.60        1.60        1.60        1.60        1.60        1.60        1.60        1.60
      15.00 |          1.60        1.60        1.60        1.60        1.60        1.60        1.60        1.60        1.60
       0.00 |          1.60        1.60        1.60        1.60        1.60        1.60        1.60        1.60        1.60
     -15.00 |          1.60        1.60        1.60        1.60        1.60        1.60        1.60        1.60        1.60
     -30.00 |          1.60        1.60        1.60        1.60        1.60        1.60        1.60        1.60        1.60
     -45.00 |          1.60        1.60        1.60        1.60        1.60        1.60        1.60        1.60        1.60
     -60.00 |          1.60        1.60        1.60        1.60        1.60        1.60        1.60        1.60        1.60
 *** ISCST3 - VERSION 02035 ***    *** South Sacramento Corridor Phase II                                  ***        07/16/08
                                   *** Cosumnes River College - Bus PM10 - Baseline                        ***        15:49:08
**MODELOPTs:                                                                                                            PAGE   7
CONC                    URBAN FLAT  FLGPOL DFAULT


                              *** NETWORK ID: UCART1   ;  NETWORK TYPE: GRIDCART ***

                                     * RECEPTOR FLAGPOLE HEIGHTS IN METERS *

   Y-COORD  |                                          X-COORD (METERS)
   (METERS) |        210.00       225.00       240.00       255.00       270.00       285.00
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

     285.00 |          1.60        1.60        1.60        1.60        1.60        1.60
     270.00 |          1.60        1.60        1.60        1.60        1.60        1.60
     255.00 |          1.60        1.60        1.60        1.60        1.60        1.60
     240.00 |          1.60        1.60        1.60        1.60        1.60        1.60
     225.00 |          1.60        1.60        1.60        1.60        1.60        1.60
     210.00 |          1.60        1.60        1.60        1.60        1.60        1.60
     195.00 |          1.60        1.60        1.60        1.60        1.60        1.60
     180.00 |          1.60        1.60        1.60        1.60        1.60        1.60
     165.00 |          1.60        1.60        1.60        1.60        1.60        1.60
     150.00 |          1.60        1.60        1.60        1.60        1.60        1.60
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     135.00 |         1.60        1.60        1.60        1.60        1.60        1.60
     120.00 |         1.60        1.60        1.60        1.60        1.60        1.60
     105.00 |         1.60        1.60        1.60        1.60        1.60        1.60
      90.00 |         1.60        1.60        1.60        1.60        1.60        1.60
      75.00 |         1.60        1.60        1.60        1.60        1.60        1.60
      60.00 |         1.60        1.60        1.60        1.60        1.60        1.60
      45.00 |         1.60        1.60        1.60        1.60        1.60        1.60
      30.00 |         1.60        1.60        1.60        1.60        1.60        1.60
      15.00 |         1.60        1.60        1.60        1.60        1.60        1.60
       0.00 |         1.60        1.60        1.60        1.60        1.60        1.60
     -15.00 |         1.60        1.60        1.60        1.60        1.60        1.60
     -30.00 |         1.60        1.60        1.60        1.60        1.60        1.60
     -45.00 |         1.60        1.60        1.60        1.60        1.60        1.60
     -60.00 |         1.60        1.60        1.60        1.60        1.60        1.60
 *** ISCST3 - VERSION 02035 ***    *** South Sacramento Corridor Phase II                                  ***        07/16/08
                                   *** Cosumnes River College - Bus PM10 - Baseline                        ***        15:49:08
**MODELOPTs:                                                                                                            PAGE   8
CONC                    URBAN FLAT  FLGPOL DFAULT


                                        *** METEOROLOGICAL DAYS SELECTED FOR PROCESSING ***
                                                          (1=YES; 0=NO)

          1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1
          1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1
          1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1
          1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1
          1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1
          1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1
          1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1
          1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1
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NOTE: METEOROLOGICAL DATA ACTUALLY PROCESSED WILL ALSO DEPEND ON WHAT IS INCLUDED IN THE DATA FILE.

*** UPPER BOUND OF FIRST THROUGH FIFTH WIND SPEED CATEGORIES ***
(METERS/SEC)

1.54, 3.09, 5.14, 8.23, 10.80,

*** WIND PROFILE EXPONENTS ***

STABILITY CATEGORY	WIND SPEED CATEGORY 1	2	3	4	5	6
A	.15000E+00	.15000E+00	.15000E+00	.15000E+00	.15000E+00	.15000E+00
B	.15000E+00	.15000E+00	.15000E+00	.15000E+00	.15000E+00	.15000E+00
C	.20000E+00	.20000E+00	.20000E+00	.20000E+00	.20000E+00	.20000E+00
D	.25000E+00	.25000E+00	.25000E+00	.25000E+00	.25000E+00	.25000E+00
E	.30000E+00	.30000E+00	.30000E+00	.30000E+00	.30000E+00	.30000E+00
F	.30000E+00	.30000E+00	.30000E+00	.30000E+00	.30000E+00	.30000E+00

*** VERTICAL POTENTIAL TEMPERATURE GRADIENTS ***
(DEGREES KELVIN PER METER)

STABILITY CATEGORY	WIND SPEED CATEGORY 1	2	3	4	5	6
A	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00
B	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00
C	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00
D	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00
E	.20000E-01	.20000E-01	.20000E-01	.20000E-01	.20000E-01	.20000E-01
F	.35000E-01	.35000E-01	.35000E-01	.35000E-01	.35000E-01	.35000E-01

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 *** ISCST3 - VERSION 02035 ***    *** South Sacramento Corridor Phase II                                  ***        07/16/08
                                   *** Cosumnes River College - Bus PM10 - Baseline                        ***        15:49:08
**MODELOPTs:                                                                                                            PAGE   9
CONC                    URBAN FLAT  FLGPOL DFAULT
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*** THE FIRST 24 HOURS OF METEOROLOGICAL DATA ***

FILE: 53123.ASC
FORMAT: (4I2,2F9.4,F6.1,I2,2F7.1,f9.4,f10.1,f8.4,i4,f7.2)
SURFACE STATION NO.: 54144 UPPER AIR STATION NO.: 99999
NAME: UNKNOWN NAME: UNKNOWN
YEAR: 1981 YEAR: 1981

YR	MN	DY	HR	FLOW VECTOR	SPEED (M/S)	TEMP (K)	STAB CLASS	MIXING HEIGHT (M) RURAL	MIXING HEIGHT (M) URBAN	USTAR (M/S)	M-O LENGTH (M)	Z-0 (M)	IPCODE	PRATE (mm/HR)
81	01	01	01	134.8	1.34	284.3	7	522.6	170.0	0.0000	0.0	0.0000	0	0.00
81	01	01	02	102.4	1.00	284.3	7	507.0	170.0	0.0000	0.0	0.0000	0	0.00
81	01	01	03	85.0	1.00	283.1	7	491.4	170.0	0.0000	0.0	0.0000	0	0.00
81	01	01	04	143.5	1.00	283.1	7	475.8	170.0	0.0000	0.0	0.0000	0	0.00
81	01	01	05	106.5	1.00	282.6	7	460.3	170.0	0.0000	0.0	0.0000	0	0.00
81	01	01	06	117.0	1.34	283.1	7	444.7	170.0	0.0000	0.0	0.0000	0	0.00
81	01	01	07	139.5	1.79	285.4	6	1.4	170.7	0.0000	0.0	0.0000	0	0.00
81	01	01	08	179.6	1.34	287.6	5	47.0	192.0	0.0000	0.0	0.0000	0	0.00
81	01	01	09	6.5	1.00	289.8	4	92.5	213.3	0.0000	0.0	0.0000	0	0.00
81	01	01	10	279.1	2.24	291.5	3	138.0	234.7	0.0000	0.0	0.0000	0	0.00
81	01	01	11	269.1	2.24	294.3	3	183.5	256.0	0.0000	0.0	0.0000	0	0.00
81	01	01	12	260.6	2.24	297.6	3	229.0	277.3	0.0000	0.0	0.0000	0	0.00
81	01	01	13	267.2	1.34	298.7	2	274.5	298.7	0.0000	0.0	0.0000	0	0.00
81	01	01	14	259.2	2.68	299.8	3	320.0	320.0	0.0000	0.0	0.0000	0	0.00
81	01	01	15	269.8	3.13	299.3	3	320.0	320.0	0.0000	0.0	0.0000	0	0.00
81	01	01	16	278.2	2.68	298.7	4	320.0	320.0	0.0000	0.0	0.0000	0	0.00
81	01	01	17	222.6	1.79	295.4	5	325.6	318.5	0.0000	0.0	0.0000	0	0.00
81	01	01	18	187.6	1.79	291.5	6	357.2	310.3	0.0000	0.0	0.0000	0	0.00
81	01	01	19	155.5	2.24	289.8	6	388.8	302.1	0.0000	0.0	0.0000	0	0.00
81	01	01	20	145.7	1.00	287.0	7	420.4	293.9	0.0000	0.0	0.0000	0	0.00
81	01	01	21	111.1	1.34	286.5	7	452.0	285.7	0.0000	0.0	0.0000	0	0.00
81	01	01	22	114.5	0.00	287.0	7	483.5	277.4	0.0000	0.0	0.0000	0	0.00
81	01	01	23	135.7	1.34	285.9	7	515.1	269.2	0.0000	0.0	0.0000	0	0.00
81	01	01	24	112.2	1.34	285.4	7	546.7	261.0	0.0000	0.0	0.0000	0	0.00

*** NOTES: STABILITY CLASS 1=A, 2=B, 3=C, 4=D, 5=E AND 6=F.

FLOW VECTOR IS DIRECTION TOWARD WHICH WIND IS BLOWING.

*** ISCST3 - VERSION 02035 *** *** South Sacramento Corridor Phase II *** 07/16/08
*** Cosumnes River College - Bus PM10 - Baseline *** 15:49:08
**MODELOPTs: PAGE 10
CONC URBAN FLAT FLGPOL DFAULT

*** THE 1ST HIGHEST 24-HR AVERAGE CONCENTRATION VALUES FOR SOURCE GROUP: ALL ***
INCLUDING SOURCE(S): PNR ,

*** NETWORK ID: UCART1 ; NETWORK TYPE: GRIDCART ***

** CONC OF OTHER IN MICROGRAMS/M**3 **

Y-COORD (METERS)	X-COORD (METERS) -60.00	-45.00	-30.00	-15.00	0.00
285.0	0.00090c(81082824)	0.00092c(81082824)	0.00119c(81080624)	0.00198c(81080624)	0.00277c(81080624)
270.0	0.00099c(81082824)	0.00102c(81082824)	0.00117c(81080624)	0.00203c(81080624)	0.00291c(81080624)
255.0	0.00108c(81082824)	0.00113c(81082824)	0.00114c(81080624)	0.00207c(81080624)	0.00306c(81080624)
240.0	0.00119c(81082824)	0.00125c(81082824)	0.00127c(81082824)	0.00211c(81080624)	0.00322c(81080624)
225.0	0.00164 (81011624)	0.00139c(81082824)	0.00144c(81082824)	0.00216c(81080624)	0.00340c(81080624)
210.0	0.00229 (81011624)	0.00156 (81011624)	0.00163c(81082824)	0.00220c(81080624)	0.00361c(81080624)
195.0	0.00311 (81011624)	0.00226 (81011624)	0.00185c(81082824)	0.00223c(81080624)	0.00386c(81080624)
180.0	0.00407 (81011624)	0.00320 (81011624)	0.00220 (81011624)	0.00225c(81080624)	0.00414c(81080624)
165.0	0.00510 (81011624)	0.00435 (81011624)	0.00327 (81011624)	0.00253c(81082824)	0.00447c(81080624)
150.0	0.00612 (81011624)	0.00563 (81011624)	0.00465 (81011624)	0.00327 (81011624)	0.00486c(81080624)
135.0	0.00705 (81011624)	0.00692 (81011624)	0.00625 (81011624)	0.00495 (81011624)	0.00535c(81080624)
120.0	0.00784 (81011624)	0.00819 (81011624)	0.00791 (81011624)	0.00698 (81011624)	0.00596c(81080624)
105.0	0.00822 (81011624)	0.00946 (81011624)	0.00958 (81011624)	0.00915 (81011624)	0.00786 (81011624)
90.0	0.00758 (81011624)	0.01062 (81011624)	0.01147 (81011624)	0.01139 (81011624)	0.01074 (81011624)
75.0	0.00989 (81093024)	0.01073 (81011624)	0.01369 (81011624)	0.01410 (81011624)	0.01380 (81011624)
60.0	0.01363 (81110324)	0.01298c(81030824)	0.01576 (81011624)	0.01783 (81011624)	0.01779 (81011624)
45.0	0.02063 (81110324)	0.02198 (81110324)	0.02094 (81110324)	0.02327 (81011624)	0.02403c(81080624)
30.0	0.03012c(81091624)	0.03101c(81011424)	0.03719 (81110324)	0.03998 (81030924)	0.04380 (81011524)
15.0	0.04372 (81011124)	0.05837c(81091624)	0.08143c(81091624)	0.10982c(81091624)	0.12593c(81091624)
0.0	0.05237 (81110224)	0.06987 (81110224)	0.09954 (81120124)	0.17313 (81120124)	0.24447 (81120124)
-15.0	0.06051 (81120124)	0.08529 (81120124)	0.11367 (81120124)	0.14842 (81120124)	0.18397 (81011324)
-30.0	0.06032 (81120124)	0.07042 (81120124)	0.08358 (81120124)	0.10982 (81120124)	0.12230 (81011324)
-45.0	0.04558 (81120124)	0.05798 (81120224)	0.07148 (81120224)	0.08377 (81011824)	0.08906 (81011324)
-60.0	0.04320 (81120224)	0.05301 (81120224)	0.05715 (81120224)	0.06939 (81011824)	0.06851 (81011824)

*** ISCST3 - VERSION 02035 *** *** South Sacramento Corridor Phase II *** 07/16/08
*** Cosumnes River College - Bus PM10 - Baseline *** 15:49:08
**MODELOPTs: PAGE 11
CONC URBAN FLAT FLGPOL DFAULT

*** THE 1ST HIGHEST 24-HR AVERAGE CONCENTRATION VALUES FOR SOURCE GROUP: ALL ***
INCLUDING SOURCE(S): PNR ,

*** NETWORK ID: UCART1 ; NETWORK TYPE: GRIDCART ***

** CONC OF OTHER IN MICROGRAMS/M**3 **

Y-COORD (METERS)	X-COORD (METERS) 15.00	30.00	45.00	60.00	75.00
285.0	0.00335c(81080624)	0.00358c(81080624)	0.00343c(81080624)	0.00292c(81080624)	0.00241 (81042924)
270.0	0.00356c(81080624)	0.00383c(81080624)	0.00368c(81080624)	0.00314c(81080624)	0.00260 (81042924)
255.0	0.00378c(81080624)	0.00410c(81080624)	0.00396c(81080624)	0.00340c(81080624)	0.00281 (81042924)
240.0	0.00404c(81080624)	0.00439c(81080624)	0.00427c(81080624)	0.00369c(81080624)	0.00305 (81042924)
225.0	0.00432c(81080624)	0.00471c(81080624)	0.00461c(81080624)	0.00402c(81080624)	0.00333 (81042924)
210.0	0.00464c(81080624)	0.00507c(81080624)	0.00499c(81080624)	0.00441c(81080624)	0.00365 (81042924)
195.0	0.00501c(81080624)	0.00546c(81080624)	0.00541c(81080624)	0.00485c(81080624)	0.00404 (81042924)
180.0	0.00544c(81080624)	0.00591c(81080624)	0.00589c(81080624)	0.00537c(81080624)	0.00450 (81042924)
165.0	0.00596c(81080624)	0.00642c(81080624)	0.00641c(81080624)	0.00598c(81080624)	0.00508 (81042924)
150.0	0.00657c(81080624)	0.00701c(81080624)	0.00702c(81080624)	0.00671c(81080624)	0.00614 (81091824)
135.0	0.00731c(81080624)	0.00771c(81080624)	0.00773c(81080624)	0.00761c(81080624)	0.00747 (81091824)
120.0	0.00823c(81080624)	0.00854c(81080624)	0.00860c(81080624)	0.00878c(81080624)	0.00929 (81090824)
105.0	0.00939c(81080624)	0.00959c(81080624)	0.00975 (81042924)	0.01043c(81080624)	0.01572 (81090824)
90.0	0.01092c(81080624)	0.01113 (81042924)	0.01174 (81042924)	0.01603c(81012024)	0.02479 (81090824)
75.0	0.01319c(81080624)	0.01353 (81042924)	0.01817c(81012024)	0.02817 (81090824)	0.03587 (81090824)
60.0	0.01747 (81011624)	0.01986c(81012024)	0.03420c(81012024)	0.04415 (81090824)	0.05328c(81101624)
45.0	0.02635c(81080624)	0.04388c(81012024)	0.05901c(81012024)	0.07721 (81122824)	0.09322 (81122824)
30.0	0.05495 (81011524)	0.09277 (81122824)	0.13284 (81122824)	0.15995c(81101224)	0.18740c(81101224)
15.0	0.15868c(81042324)	0.23278c(81042324)	0.29774 (81121024)	0.35272 (81121024)	0.38602 (81121024)
0.0	0.28823c(81112824)	0.36104c(81112824)	0.38674c(81112824)	0.37714c(81112824)	0.33717c(81112824)
-15.0	0.18448 (81011324)	0.18565 (81011324)	0.21425c(81120524)	0.22047c(81120524)	0.24022c(81120624)
-30.0	0.12345 (81011324)	0.12315 (81120424)	0.13859 (81110324)	0.15189 (81110324)	0.15764c(81120524)
-45.0	0.09054 (81011324)	0.09988 (81120424)	0.09992 (81120424)	0.11215 (81110324)	0.11206 (81110324)
-60.0	0.07270 (81120424)	0.07847 (81120424)	0.07430 (81120424)	0.07860 (81110324)	0.08135 (81110324)

*** ISCST3 - VERSION 02035 *** *** South Sacramento Corridor Phase II *** 07/16/08
*** Cosumnes River College - Bus PM10 - Baseline *** 15:49:08
**MODELOPTs: PAGE 12
CONC URBAN FLAT FLGPOL DFAULT

*** THE 1ST HIGHEST 24-HR AVERAGE CONCENTRATION VALUES FOR SOURCE GROUP: ALL ***
INCLUDING SOURCE(S): PNR ,

*** NETWORK ID: UCART1 ; NETWORK TYPE: GRIDCART ***

** CONC OF OTHER IN MICROGRAMS/M**3 **

Y-COORD (METERS)	X-COORD (METERS) 90.00	105.00	120.00	135.00	150.00
285.0	0.00194 (81042924)	0.00196 (81091824)	0.00263 (81091824)	0.00314 (81091824)	0.00338 (81091824)
270.0	0.00207 (81042924)	0.00235 (81091824)	0.00304 (81091824)	0.00350 (81091824)	0.00366 (81091824)
255.0	0.00221 (81042924)	0.00280 (81091824)	0.00349 (81091824)	0.00389 (81091824)	0.00396 (81091824)
240.0	0.00241 (81091824)	0.00331 (81091824)	0.00397 (81091824)	0.00429 (81091824)	0.00427 (81091824)
225.0	0.00296 (81091824)	0.00388 (81091824)	0.00448 (81091824)	0.00474 (81091824)	0.00549 (81090824)
210.0	0.00362 (81091824)	0.00451 (81091824)	0.00505 (81091824)	0.00533 (81090824)	0.00721 (81090824)
195.0	0.00436 (81091824)	0.00520 (81091824)	0.00570 (81091824)	0.00725 (81090824)	0.00930 (81090824)
180.0	0.00519 (81091824)	0.00598 (81091824)	0.00714 (81090824)	0.00970 (81090824)	0.01170 (81090824)
165.0	0.00613 (81091824)	0.00693 (81091824)	0.00998 (81090824)	0.01263 (81090824)	0.01430 (81090824)
150.0	0.00724 (81091824)	0.01007 (81090824)	0.01354 (81090824)	0.01593 (81090824)	0.01698 (81090824)
135.0	0.00988 (81090824)	0.01441 (81090824)	0.01772 (81090824)	0.01946 (81090824)	0.01958 (81090824)
120.0	0.01517 (81090824)	0.01971 (81090824)	0.02235 (81090824)	0.02319 (81090824)	0.02441 (81112924)
105.0	0.02201 (81090824)	0.02577 (81090824)	0.02751 (81090824)	0.02976 (81112924)	0.03125 (81112924)
90.0	0.03007 (81090824)	0.03282 (81090824)	0.03686c(81101624)	0.04017 (81112924)	0.03898 (81112924)
75.0	0.04023c(81101624)	0.04749c(81101624)	0.05271 (81112924)	0.05315 (81112924)	0.05190c(81101224)
60.0	0.06400c(81101624)	0.07201c(81101624)	0.07602c(81101224)	0.07880c(81101224)	0.07694c(81101224)
45.0	0.10654c(81101224)	0.12294c(81101224)	0.12478c(81101224)	0.11414c(81101224)	0.09540c(81101224)

30.0	0.20367c(81101224)	0.20805c(81101224)	0.18133 (81121024)	0.15865 (81121024)	0.12674 (81121024)
15.0	0.41092 (81121024)	0.36429 (81121024)	0.24078 (81121024)	0.16426 (81112924)	0.12098 (81112924)
0.0	0.34372c(81042124)	0.29902c(81042124)	0.19636c(81121524)	0.14133c(81100424)	0.10826c(81100424)
-15.0	0.24737c(81120624)	0.20712c(81120624)	0.16982c(81042124)	0.14445c(81042124)	0.11245c(81042124)
-30.0	0.16768c(81120624)	0.14887c(81120624)	0.13970c(81120624)	0.11346c(81120624)	0.08897c(81042124)
-45.0	0.11091c(81120524)	0.10073c(81120624)	0.09856c(81120624)	0.09766c(81120624)	0.08411c(81120624)
-60.0	0.07743 (81110324)	0.07396 (81110324)	0.06968 (81110324)	0.07004c(81120624)	0.07094c(81120624)

*** ISCST3 - VERSION 02035 *** *** South Sacramento Corridor Phase II *** 07/16/08
*** Cosumnes River College - Bus PM10 - Baseline *** 15:49:08
**MODELOPTs: PAGE 13
CONC URBAN FLAT FLGPOL DFAULT

*** THE 1ST HIGHEST 24-HR AVERAGE CONCENTRATION VALUES FOR SOURCE GROUP: ALL ***
INCLUDING SOURCE(S): PNR ,

*** NETWORK ID: UCART1 ; NETWORK TYPE: GRIDCART ***

** CONC OF OTHER IN MICROGRAMS/M**3 **

Y-COORD (METERS)	X-COORD (METERS) 165.00	180.00	195.00	210.00	225.00
285.0	0.00333 (81091824)	0.00345 (81090824)	0.00440 (81090824)	0.00526 (81090824)	0.00591 (81090824)
270.0	0.00352 (81091824)	0.00438 (81090824)	0.00540 (81090824)	0.00624 (81090824)	0.00674 (81090824)
255.0	0.00430 (81090824)	0.00551 (81090824)	0.00655 (81090824)	0.00726 (81090824)	0.00752 (81090824)
240.0	0.00554 (81090824)	0.00683 (81090824)	0.00780 (81090824)	0.00827 (81090824)	0.00816 (81090824)
225.0	0.00706 (81090824)	0.00832 (81090824)	0.00906 (81090824)	0.00915 (81090824)	0.00858 (81090824)
210.0	0.00883 (81090824)	0.00991 (81090824)	0.01026 (81090824)	0.00981 (81090824)	0.00923 (81112924)
195.0	0.01079 (81090824)	0.01149 (81090824)	0.01124 (81090824)	0.01050 (81112924)	0.01061 (81112924)
180.0	0.01283 (81090824)	0.01290 (81090824)	0.01202 (81112924)	0.01227 (81112924)	0.01199 (81112924)
165.0	0.01481 (81090824)	0.01398 (81090824)	0.01433 (81112924)	0.01404 (81112924)	0.01331 (81112924)
150.0	0.01654 (81090824)	0.01693 (81112924)	0.01669 (81112924)	0.01578 (81112924)	0.01458 (81112924)
135.0	0.02022 (81112924)	0.02016 (81112924)	0.01904 (81112924)	0.01748 (81112924)	0.01714c(81080924)
120.0	0.02484 (81112924)	0.02348 (81112924)	0.02140 (81112924)	0.02097 (81010724)	0.02190c(81101224)
105.0	0.02975 (81112924)	0.02688 (81112924)	0.02738c(81101224)	0.02880c(81101224)	0.02914c(81101224)
90.0	0.03559c(81101224)	0.03767c(81101224)	0.03852c(81101224)	0.03754c(81101224)	0.03482c(81101224)
75.0	0.05318c(81101224)	0.05214c(81101224)	0.04814c(81101224)	0.04195c(81101224)	0.03502c(81101224)
60.0	0.07094c(81101224)	0.06042c(81101224)	0.05132 (81121024)	0.04632 (81121024)	0.04111 (81121024)
45.0	0.08362 (81121024)	0.07229 (81121024)	0.06135 (81121024)	0.05209 (81121024)	0.04453 (81121024)
30.0	0.09929 (81121024)	0.07860 (81121024)	0.06323 (81121024)	0.05168 (81121024)	0.04284 (81121024)
15.0	0.09217 (81112924)	0.07305 (81121324)	0.05943 (81121324)	0.04924 (81121324)	0.04145 (81121324)
0.0	0.08416c(81100424)	0.06683c(81100424)	0.05468 (81041624)	0.04598 (81041624)	0.03921 (81041624)
-15.0	0.08762c(81042124)	0.06924c(81042124)	0.05544c(81042124)	0.04496c(81042124)	0.03695c(81042124)
-30.0	0.07739c(81042124)	0.06494c(81042124)	0.05469c(81042124)	0.04652c(81042124)	0.03989c(81042124)
-45.0	0.06495c(81120624)	0.05378c(81042124)	0.04795c(81042124)	0.04191c(81042124)	0.03669c(81042124)
-60.0	0.06372c(81120624)	0.05257c(81120624)	0.04395c(81122524)	0.03781c(81122524)	0.03278c(81042124)

*** ISCST3 - VERSION 02035 *** *** South Sacramento Corridor Phase II *** 07/16/08
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**MODELOPTs: PAGE 14
CONC URBAN FLAT FLGPOL DFAULT

*** THE 1ST HIGHEST 24-HR AVERAGE CONCENTRATION VALUES FOR SOURCE GROUP: ALL ***
INCLUDING SOURCE(S): PNR ,

*** NETWORK ID: UCART1 ; NETWORK TYPE: GRIDCART ***

** CONC OF OTHER IN MICROGRAMS/M**3 **

Y-COORD (METERS)	X-COORD (METERS) 240.00	255.00	270.00	285.00
285.0	0.00623 (81090824)	0.00620 (81090824)	0.00584 (81090824)	0.00527 (81112924)
270.0	0.00683 (81090824)	0.00651 (81090824)	0.00588 (81090824)	0.00588 (81112924)
255.0	0.00729 (81090824)	0.00664 (81090824)	0.00652 (81112924)	0.00649 (81112924)
240.0	0.00753 (81090824)	0.00727 (81112924)	0.00725 (81112924)	0.00710 (81112924)
225.0	0.00817 (81112924)	0.00817 (81112924)	0.00798 (81112924)	0.00767 (81112924)
210.0	0.00927 (81112924)	0.00905 (81112924)	0.00867 (81112924)	0.00818 (81112924)
195.0	0.01036 (81112924)	0.00989 (81112924)	0.00929 (81112924)	0.00911c(81080924)
180.0	0.01140 (81112924)	0.01066 (81112924)	0.01053c(81080924)	0.01048c(81080924)
165.0	0.01238 (81112924)	0.01227c(81080924)	0.01203c(81080924)	0.01164 (81010724)
150.0	0.01444c(81080924)	0.01398 (81010724)	0.01430c(81101224)	0.01492c(81101224)
135.0	0.01696c(81101224)	0.01792c(81101224)	0.01839c(81101224)	0.01832c(81101224)
120.0	0.02273c(81101224)	0.02279c(81101224)	0.02209c(81101224)	0.02077c(81101224)
105.0	0.02828c(81101224)	0.02641c(81101224)	0.02390c(81101224)	0.02110c(81101224)
90.0	0.03098c(81101224)	0.02670c(81101224)	0.02371 (81121024)	0.02208 (81121024)
75.0	0.03219 (81121024)	0.02940 (81121024)	0.02668 (81121024)	0.02419 (81121024)
60.0	0.03633 (81121024)	0.03218 (81121024)	0.02861 (81121024)	0.02556 (81121024)
45.0	0.03834 (81121024)	0.03327 (81121024)	0.02906 (81121024)	0.02555 (81121024)
30.0	0.03598 (81121024)	0.03059 (81121024)	0.02673 (81121324)	0.02399 (81121324)
15.0	0.03539 (81121324)	0.03059 (81121324)	0.02671 (81121324)	0.02355 (81121324)
0.0	0.03385 (81041624)	0.02955 (81041624)	0.02603 (81041624)	0.02313 (81041624)
-15.0	0.03077c(81121524)	0.02722c(81100424)	0.02429c(81100424)	0.02176c(81100424)
-30.0	0.03464c(81042024)	0.03020c(81042024)	0.02627c(81042024)	0.02287c(81042024)
-45.0	0.03238c(81042124)	0.02877c(81042124)	0.02571c(81042124)	0.02307c(81042124)
-60.0	0.02938c(81042124)	0.02634c(81042124)	0.02374c(81042124)	0.02153c(81042124)

*** ISCST3 - VERSION 02035 *** *** South Sacramento Corridor Phase II *** 07/16/08
*** Cosumnes River College - Bus PM10 - Baseline *** 15:49:08
**MODELOPTs: PAGE 15
CONC URBAN FLAT FLGPOL DFAULT

*** THE SUMMARY OF HIGHEST 24-HR RESULTS ***

** CONC OF OTHER IN MICROGRAMS/M**3 **

GROUP ID		AVERAGE CONC	DATE (YYMMDDHH)	RECEPTOR (XR, YR, ZELEV, ZFLAG)	OF TYPE	NETWORK GRID-ID
ALL	HIGH 1ST HIGH VALUE IS	0.41092	ON 81121024:	AT (90.00, 15.00, 0.00, 1.60)	GC	UCART1

*** RECEPTOR TYPES: GC = GRIDCART
GP = GRIDPOLR
DC = DISCCART
DP = DISCPOLR
BD = BOUNDARY

*** ISCST3 - VERSION 02035 *** *** South Sacramento Corridor Phase II *** 07/16/08
*** Cosumnes River College - Bus PM10 - Baseline *** 15:49:08
**MODELOPTs: PAGE 16
CONC URBAN FLAT FLGPOL DFAULT

```
*** Message Summary : ISCST3 Model Execution ***

 --------- Summary of Total Messages --------

A Total of            0 Fatal Error Message(s)
A Total of            0 Warning Message(s)
A Total of          138 Informational Message(s)

A Total of          138 Calm Hours Identified


   ******** FATAL ERROR MESSAGES ********
              ***  NONE  ***


   ********   WARNING MESSAGES   ********
              ***  NONE  ***


   ************************************
   *** ISCST3 Finishes Successfully ***
   ************************************
```

```
**
****************************************
**
** ISCST3 Input Produced by:
** ISC-AERMOD View Ver. 4.6.2
** Lakes Environmental Software Inc.
** Date: 7/16/2008
** File: D:\00Projects\South Sacramento\ISC\PM25Bus.INP
**
****************************************
**
**
****************************************
** ISCST3 Control Pathway
****************************************
**
**
CO STARTING
   TITLEONE South Sacramento Corridor Phase II
   TITLETWO Cosumnes River College - Bus PM2.5 - Baseline
   MODELOPT DFAULT CONC  URBAN
   AVERTIME 24
   POLLUTID OTHER
   TERRHGTS FLAT
   FLAGPOLE 1.60
   RUNORNOT RUN
CO FINISHED
**
****************************************
** ISCST3 Source Pathway
****************************************
**
**
SO STARTING
** Source Location **
** Source ID - Type - X Coord. - Y Coord. **
   LOCATION PNR AREA 0.000 0.000
** DESCRSRC Cosumnes River College Station
** Source Parameters **
   SRCPARAM PNR 1.425E-7 3.000 91.440 14.326 0.000
   SRCGROUP ALL
SO FINISHED
**
****************************************
** ISCST3 Receptor Pathway
****************************************
**
**
RE STARTING
   GRIDCART UCART1 STA
                     XYINC -60.00 24 15.00 -60.00 24 15.00
                     FLAG  1 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6
                     FLAG  1 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6
                     FLAG  2 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6
                     FLAG  2 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6
                     FLAG  3 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6
                     FLAG  3 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6
                     FLAG  4 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6
                     FLAG  4 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6
                     FLAG  5 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6
                     FLAG  5 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6
                     FLAG  6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6
                     FLAG  6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6
                     FLAG  7 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6
                     FLAG  7 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6
                     FLAG  8 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6
                     FLAG  8 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6
                     FLAG  9 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6
                     FLAG  9 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6
                     FLAG  10 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6
                     FLAG  10 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6
                     FLAG  11 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6
                     FLAG  11 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6
                     FLAG  12 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6
                     FLAG  12 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6
                     FLAG  13 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6
                     FLAG  13 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6
                     FLAG  14 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6
                     FLAG  14 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6
                     FLAG  15 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6
                     FLAG  15 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6
                     FLAG  16 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6
                     FLAG  16 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6
                     FLAG  17 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6
                     FLAG  17 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6
                     FLAG  18 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6
                     FLAG  18 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6
                     FLAG  19 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6
                     FLAG  19 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6
                     FLAG  20 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6
                     FLAG  20 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6
                     FLAG  21 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6
                     FLAG  21 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6
                     FLAG  22 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6
                     FLAG  22 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6
                     FLAG  23 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6
                     FLAG  23 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6
                     FLAG  24 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6
                     FLAG  24 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6 1.6
   GRIDCART UCART1 END
RE FINISHED
**
****************************************
** ISCST3 Meteorology Pathway
****************************************
**
**
ME STARTING
   INPUTFIL 53123.ASC
   ANEMHGHT 10 METERS
   SURFDATA 54144 1981
   UAIRDATA 99999 1981
ME FINISHED
**
```

BUS EMISSIONS ~ $PM_{2.5}$

```
****************************************
** ISCST3 Output Pathway
****************************************
**
**
OU STARTING
   RECTABLE ALLAVE FIRST
   RECTABLE 24 FIRST
** Auto-Generated Plotfiles
   PLOTFILE 24 ALL 1ST PM25BUS.IS\24H1GALL.PLT
OU FINISHED

***********************************
*** SETUP Finishes Successfully ***
***********************************
 *** ISCST3 - VERSION 02035 ***    *** South Sacramento Corridor Phase II                                  ***        07/16/08
                                  *** Cosumnes River College - Bus PM2.5 - Baseline                        ***        16:40:11
**MODELOPTs:                                                                                                            PAGE   1
CONC                    URBAN FLAT  FLGPOL DFAULT

                                         ***     MODEL SETUP OPTIONS SUMMARY       ***
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

**Intermediate Terrain Processing is Selected

**Model Is Setup For Calculation of Average CONCentration Values.

  --  SCAVENGING/DEPOSITION LOGIC --
**Model Uses NO DRY DEPLETION.  DDPLETE =  F
**Model Uses NO WET DEPLETION.  WDPLETE =  F
**NO WET SCAVENGING Data Provided.
**NO GAS DRY DEPOSITION Data Provided.
**Model Does NOT Use GRIDDED TERRAIN Data for Depletion Calculations

**Model Uses URBAN Dispersion.

**Model Uses Regulatory DEFAULT Options:
           1. Final Plume Rise.
           2. Stack-tip Downwash.
           3. Buoyancy-induced Dispersion.
           4. Use Calms Processing Routine.
           5. Not Use Missing Data Processing Routine.
           6. Default Wind Profile Exponents.
           7. Default Vertical Potential Temperature Gradients.
           8. "Upper Bound" Values for Supersquat Buildings.
           9. No Exponential Decay for URBAN/Non-SO2

**Model Assumes Receptors on FLAT Terrain.

**Model Accepts FLAGPOLE Receptor Heights.

**Model Calculates  1 Short Term Average(s) of:  24-HR

**This Run Includes:     1 Source(s);      1 Source Group(s); and     576 Receptor(s)

**The Model Assumes A Pollutant Type of:  OTHER

**Model Set To Continue RUNning After the Setup Testing.

**Output Options Selected:
         Model Outputs Tables of Highest Short Term Values by Receptor (RECTABLE Keyword)
         Model Outputs External File(s) of High Values for Plotting (PLOTFILE Keyword)

**NOTE:  The Following Flags May Appear Following CONC Values:  c for Calm Hours
                                                                m for Missing Hours
                                                                b for Both Calm and Missing Hours

**Misc. Inputs:  Anem. Hgt. (m) =    10.00 ;    Decay Coef. =   0.0000E+00 ;    Rot. Angle =     0.0
                 Emission Units = GRAMS/SEC                                ;  Emission Rate Unit Factor =   0.10000E+07
                 Output Units   = MICROGRAMS/M**3

**Approximate Storage Requirements of Model =     1.2 MB of RAM.

**Input Runstream File:          PM25Bus.INP
**Output Print File:             PM25Bus.OUT                                                                    *** ISCST3 - VERSION 02035 ***    *** South
Sacramento Corridor Phase II                                   ***        07/16/08
                                  *** Cosumnes River College - Bus PM2.5 - Baseline                        ***        16:40:11
**MODELOPTs:                                                                                                            PAGE   2
CONC                    URBAN FLAT  FLGPOL DFAULT


                                                *** AREA SOURCE DATA ***

             NUMBER EMISSION RATE  COORD (SW CORNER)  BASE     RELEASE  X-DIM     Y-DIM    ORIENT.    INIT.  EMISSION RATE
   SOURCE     PART.  (GRAMS/SEC      X       Y      ELEV.    HEIGHT  OF AREA   OF AREA   OF AREA     SZ     SCALAR VARY
     ID       CATS.   /METER**2)   (METERS) (METERS) (METERS) (METERS) (METERS)  (METERS)   (DEG.)  (METERS)      BY
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

  PNR           0   0.14250E-06       0.0       0.0     0.0     3.00     91.44     14.33      0.00     0.00            *** ISCST3 - VERSION 02035 ***    ***
South Sacramento Corridor Phase II                                   ***        07/16/08
                                  *** Cosumnes River College - Bus PM2.5 - Baseline                        ***        16:40:11
**MODELOPTs:                                                                                                            PAGE   3
CONC                    URBAN FLAT  FLGPOL DFAULT


                                           *** SOURCE IDs DEFINING SOURCE GROUPS ***

GROUP ID                                                  SOURCE IDs


 ALL       PNR     , *** ISCST3 - VERSION 02035 ***    *** South Sacramento Corridor Phase II                                  ***        07/16/08
                                  *** Cosumnes River College - Bus PM2.5 - Baseline                        ***        16:40:11
**MODELOPTs:                                                                                                            PAGE   4
CONC                    URBAN FLAT  FLGPOL DFAULT


                                         *** GRIDDED RECEPTOR NETWORK SUMMARY ***

                                  *** NETWORK ID: UCART1   ;  NETWORK TYPE: GRIDCART ***

                                          *** X-COORDINATES OF GRID ***
```

(METERS)

-60.0, -45.0, -30.0, -15.0, 0.0, 15.0, 30.0, 45.0, 60.0, 75.0,
90.0, 105.0, 120.0, 135.0, 150.0, 165.0, 180.0, 195.0, 210.0, 225.0,
240.0, 255.0, 270.0, 285.0,

*** Y-COORDINATES OF GRID ***
(METERS)

-60.0, -45.0, -30.0, -15.0, 0.0, 15.0, 30.0, 45.0, 60.0, 75.0,
90.0, 105.0, 120.0, 135.0, 150.0, 165.0, 180.0, 195.0, 210.0, 225.0,
240.0, 255.0, 270.0, 285.0, *** ISCST3 - VERSION 02035 *** *** South Sacramento Corridor Phase II ***
07/16/08
*** Cosumnes River College - Bus PM2.5 - Baseline *** 16:40:11
**MODELOPTs: PAGE 5
CONC URBAN FLAT FLGPOL DFAULT

*** NETWORK ID: UCART1 ; NETWORK TYPE: GRIDCART ***

* RECEPTOR FLAGPOLE HEIGHTS IN METERS *

Y-COORD (METERS)	X-COORD (METERS) -60.00	-45.00	-30.00	-15.00	0.00	15.00	30.00	45.00	60.00
285.00	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60
270.00	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60
255.00	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60
240.00	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60
225.00	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60
210.00	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60
195.00	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60
180.00	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60
165.00	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60
150.00	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60
135.00	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60
120.00	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60
105.00	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60
90.00	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60
75.00	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60
60.00	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60
45.00	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60
30.00	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60
15.00	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60
0.00	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60
-15.00	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60
-30.00	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60
-45.00	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60
-60.00	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60

*** ISCST3 - VERSION 02035 *** *** South Sacramento Corridor Phase II *** 07/16/08
*** Cosumnes River College - Bus PM2.5 - Baseline *** 16:40:11
**MODELOPTs: PAGE 6
CONC URBAN FLAT FLGPOL DFAULT

*** NETWORK ID: UCART1 ; NETWORK TYPE: GRIDCART ***

* RECEPTOR FLAGPOLE HEIGHTS IN METERS *

Y-COORD (METERS)	X-COORD (METERS) 75.00	90.00	105.00	120.00	135.00	150.00	165.00	180.00	195.00
285.00	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60
270.00	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60
255.00	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60
240.00	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60
225.00	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60
210.00	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60
195.00	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60
180.00	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60
165.00	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60
150.00	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60
135.00	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60
120.00	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60
105.00	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60
90.00	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60
75.00	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60
60.00	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60
45.00	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60
30.00	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60
15.00	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60
0.00	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60
-15.00	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60
-30.00	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60
-45.00	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60
-60.00	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60

*** ISCST3 - VERSION 02035 *** *** South Sacramento Corridor Phase II *** 07/16/08
*** Cosumnes River College - Bus PM2.5 - Baseline *** 16:40:11
**MODELOPTs: PAGE 7
CONC URBAN FLAT FLGPOL DFAULT

*** NETWORK ID: UCART1 ; NETWORK TYPE: GRIDCART ***

* RECEPTOR FLAGPOLE HEIGHTS IN METERS *

Y-COORD (METERS)	X-COORD (METERS) 210.00	225.00	240.00	255.00	270.00	285.00
285.00	1.60	1.60	1.60	1.60	1.60	1.60
270.00	1.60	1.60	1.60	1.60	1.60	1.60
255.00	1.60	1.60	1.60	1.60	1.60	1.60
240.00	1.60	1.60	1.60	1.60	1.60	1.60
225.00	1.60	1.60	1.60	1.60	1.60	1.60
210.00	1.60	1.60	1.60	1.60	1.60	1.60
195.00	1.60	1.60	1.60	1.60	1.60	1.60
180.00	1.60	1.60	1.60	1.60	1.60	1.60
165.00	1.60	1.60	1.60	1.60	1.60	1.60
150.00	1.60	1.60	1.60	1.60	1.60	1.60
135.00	1.60	1.60	1.60	1.60	1.60	1.60
120.00	1.60	1.60	1.60	1.60	1.60	1.60

```
     105.00 |         1.60        1.60        1.60        1.60        1.60        1.60
      90.00 |         1.60        1.60        1.60        1.60        1.60        1.60
      75.00 |         1.60        1.60        1.60        1.60        1.60        1.60
      60.00 |         1.60        1.60        1.60        1.60        1.60        1.60
      45.00 |         1.60        1.60        1.60        1.60        1.60        1.60
      30.00 |         1.60        1.60        1.60        1.60        1.60        1.60
      15.00 |         1.60        1.60        1.60        1.60        1.60        1.60
       0.00 |         1.60        1.60        1.60        1.60        1.60        1.60
     -15.00 |         1.60        1.60        1.60        1.60        1.60        1.60
     -30.00 |         1.60        1.60        1.60        1.60        1.60        1.60
     -45.00 |         1.60        1.60        1.60        1.60        1.60        1.60
     -60.00 |         1.60        1.60        1.60        1.60        1.60        1.60 *** ISCST3 - VERSION 02035 ***    *** South Sacramento Corridor
Phase II                                  ***        07/16/08
                                   *** Cosumnes River College - Bus PM2.5 - Baseline                        ***        16:40:11
**MODELOPTs:                                                                                                            PAGE   8
CONC                    URBAN FLAT  FLGPOL DFAULT


                                          *** METEOROLOGICAL DAYS SELECTED FOR PROCESSING ***
                                                                (1=YES; 0=NO)

          1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1
          1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1
          1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1
          1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1
          1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1
          1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1
          1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1
          1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1
```

NOTE: METEOROLOGICAL DATA ACTUALLY PROCESSED WILL ALSO DEPEND ON WHAT IS INCLUDED IN THE DATA FILE.

*** UPPER BOUND OF FIRST THROUGH FIFTH WIND SPEED CATEGORIES ***
(METERS/SEC)

1.54, 3.09, 5.14, 8.23, 10.80,

*** WIND PROFILE EXPONENTS ***

STABILITY CATEGORY	WIND SPEED CATEGORY 1	2	3	4	5	6
A	.15000E+00	.15000E+00	.15000E+00	.15000E+00	.15000E+00	.15000E+00
B	.15000E+00	.15000E+00	.15000E+00	.15000E+00	.15000E+00	.15000E+00
C	.20000E+00	.20000E+00	.20000E+00	.20000E+00	.20000E+00	.20000E+00
D	.25000E+00	.25000E+00	.25000E+00	.25000E+00	.25000E+00	.25000E+00
E	.30000E+00	.30000E+00	.30000E+00	.30000E+00	.30000E+00	.30000E+00
F	.30000E+00	.30000E+00	.30000E+00	.30000E+00	.30000E+00	.30000E+00

*** VERTICAL POTENTIAL TEMPERATURE GRADIENTS ***
(DEGREES KELVIN PER METER)

STABILITY CATEGORY	WIND SPEED CATEGORY 1	2	3	4	5	6
A	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00
B	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00
C	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00
D	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00
E	.20000E-01	.20000E-01	.20000E-01	.20000E-01	.20000E-01	.20000E-01
F	.35000E-01	.35000E-01	.35000E-01	.35000E-01	.35000E-01	.35000E-01

```
*** ISCST3 - VERSION 02035 ***    *** South
Sacramento Corridor Phase II                                   ***        07/16/08
                                   *** Cosumnes River College - Bus PM2.5 - Baseline                        ***        16:40:11
**MODELOPTs:                                                                                                            PAGE   9
CONC                    URBAN FLAT  FLGPOL DFAULT
```

*** THE FIRST 24 HOURS OF METEOROLOGICAL DATA ***

```
     FILE:   53123.ASC
     FORMAT: (4I2,2F9.4,F6.1,I2,2F7.1,f9.4,f10.1,f8.4,i4,f7.2)
     SURFACE STATION NO.:  54144                    UPPER AIR STATION NO.:  99999
                   NAME: UNKNOWN                                  NAME: UNKNOWN
                   YEAR:   1981                                   YEAR:   1981
```

YR	MN	DY	HR	FLOW VECTOR	SPEED (M/S)	TEMP (K)	STAB CLASS	MIXING HEIGHT (M) RURAL	MIXING HEIGHT (M) URBAN	USTAR (M/S)	M-O LENGTH (M)	Z-0 (M)	IPCODE	PRATE (mm/HR)
81	01	01	01	134.8	1.34	284.3	7	522.6	170.0	0.0000	0.0	0.0000	0	0.00
81	01	01	02	102.4	1.00	284.3	7	507.0	170.0	0.0000	0.0	0.0000	0	0.00
81	01	01	03	85.0	1.00	283.1	7	491.4	170.0	0.0000	0.0	0.0000	0	0.00
81	01	01	04	143.5	1.00	283.1	7	475.8	170.0	0.0000	0.0	0.0000	0	0.00
81	01	01	05	106.5	1.00	282.6	7	460.3	170.0	0.0000	0.0	0.0000	0	0.00
81	01	01	06	117.0	1.34	283.1	7	444.7	170.0	0.0000	0.0	0.0000	0	0.00
81	01	01	07	139.5	1.79	285.4	6	1.4	170.7	0.0000	0.0	0.0000	0	0.00
81	01	01	08	179.6	1.34	287.6	5	47.0	192.0	0.0000	0.0	0.0000	0	0.00
81	01	01	09	6.5	1.00	289.8	4	92.5	213.3	0.0000	0.0	0.0000	0	0.00
81	01	01	10	279.1	2.24	291.5	3	138.0	234.7	0.0000	0.0	0.0000	0	0.00
81	01	01	11	269.1	2.24	294.3	3	183.5	256.0	0.0000	0.0	0.0000	0	0.00
81	01	01	12	260.6	2.24	297.6	3	229.0	277.3	0.0000	0.0	0.0000	0	0.00
81	01	01	13	267.2	1.34	298.7	2	274.5	298.7	0.0000	0.0	0.0000	0	0.00
81	01	01	14	259.2	2.68	299.8	3	320.0	320.0	0.0000	0.0	0.0000	0	0.00
81	01	01	15	269.8	3.13	299.3	3	320.0	320.0	0.0000	0.0	0.0000	0	0.00
81	01	01	16	278.2	2.68	298.7	4	320.0	320.0	0.0000	0.0	0.0000	0	0.00
81	01	01	17	222.6	1.79	295.4	5	325.6	318.5	0.0000	0.0	0.0000	0	0.00
81	01	01	18	187.6	1.79	291.5	6	357.2	310.3	0.0000	0.0	0.0000	0	0.00
81	01	01	19	155.5	2.24	289.8	6	388.8	302.1	0.0000	0.0	0.0000	0	0.00
81	01	01	20	145.7	1.00	287.0	7	420.4	293.9	0.0000	0.0	0.0000	0	0.00
81	01	01	21	111.1	1.34	286.5	7	452.0	285.7	0.0000	0.0	0.0000	0	0.00
81	01	01	22	114.5	0.00	287.0	7	483.5	277.4	0.0000	0.0	0.0000	0	0.00
81	01	01	23	135.7	1.34	285.9	7	515.1	269.2	0.0000	0.0	0.0000	0	0.00
81	01	01	24	112.2	1.34	285.4	7	546.7	261.0	0.0000	0.0	0.0000	0	0.00

```
*** NOTES:  STABILITY CLASS 1=A, 2=B, 3=C, 4=D, 5=E AND 6=F.
            FLOW VECTOR IS DIRECTION TOWARD WHICH WIND IS BLOWING. *** ISCST3 - VERSION 02035 ***    *** South Sacramento Corridor Phase II
***         07/16/08
                                   *** Cosumnes River College - Bus PM2.5 - Baseline                        ***        16:40:11
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**MODELOPTs: PAGE 10
CONC URBAN FLAT FLGPOL DFAULT

*** THE 1ST HIGHEST 24-HR AVERAGE CONCENTRATION VALUES FOR SOURCE GROUP: ALL ***
INCLUDING SOURCE(S): PNR ,

*** NETWORK ID: UCART1 ; NETWORK TYPE: GRIDCART ***

** CONC OF OTHER IN MICROGRAMS/M**3 **

Y-COORD (METERS)	X-COORD (METERS) -60.00	-45.00	-30.00	-15.00	0.00
285.0	0.00083c(81082824)	0.00084c(81082824)	0.00110c(81080624)	0.00182c(81080624)	0.00255c(81080624)
270.0	0.00091c(81082824)	0.00093c(81082824)	0.00108c(81080624)	0.00186c(81080624)	0.00267c(81080624)
255.0	0.00100c(81082824)	0.00104c(81082824)	0.00105c(81080624)	0.00190c(81080624)	0.00281c(81080624)
240.0	0.00109c(81082824)	0.00115c(81082824)	0.00117c(81082824)	0.00195c(81080624)	0.00296c(81080624)
225.0	0.00151 (81011624)	0.00128c(81082824)	0.00132c(81082824)	0.00198c(81080624)	0.00313c(81080624)
210.0	0.00211 (81011624)	0.00144 (81011624)	0.00150c(81082824)	0.00202c(81080624)	0.00333c(81080624)
195.0	0.00286 (81011624)	0.00208 (81011624)	0.00170c(81082824)	0.00205c(81080624)	0.00355c(81080624)
180.0	0.00374 (81011624)	0.00295 (81011624)	0.00202 (81011624)	0.00207c(81080624)	0.00380c(81080624)
165.0	0.00469 (81011624)	0.00400 (81011624)	0.00300 (81011624)	0.00233c(81082824)	0.00411c(81080624)
150.0	0.00563 (81011624)	0.00518 (81011624)	0.00428 (81011624)	0.00301 (81011624)	0.00447c(81080624)
135.0	0.00649 (81011624)	0.00637 (81011624)	0.00575 (81011624)	0.00455 (81011624)	0.00492c(81080624)
120.0	0.00721 (81011624)	0.00754 (81011624)	0.00728 (81011624)	0.00642 (81011624)	0.00549c(81080624)
105.0	0.00757 (81011624)	0.00870 (81011624)	0.00882 (81011624)	0.00841 (81011624)	0.00723 (81011624)
90.0	0.00698 (81011624)	0.00977 (81011624)	0.01055 (81011624)	0.01048 (81011624)	0.00988 (81011624)
75.0	0.00909 (81093024)	0.00987 (81011624)	0.01259 (81011624)	0.01297 (81011624)	0.01270 (81011624)
60.0	0.01254 (81110324)	0.01194c(81030824)	0.01450 (81011624)	0.01640 (81011624)	0.01637 (81011624)
45.0	0.01898 (81110324)	0.02022 (81110324)	0.01926 (81110324)	0.02141 (81011624)	0.02211c(81080624)
30.0	0.02771c(81091624)	0.02853c(81011424)	0.03421 (81110324)	0.03678 (81030924)	0.04030 (81011524)
15.0	0.04022 (81011124)	0.05370c(81091624)	0.07491c(81091624)	0.10103c(81091624)	0.11585c(81091624)
0.0	0.04818 (81110224)	0.06428 (81110224)	0.09157 (81120124)	0.15927 (81120124)	0.22490 (81120124)
-15.0	0.05566 (81120124)	0.07846 (81120124)	0.10457 (81120124)	0.13654 (81120124)	0.16925 (81011324)
-30.0	0.05549 (81120124)	0.06478 (81120124)	0.07689 (81120124)	0.10103 (81120124)	0.11251 (81011324)
-45.0	0.04193 (81120124)	0.05334 (81120224)	0.06576 (81120224)	0.07707 (81011824)	0.08193 (81011324)
-60.0	0.03974 (81120224)	0.04877 (81120224)	0.05257 (81120224)	0.06383 (81011824)	0.06302 (81011824)

*** ISCST3 - VERSION 02035
*** *** South Sacramento Corridor Phase II *** 07/16/08
*** Cosumnes River College - Bus PM2.5 - Baseline *** 16:40:11
**MODELOPTs: PAGE 11
CONC URBAN FLAT FLGPOL DFAULT

*** THE 1ST HIGHEST 24-HR AVERAGE CONCENTRATION VALUES FOR SOURCE GROUP: ALL ***
INCLUDING SOURCE(S): PNR ,

*** NETWORK ID: UCART1 ; NETWORK TYPE: GRIDCART ***

** CONC OF OTHER IN MICROGRAMS/M**3 **

Y-COORD (METERS)	X-COORD (METERS) 15.00	30.00	45.00	60.00	75.00
285.0	0.00308c(81080624)	0.00330c(81080624)	0.00315c(81080624)	0.00268c(81080624)	0.00222 (81042924)
270.0	0.00327c(81080624)	0.00352c(81080624)	0.00339c(81080624)	0.00289c(81080624)	0.00239 (81042924)
255.0	0.00348c(81080624)	0.00377c(81080624)	0.00364c(81080624)	0.00313c(81080624)	0.00258 (81042924)
240.0	0.00371c(81080624)	0.00404c(81080624)	0.00393c(81080624)	0.00339c(81080624)	0.00280 (81042924)
225.0	0.00397c(81080624)	0.00433c(81080624)	0.00424c(81080624)	0.00370c(81080624)	0.00306 (81042924)
210.0	0.00427c(81080624)	0.00466c(81080624)	0.00459c(81080624)	0.00405c(81080624)	0.00336 (81042924)
195.0	0.00461c(81080624)	0.00503c(81080624)	0.00498c(81080624)	0.00446c(81080624)	0.00371 (81042924)
180.0	0.00501c(81080624)	0.00544c(81080624)	0.00541c(81080624)	0.00494c(81080624)	0.00414 (81042924)
165.0	0.00548c(81080624)	0.00590c(81080624)	0.00590c(81080624)	0.00550c(81080624)	0.00468 (81042924)
150.0	0.00604c(81080624)	0.00645c(81080624)	0.00646c(81080624)	0.00618c(81080624)	0.00564 (81091824)
135.0	0.00673c(81080624)	0.00709c(81080624)	0.00711c(81080624)	0.00700c(81080624)	0.00688 (81091824)
120.0	0.00757c(81080624)	0.00786c(81080624)	0.00791c(81080624)	0.00807c(81080624)	0.00855 (81090824)
105.0	0.00864c(81080624)	0.00882c(81080624)	0.00897 (81042924)	0.00960c(81080624)	0.01446 (81090824)
90.0	0.01004c(81080624)	0.01024 (81042924)	0.01080 (81042924)	0.01474c(81012024)	0.02281 (81090824)
75.0	0.01213c(81080624)	0.01245 (81042924)	0.01671c(81012024)	0.02591 (81090824)	0.03299 (81090824)
60.0	0.01607 (81011624)	0.01827c(81012024)	0.03147c(81012024)	0.04061 (81090824)	0.04901c(81101624)
45.0	0.02424c(81080624)	0.04037c(81012024)	0.05428c(81012024)	0.07103 (81122824)	0.08575 (81122824)
30.0	0.05055 (81011524)	0.08534 (81122824)	0.12220 (81122824)	0.14715c(81101224)	0.17240c(81101224)
15.0	0.14598c(81042324)	0.21415c(81042324)	0.27391 (81121024)	0.32449 (81121024)	0.35512 (81121024)
0.0	0.26515c(81112824)	0.33214c(81112824)	0.35578c(81112824)	0.34695c(81112824)	0.31018c(81112824)
-15.0	0.16972 (81011324)	0.17079 (81011324)	0.19710c(81120524)	0.20282c(81120524)	0.22099c(81120624)
-30.0	0.11357 (81011324)	0.11329 (81120424)	0.12750 (81110324)	0.13973 (81110324)	0.14502c(81120524)
-45.0	0.08329 (81011324)	0.09188 (81120424)	0.09192 (81120424)	0.10317 (81110324)	0.10308 (81110324)
-60.0	0.06688 (81120424)	0.07219 (81120424)	0.06835 (81120424)	0.07231 (81110324)	0.07484 (81110324)

*** ISCST3 - VERSION 02035
*** *** South Sacramento Corridor Phase II *** 07/16/08
*** Cosumnes River College - Bus PM2.5 - Baseline *** 16:40:11
**MODELOPTs: PAGE 12
CONC URBAN FLAT FLGPOL DFAULT

*** THE 1ST HIGHEST 24-HR AVERAGE CONCENTRATION VALUES FOR SOURCE GROUP: ALL ***
INCLUDING SOURCE(S): PNR ,

*** NETWORK ID: UCART1 ; NETWORK TYPE: GRIDCART ***

** CONC OF OTHER IN MICROGRAMS/M**3 **

Y-COORD (METERS)	X-COORD (METERS) 90.00	105.00	120.00	135.00	150.00
285.0	0.00179 (81042924)	0.00181 (81091824)	0.00242 (81091824)	0.00289 (81091824)	0.00311 (81091824)
270.0	0.00190 (81042924)	0.00216 (81091824)	0.00280 (81091824)	0.00322 (81091824)	0.00337 (81091824)
255.0	0.00204 (81042924)	0.00258 (81091824)	0.00321 (81091824)	0.00358 (81091824)	0.00364 (81091824)
240.0	0.00222 (81091824)	0.00305 (81091824)	0.00365 (81091824)	0.00395 (81091824)	0.00393 (81091824)
225.0	0.00273 (81091824)	0.00357 (81091824)	0.00412 (81091824)	0.00436 (81091824)	0.00505 (81090824)
210.0	0.00333 (81091824)	0.00415 (81091824)	0.00464 (81091824)	0.00490 (81090824)	0.00664 (81090824)
195.0	0.00401 (81091824)	0.00478 (81091824)	0.00524 (81091824)	0.00667 (81090824)	0.00856 (81090824)
180.0	0.00478 (81091824)	0.00550 (81091824)	0.00657 (81090824)	0.00892 (81090824)	0.01077 (81090824)
165.0	0.00564 (81091824)	0.00638 (81091824)	0.00918 (81090824)	0.01162 (81090824)	0.01316 (81090824)
150.0	0.00666 (81091824)	0.00926 (81090824)	0.01246 (81090824)	0.01465 (81090824)	0.01562 (81090824)
135.0	0.00909 (81090824)	0.01325 (81090824)	0.01630 (81090824)	0.01791 (81090824)	0.01802 (81090824)
120.0	0.01395 (81090824)	0.01813 (81090824)	0.02056 (81090824)	0.02134 (81090824)	0.02245 (81112924)
105.0	0.02025 (81090824)	0.02371 (81090824)	0.02531 (81090824)	0.02737 (81112924)	0.02874 (81112924)
90.0	0.02766 (81090824)	0.03019 (81090824)	0.03391c(81101624)	0.03696 (81112924)	0.03586 (81112924)
75.0	0.03701c(81101624)	0.04369c(81101624)	0.04849 (81112924)	0.04889 (81112924)	0.04774c(81101224)
60.0	0.05888c(81101624)	0.06624c(81101624)	0.06994c(81101224)	0.07249c(81101224)	0.07078c(81101224)
45.0	0.09801c(81101224)	0.11310c(81101224)	0.11479c(81101224)	0.10500c(81101224)	0.08776c(81101224)
30.0	0.18736c(81101224)	0.19139c(81101224)	0.16681 (81121024)	0.14595 (81121024)	0.11660 (81121024)
15.0	0.37802 (81121024)	0.33513 (81121024)	0.22151 (81121024)	0.15111 (81112924)	0.11130 (81112924)
0.0	0.31621c(81042124)	0.27508c(81042124)	0.18064c(81121524)	0.13001c(81100424)	0.09959c(81100424)

-15.0	0.22757c(81120624)	0.19054c(81120624)	0.15623c(81042124)	0.13289c(81042124)	0.10345c(81042124)
-30.0	0.15426c(81120624)	0.13695c(81120624)	0.12852c(81120624)	0.10437c(81120624)	0.08185c(81042124)
-45.0	0.10203c(81120524)	0.09267c(81120624)	0.09067c(81120624)	0.08984c(81120624)	0.07737c(81120624)
-60.0	0.07123 (81110324)	0.06803 (81110324)	0.06410 (81110324)	0.06444c(81120624)	0.06526c(81120624)

*** ISCST3 - VERSION 02035 ***   *** South Sacramento Corridor Phase II ***   07/16/08
*** Cosumnes River College - Bus PM2.5 - Baseline ***   16:40:11
**MODELOPTs: PAGE 13
CONC   URBAN FLAT FLGPOL DFAULT

*** THE 1ST HIGHEST 24-HR AVERAGE CONCENTRATION VALUES FOR SOURCE GROUP: ALL ***
INCLUDING SOURCE(S): PNR ,

*** NETWORK ID: UCART1 ; NETWORK TYPE: GRIDCART ***

** CONC OF OTHER IN MICROGRAMS/M**3 **

Y-COORD (METERS)	X-COORD (METERS) 165.00	180.00	195.00	210.00	225.00
285.0	0.00306 (81091824)	0.00317 (81090824)	0.00405 (81090824)	0.00484 (81090824)	0.00543 (81090824)
270.0	0.00324 (81091824)	0.00403 (81090824)	0.00497 (81090824)	0.00574 (81090824)	0.00620 (81090824)
255.0	0.00395 (81090824)	0.00507 (81090824)	0.00603 (81090824)	0.00668 (81090824)	0.00692 (81090824)
240.0	0.00510 (81090824)	0.00628 (81090824)	0.00717 (81090824)	0.00760 (81090824)	0.00751 (81090824)
225.0	0.00650 (81090824)	0.00766 (81090824)	0.00834 (81090824)	0.00842 (81090824)	0.00789 (81090824)
210.0	0.00812 (81090824)	0.00912 (81090824)	0.00944 (81090824)	0.00902 (81090824)	0.00849 (81112924)
195.0	0.00993 (81090824)	0.01057 (81090824)	0.01034 (81090824)	0.00966 (81112924)	0.00976 (81112924)
180.0	0.01181 (81090824)	0.01187 (81090824)	0.01105 (81112924)	0.01128 (81112924)	0.01103 (81112924)
165.0	0.01362 (81090824)	0.01286 (81090824)	0.01318 (81112924)	0.01292 (81112924)	0.01225 (81112924)
150.0	0.01521 (81090824)	0.01557 (81112924)	0.01535 (81112924)	0.01452 (81112924)	0.01341 (81112924)
135.0	0.01860 (81112924)	0.01855 (81112924)	0.01751 (81112924)	0.01608 (81112924)	0.01577c(81080924)
120.0	0.02285 (81112924)	0.02160 (81112924)	0.01968 (81112924)	0.01929 (81010724)	0.02014c(81101224)
105.0	0.02737 (81112924)	0.02473 (81112924)	0.02519c(81101224)	0.02650c(81101224)	0.02681c(81101224)
90.0	0.03274c(81101224)	0.03465c(81101224)	0.03543c(81101224)	0.03453c(81101224)	0.03203c(81101224)
75.0	0.04892c(81101224)	0.04797c(81101224)	0.04429c(81101224)	0.03860c(81101224)	0.03221c(81101224)
60.0	0.06526c(81101224)	0.05558c(81101224)	0.04722 (81121024)	0.04261 (81121024)	0.03782 (81121024)
45.0	0.07693 (81121024)	0.06650 (81121024)	0.05644 (81121024)	0.04792 (81121024)	0.04096 (81121024)
30.0	0.09134 (81121024)	0.07231 (81121024)	0.05817 (81121024)	0.04754 (81121024)	0.03941 (81121024)
15.0	0.08479 (81112924)	0.06720 (81121324)	0.05467 (81121324)	0.04530 (81121324)	0.03813 (81121324)
0.0	0.07742c(81100424)	0.06148c(81100424)	0.05030 (81041624)	0.04230 (81041624)	0.03607 (81041624)
-15.0	0.08060c(81042124)	0.06370c(81042124)	0.05100c(81042124)	0.04137c(81042124)	0.03399c(81042124)
-30.0	0.07119c(81042124)	0.05974c(81042124)	0.05031c(81042124)	0.04280c(81042124)	0.03670c(81042124)
-45.0	0.05975c(81120624)	0.04947c(81042124)	0.04411c(81042124)	0.03855c(81042124)	0.03375c(81042124)
-60.0	0.05862c(81120624)	0.04836c(81120624)	0.04043c(81122524)	0.03478c(81122524)	0.03015c(81042124)

*** ISCST3 - VERSION 02035 ***   *** South Sacramento Corridor Phase II ***   07/16/08
*** Cosumnes River College - Bus PM2.5 - Baseline ***   16:40:11
**MODELOPTs: PAGE 14
CONC   URBAN FLAT FLGPOL DFAULT

*** THE 1ST HIGHEST 24-HR AVERAGE CONCENTRATION VALUES FOR SOURCE GROUP: ALL ***
INCLUDING SOURCE(S): PNR ,

*** NETWORK ID: UCART1 ; NETWORK TYPE: GRIDCART ***

** CONC OF OTHER IN MICROGRAMS/M**3 **

Y-COORD (METERS)	X-COORD (METERS) 240.00	255.00	270.00	285.00
285.0	0.00574 (81090824)	0.00571 (81090824)	0.00537 (81090824)	0.00485 (81112924)
270.0	0.00629 (81090824)	0.00599 (81090824)	0.00541 (81090824)	0.00541 (81112924)
255.0	0.00670 (81090824)	0.00611 (81090824)	0.00600 (81112924)	0.00597 (81112924)
240.0	0.00693 (81090824)	0.00669 (81112924)	0.00667 (81112924)	0.00653 (81112924)
225.0	0.00751 (81112924)	0.00751 (81112924)	0.00734 (81112924)	0.00705 (81112924)
210.0	0.00853 (81112924)	0.00833 (81112924)	0.00797 (81112924)	0.00752 (81112924)
195.0	0.00953 (81112924)	0.00910 (81112924)	0.00854 (81112924)	0.00838c(81080924)
180.0	0.01049 (81112924)	0.00980 (81112924)	0.00969c(81080924)	0.00964c(81080924)
165.0	0.01138 (81112924)	0.01129c(81080924)	0.01107c(81080924)	0.01070 (81010724)
150.0	0.01328c(81080924)	0.01286 (81010724)	0.01316c(81101224)	0.01373c(81101224)
135.0	0.01560c(81101224)	0.01648c(81101224)	0.01692c(81101224)	0.01685c(81101224)
120.0	0.02091c(81101224)	0.02097c(81101224)	0.02032c(81101224)	0.01911c(81101224)
105.0	0.02601c(81101224)	0.02430c(81101224)	0.02198c(81101224)	0.01941c(81101224)
90.0	0.02850c(81101224)	0.02456c(81101224)	0.02181 (81121024)	0.02031 (81121024)
75.0	0.02962 (81121024)	0.02705 (81121024)	0.02455 (81121024)	0.02225 (81121024)
60.0	0.03342 (81121024)	0.02960 (81121024)	0.02632 (81121024)	0.02351 (81121024)
45.0	0.03528 (81121024)	0.03060 (81121024)	0.02673 (81121024)	0.02350 (81121024)
30.0	0.03310 (81121024)	0.02814 (81121024)	0.02459 (81121324)	0.02207 (81121324)
15.0	0.03256 (81121324)	0.02814 (81121324)	0.02458 (81121324)	0.02167 (81121324)
0.0	0.03114 (81041624)	0.02718 (81041624)	0.02395 (81041624)	0.02127 (81041624)
-15.0	0.02830c(81121524)	0.02504c(81100424)	0.02234c(81100424)	0.02002c(81100424)
-30.0	0.03186c(81042024)	0.02779c(81042024)	0.02417c(81042024)	0.02104c(81042024)
-45.0	0.02979c(81042124)	0.02647c(81042124)	0.02366c(81042124)	0.02122c(81042124)
-60.0	0.02703c(81042124)	0.02423c(81042124)	0.02184c(81042124)	0.01981c(81042124)

*** ISCST3 - VERSION 02035 ***   *** South Sacramento Corridor Phase II ***   07/16/08
*** Cosumnes River College - Bus PM2.5 - Baseline ***   16:40:11
**MODELOPTs: PAGE 15
CONC   URBAN FLAT FLGPOL DFAULT

*** THE SUMMARY OF HIGHEST 24-HR RESULTS ***

** CONC OF OTHER IN MICROGRAMS/M**3 **

GROUP ID		AVERAGE CONC	DATE (YYMMDDHH)	RECEPTOR (XR, YR, ZELEV, ZFLAG)	OF TYPE	NETWORK GRID-ID
ALL	HIGH 1ST HIGH VALUE IS	0.37802	ON 81121024: AT (	90.00, 15.00, 0.00, 1.60)	GC	UCART1

*** RECEPTOR TYPES: GC = GRIDCART
GP = GRIDPOLR
DC = DISCCART
DP = DISCPOLR
BD = BOUNDARY

*** ISCST3 - VERSION 02035 ***   *** South Sacramento Corridor Phase II ***   07/16/08
*** Cosumnes River College - Bus PM2.5 - Baseline ***   16:40:11
**MODELOPTs: PAGE 16
CONC   URBAN FLAT FLGPOL DFAULT

*** Message Summary : ISCST3 Model Execution ***

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 --------- Summary of Total Messages --------

A Total of            0 Fatal Error Message(s)
A Total of            0 Warning Message(s)
A Total of          138 Informational Message(s)

A Total of          138 Calm Hours Identified


   ******** FATAL ERROR MESSAGES ********
              ***  NONE  ***


   ********   WARNING MESSAGES   ********
              ***  NONE  ***


   ************************************
   *** ISCST3 Finishes Successfully ***
   ************************************
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APPENDIX J:

Biological Opinion

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Sacramento Fish and Wildlife Office
2800 Cottage Way, Room W-2605
Sacramento, California 95825-1846

In reply refer to:
81420-2008-F-0285

APR 18 2008 RECEIVED
APR 21 2008
PARSONS
San Francisco, CA

Leslie T. Rogers
Regional Administrator
U.S. Department of Transportation
Federal Transit Administration
201 Mission Street, Suite 1650
San Francisco, California 94105-1839

Subject Section 7 Consultation for the Proposed South Sacramento Corridor Phase 2 Project, Sacramento County, California.

Dear Ms. Rogers:

This is in response to your request for formal consultation dated 25 January, 2007, and received by this office on 31 January, 2007, for the U. S. Fish and Wildlife's (Service) biological opinion (Bio Op) regarding the Federal Transit Administration (FTA) and the Sacramento Regional Transit District's (RT) proposed extension of the light rail transit (LRT) service from the existing Meadowview Station to Cosumnes River College, a total of approximately 4.3 miles (mi), and including four LRT stations and associated facilities (Project). This document represents the Service's biological opinion regarding the effects of this project on the Federally endangered vernal pool tadpole shrimp (*Lepidurus packardi*) and the threatened vernal pool fairy shrimp (*Branchinecta lynchi*) (collectively vernal pool crustaceans), the giant garter snake (*Thamnophis gigas*) (GGS), and the valley elderberry longhorn beetle (*Desmocerus californicus dimorphus*) (VELB) in accordance with section 7 of the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 *et seq.*)(Act).

The Service has reviewed the biological information submitted by your office, by the permit applicant and by their consultant describing the effects of the proposed project. Information analyzed to develop this biological opinion included the following: (1) *South Sacramento Corridor Phase 2 Project Biological Assessment* dated October 2006; (2) *South Sacramento Corridor Phase 2 Project Revised Biological Assessment* dated November 2007; (3) *South Sacramento Corridor Phase 2 Project Preliminary Wetland Delineation* dated July 2005; (4) *South Sacramento Corridor Phase 2 Project Revised Wetland Delineation* dated May 2006; (5) *South Sacramento Corridor Phase 2 Project Special-Status Plant Survey* dated April 2007; (6) *South Sacramento Corridor Phase 2 Project-Supplemental Information in Support of Section 7*

TAKE PRIDE IN AMERICA

Consultation dated May 2007; (7) *South Sacramento Corridor Phase 2 Project-Additional Information in Support of Section 7 Consultation;* and (8) other information available to the Service.

Thirty-three elderberry shrubs occur adjacent to Franklin Blvd within the SRCSD Bufferlands property. The interim driveway to the proposed Franklin Station would directly impact approximately 20 of these shrubs. However, according to the City of Sacramento, the Interstate-5/Cosumnes River Blvd Interchange Project is anticipated to initiate construction ahead of the proposed South Sacramento Corridor Phase 2 Project at the location where the elderberry shrubs are currently. The 20 shrubs that the South Sacramento Corridor Phase 2 Project would affect are a subset of the 26 elderberry shrubs that the Interstate-5/Cosumnes River Blvd Interchange Project will affect, for that reason the FTA has made the determination of *Not Likely to Adversely Affect* for the proposed South Sacramento Corridor Phase 2 Project regarding the VELB. Based on this, the Service concurs with the FTA determination of *Not Likely to Adversely Affect* for the proposed South Sacramento Corridor Phase 2 Project. No further discussion of VELB will appear in this Bio Op. However, in the event that the project timing is modified such that project-related activities associated with the South Sacramento Corridor Phase 2 Project occur prior to the Interstate-5/Cosumnes River Blvd Interchange Project, then it will be necessary for the FTA to reinitiate and address the impacts on VELB by the proposed South Sacramento Corridor Phase 2 Project.

Consultation History

January 31, 2007 The Service received a request to initiate formal consultation under section 7 of the Act from the FTA for the Project with a copy of the BA prepared by Parsons Corp.

February 8, 2007 The Service received an electronic copy of the *Supplemental Draft Environmental Impact Statement* (SDEIS)/ *Subsequent Draft Environmental Impact Report* (SDEIR) on a compact disk format (CD).

March 30, 2007 A letter was sent by Justin Cutler (Service) requesting additional information (1-1-07-I-0576) regarding the Project to Leslie Rogers (FTA).

April 2, 2007 Adam Ballard (ECORP) sent an electronic mail to Justin Cutler (Service) clarifying what additional information was needed by the Service.

April 3, 2007 Justin Cutler (Service) confirmed additional information required to Adam Ballard (ECORP) via electronic mail.

May 9, 2007 Service received *Supplemental Information in Support of Section 7 Consultation* Packet from ECORP which included:

- Current plan set overlaid on the wetland delineation;
- Preliminary engineering drawings for proposed bridges;

- Copy of the 2006 *Special Status Plant Survey*, dated 4/26/2007;
- Copy of Parsons preliminary wetland delineation report;
- Copy of the verified wetland map set;
- Copy of CADD/GIS files to support the wetland delineation;
- Copy of the biological opinion (1-1-04-F-0363), for the *Proposed Interstate-5 Cosumnes River Boulevard Interchange Project*, Sacramento County, California;
- Copy of the biological opinion (1-1-01-F-0043), for the *South Sacramento County Streams Project,* Sacramento County, California.

July 31, 2007 Service received *Additional Information in Support of Section 7 Consultation* Packet from ECORP which included:

- Giant garter snake upland habitat assessment;
- Copy of FOIA request for copies of wetland delineations reports that have been prepared in the vicinity of the project, dated May 7, 2007;
- Copy of the response to the FOIA request from Carl Korman, USACE, dated June 14, 2007;
- Copy of relevant portions of the wetland delineation for the Freeport Regional Water Project, Freeport Regional Water Authority Alignment, prepared by Jones and Stokes, dated February 15, 2006.

August 24, 2007 Justin Cutler (Service) received electronic mail request for a meeting regarding the project from Adam Ballard (ECORP).

September 19, 2007 Justin Cutler (Service) sent an electronic mail to Adam Ballard (ECORP) that he, Justin, had taken a new position within the Service and would no longer be assigned to the project; in addition Mr. Cutler requested that the biological assessment be revised to include the following:

- GGS- Clear description of impact; quantify direct, indirect, and permanent vs. temporary impacts; a detailed compensation proposal for the loss of habitat; address the interrelated or interdependent actions such as compensatory mitigations;
- VP Crustaceans- Assess and quantify the indirect effects (within 250 feet) of construction activities;
- Provide GIS/CAD data requested in a projected format, preferably in a shapefile format with projection information.

November 6, 2007 Service received the revised *Biological Assessment* for the project from ECORP.

March 5, 2008 The project was assigned to Richard Montgomery (Service).

BIOLOGICAL OPINION

Description of the Proposed Action

The FTA and the RT, propose to extend LRT service from the existing Meadowview Station for approximately 4.3 mi to Cosumnes River College in Sacramento County, California. The proposed project will begin at Meadowview Road at the Union Pacific Railroad (UPRR) grade crossing and will extend southward along the existing UPRR right-of-way (ROW) to Morrison Creek, where it will turn to the west following the creek along its westerly bank to the confluence with Union House Creek (Beacon Creek). At the confluence of Morrison Creek and Union House Creek, the alignment turns eastward onto the Sacramento Regional County Sanitation District (SRCSD) Bufferlands, and then parallels Union House Creek to Bruceville Road at Cosumnes River College (CRC). From the intersection of Bruceville Road and Cosumnes River Boulevard (CRB), the project footprint will turn south to a terminus on the CRC campus. The proposed project will additionally include the construction of four LRT stations and associated facilities. A large part of the track alignments will be supported on new raised earth embankments. The Morrison Creek and Franklin station areas, including associated platforms and parking lots, will be constructed on raised embankments. Station facilities will include concrete platforms with modest passenger amenities, parking lots, and landscaping. During earth moving activities the conventional equipment used will include scrapers, dump trucks, bulldozers, compactors, water trucks, and graders. In addition, the following equipment will be used in construction of the stations to be built: asphalt paver, concrete trucks, concrete pumper, and small crane or boom truck.

The proposed project alignment crosses several streets within the City of Sacramento requiring roadway improvements. These are Meadowview Road (Rd), Franklin Boulevard (Blvd), Center Parkway (Pkwy) and College Entrance Rd. These improvements will include profile adjustments, drainage improvements, roadway widening, traffic signal modification, and the installation of crossing arm gates and signals, and grade crossing panels.

A new entrance will be constructed at the Franklin Station off of the CRB following the extension of CRB. If the CRB extension project is delayed, an interim entrance road will be constructed at intersection of Franklin Blvd and CRB.

At Center Pkwy it is assumed that CRB will not be widened prior to construction of this project. An interim bus turnout area and "kiss-and-ride" drop-off area is proposed for this project on the north side of CRB, immediately west of Center Pkwy for the Center parkway Station. A 12-foot wide multi-use path is to be constructed on the north side of the LRT, and will be used by maintenance vehicles, bicyclists, and pedestrians. The bridge structure on Center pkwy over Union House Creek is to be widened on both sides to accommodate bus turnouts.

A number of key utilities exist along the alignment including high voltage overhead transmission lines, gas lines, and several fiber optic telephone facilities. Based on the utility information gathered, various utility modifications and relocations have been identified as a result of the proposed project.

The proposed project will include two concrete LRT bridges. One will span Morrison Creek and the UORR freight tracks. The other is a grade separation flyover spanning CRB. In addition, there will be two pedestrian bridge structures over Union House Creek; one at the Franklin Station and the other between Franklin Blvd and Center Pkwy. There are two optional LRT grade separation bridges proposed at Meadowview Rd. and at Franklin Blvd. Foundations for the pedestrian bridges are expected to be concrete filled, drilled-hole piles. The superstructures for the larger bridges are to be reinforced post-tensioned concrete. The larger equipment needed for construction will include a pile auger drill rig, concrete trucks, concrete pumpers, dump trucks, excavator, back hoe, and small and large cranes.

A number of short retaining walls will be required to retain the earth embankments at limited locations along the project. Additionally, sound walls will be constructed along selected locations of the alignment. Equipment necessary to construct these features will include delivery trucks, forklifts or small cranes, cement trucks, and concrete pumpers.

The overhead catenary system will consist of spaced steel poles with electrical wiring suspended between the poles in order to provide electrical power to the rail vehicles. The poles are typically supported in concrete pier foundations. The traction power system is comprised of prefabricated buildings that will be positioned adjacent to the tracks and contain equipment that provides power to the catenary system. The power is transmitted to the overhead catenary system by means of underground cables. The substation buildings will be mounted on slab foundations at the same level as the surrounding ground. The equipment that will be needed for these features will include an auger drill rig, small crane, concrete trucks, concrete pumpers, rail mounted delivery trucks, and power winches.

The train control and communication systems will comprise a network of cables connected to track circuits and points of communication, such as substations and passenger stations. The cables will run along the length of the route, supported by the catenary poles and connected to equipment by way of underground conduits. Cables and equipment will be installed using rail mounted and road vehicles with bucket attachments and power winches.

Proposed Conservation Measures.

The FTA and RT propose to minimize and avoid construction impacts through the use of Best Management Practices (BMP) and procedures that have been established for the construction of large-scale public works projects. The following are proposed *Minimization and Avoidance Procedures* for the project:

1. Precautions to prevent pollution of steams, waterways, and other bodies of water during construction;

2. Dust control through watering of appropriate surfaces;

3. Clearing and grubbing procedures that specify that only trees and plants designated for removal shall be removed;

4. Excavation techniques to ensure the stability of subsurface materials as well as retention of excavated materials within the construction areas;

5. Construction within wetlands will be avoided during the rainy season to prevent excess siltation and sedimentation;

6. Materials and fluids generated by construction activities will be placed at least 100 feet (ft) from wetland areas or drainages until they can be disposed of at a permitted site;

7. After construction activities are complete, any temporary fill or construction debris shall be removed from disturbed areas will be restored to their pre-project conditions;

8. All natural communities, wetland areas, and potential habitat for listed species located outside the construction zone that could be affected by construction activities will be temporarily fenced off using high visibility fencing and designated as Environmentally Sensitive Areas (ESAs) to prevent accidental intrusion by workers and/or construction equipment. The fencing will be inspected and maintained on a regular basis throughout the construction process and will only be removed when construction of the project is completed;

9. A Service-approved biological monitor will inspect construction-related activities daily at the project site, where threatened and endangered species may occur, to ensure that there is no unauthorized take of federally listed species or destruction of their habitat. The monitor will have the authority to stop construction activities that may result in unauthorized take of federally listed species or destruction of their habitat until appropriate corrective measures have been implemented. The monitor will be responsible for immediately reporting any sightings of federally listed species within the project area or unauthorized impacts to the Service;

10. An environmental awareness program will be developed and implemented for construction personnel, including contractors. The training will include information on special-status species that may occur within or adjacent to work areas, the required avoidance and minimization measures to avoid take of these species and their habitats, and potential penalties for not complying with the requirements; and

11. The number and size of access roads and staging areas, and the total area of project activities will be restricted to the minimum necessary for the duration of the project construction activities. Stockpiling of construction materials, portable equipment, vehicles, etc. will be confined to the construction staging areas. Movement of heavy equipment to and from the project area will be restricted to established roadways to minimize disturbance. Project-related vehicles shall observe a 20-mile per hour speed limit within construction areas, except on City and County roads and on County, State, and Federal highways. All heavy equipment, vehicles, and supplies will be stored at the designated staging area at the end of each work period.

Giant garter snake
A total of approximately 0.001 ac (44 square feet) of aquatic habitat will be permanently affected by the project due to construction of the UPRR flyover at the confluence of Morrison Creek and Union House Creek. In addition, approximately 0.05 acre of aquatic habitat will be temporarily affected during construction activities associated with the UPRR flyover at that same location. Project related permanent and temporary impacts to potential upland habitat are 0.46 ac for permanent, and 8.39 ac temporary impacts. Project-related impacts to upland habitat will occur at various locations along the project including the UPRR flyover, the pedestrian access bridge at Deer Lake Drive, and in the vicinity of the modified detention basin.

Project-Related Impacts to Potential Giant Garter Snake Habitat (acres)			
Aquatic Habitat		Upland Habitat	
Permanent Impact	Temporary Impact	Permanent Impact	Temporary Impact
0.001	0.05	0.46	8.39

Pursuant to the *Programmatic Formal Consultation* (1-1-97-F-0149) for GGS, the following compensation measures will be implemented:

1. GGS habitat permanently impacted by the project will be compensated for at a 3:1 ratio.

2. All compensation habitats must include both upland and aquatic habitat components. Upland and aquatic habitat components will be compensated at a 2:1 ratio of upland acres to aquatic acres of habitat (2 upland acres for every 1 acre of aquatic).

3. Temporarily impacted GGS habitat will be restored and compensated for at a 1:1 ratio.

Giant Garter Snake Habitat; Impacted and Compensation (acres)			
Permanent Impacts			Compensation Acreage (3:1)
Aquatic Habitat	Upland Habitat	Total	
0.001	0.46	0.461	1.383
Temporary Impacts			(1:1)
0.05	8.39	8.44	8.44

Avoidance and minimization measures:

1. Avoid construction activities within 200 ft from the banks of GGS aquatic habitat. Confine movement of heavy equipment to existing roadways to minimize habitat disturbance.

2. Construction activity within habitat should be conducted between May 1 and October 1 (the active period for this species). Construction activities within 200 ft from the banks of aquatic habitat should be avoided during GGS inactive season.

3. Construction personnel will receive Service-approved worker environmental awareness training.

4. The project area will be surveyed by a Service-approved biologist for GGS 24-hours prior to construction activities. The survey will be repeated if a lapse in construction activity of two weeks or greater occurs. If a GGS is encountered during construction, activities will cease until appropriate corrective measures have been completed or it has been determined that GGS will not be harmed. Only Service-permitted individuals may handle GGS. Report any sightings and any incidental take to the Service immediately by telephone.

5. Any dewatered habitat should remain dry for at least 15 consecutive days after April 15 and prior to any excavating or filling of the dewatered habitat.

6. Confine clearing to the minimal area necessary to facilitate construction activities.

7. Flag and designate avoided GGS habitat within and adjacent to the project areas as ESAs. The ESAs should be avoided by all construction personnel.

8. After completion of construction activities, remove any temporary fill and construction debris and, wherever feasible, restore disturbed areas to pre-project conditions.

Vernal Pool Branchiopods

The project is located within the recognized range of the listed vernal pool branchiopods, vernal pool fairy shrimp and vernal pool tadpole shrimp, and potential habitat is present on-site and in the immediate vicinity of the project. In the Bio Op for the Interstate 5/ Cosumnes River Blvd Interchange Project (1-1-04-F-0363) (Service 2005), the Service determined that vernal pool fairy shrimp and vernal pool tadpole shrimp are reasonably certain to inhabit the proposed project's action area (which overlaps portions of the South Sacramento Corridor Phase 2 project site), based on the known occurrences of these two species in wetlands throughout the SRCSD Bufferlands and the occurrence of potential habitat for these species on-site. Therefore, the presence of vernal pool fairy shrimp and vernal pool tadpole shrimp is assumed within the South Sacramento Corridor Phase 2 project site within features on-site that represent potential habitat and potential project-related effects are mitigated accordingly.

Project-Related Affects to Potential Vernal Pool Branchiopod Habitat (acres)		
Potential Vernal Pool Branchiopod Habitat	Directly Affected	Indirectly Affected
	0.14	0.99

Direct impacts to vernal pool branchiopod habitat by the project will be compensated for through the combination of preservation and creation/restoration components as follows:

- Preservation Component: for every acre of directly and indirectly impacted habitat, two acres (2:1 ratio) will be preserved at a Service-approved conservation bank, or, based on

Service evaluation and approval of site specific conservation values, three acres (3:1 ratio) of vernal pool habitat may be preserved on the project site or on another non-bank site as approved by the Service.

- Creation/Restoration Component: For every acre of habitat directly impacted, at least one acre (1:1 ratio) of vernal pool creation credit will be dedicated within a Service-approved conservation bank, or, based on a Service evaluation of site-specific conservation values, two acres of vernal pool habitat will be created and monitored on the project site or on another non-bank site as approved by the Service.

Indirect impacts to habitat by the project will be compensated for as follows: For every acre of indirectly impacted habitat, two acres (2:1 ratio) will be preserved at a Service-approved conservation bank, or, based on Service evaluation of site-specific conservation values, three acres (3:1 ratio) of vernal pool habitat may be preserved and monitored on the project site or on another non-bank site as approved by the Service.

Affected, Preservation, and Creation Acreages for Impacts to Potential Vernal Pool Branchiopod Habitat				
Directly Impacted			Indirectly Impacted	
Impacted Acreage	Preservation Component (2:1)	Creation/Restoration Component (1:1)	Impacted Acreage	Preservation Component (2:1)
0.14	0.28	0.14	0.99	1.98

Action Area

The action area is defined in 50 CFR § 402.02, as "all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action." For the proposed action, the Service considers the action area to be the existing and proposed new roadway and right-of-way (ROW). The proposed project is located in southern Sacramento County, California, within the southwestern portion of the Sacramento Valley, within the Lower Sacramento Watershed. The proposed project will span a length of 4.3 mi beginning at the Meadowview Rd UPRR grade crossing and terminating at the Cosumnes River College campus. The land use for the area is dominated by suburban development, the Sacramento Regional County Sanitation District (SRCSD) Bufferlands, and right-of-ways. The proposed project is within the U.S. Geological Survey (USGS) Quadrangle (quad) of Florin (496B); T 7N, R 5E, Sections 7, 8, 14, 15, 16, 17, 22, and 23; UTM 634054E, 4259196N.

Status of the Species

Giant garter snake

Listing. The Service published a proposal to list the giant garter snake as an endangered species on December 27, 1991 (56 **FR** 67046). The Service reevaluated the status of the snake before adopting the final rule, which listed as a threatened species on October 20, 1993 (58 **FR** 54053).

Description. The giant garter snake is one of the largest garter snakes species reaching a total length of approximately 64 inches (162 centimeters). Females tend to be slightly longer and proportionately heavier than males. Generally, the snakes have a dark dorsal background color with pale dorsal and lateral stripes, although coloration and pattern prominence are geographically and individually variable (Hansen 1980; Rossman *et al.* 1996).

Historical and Current Range. Giant garter snakes formerly occurred throughout the wetlands that were extensive and widely distributed in the Sacramento and San Joaquin Valley floors of California (Fitch 1940; Hansen and Brode 1980; Rossman and Stewart 1987). The historical range of the snake is thought to have extended from the vicinity of Chico, Butte County, southward to Buena Vista Lake, near Bakersfield, in Kern County (Fitch 1940; Fox 1948; Hansen and Brode 1980; Rossman and Stewart 1987). Early collecting localities of the giant garter snake coincide with the distribution of large flood basins, particularly riparian marsh or slough habitats and associated tributary streams (Hansen and Brode 1980). Loss of habitat due to agricultural activities and flood control have extirpated the snake from the southern one third of its range in former wetlands associated with the historic Buena Vista, Tulare, and Kern lake beds (Hansen 1980; Hansen and Brode 1980).

Upon federal listing in 1993, the Service identified 13 separate populations of giant garter snakes, with each population representing a cluster of discrete locality records (Service 1993). The 13 populations largely coincide with historical flood basins and tributary streams throughout the Central Valley: (1) Butte Basin, (2) Colusa Basin, (3) Sutter Basin, (4) American Basin, (5) Yolo Basin/Willow Slough, (6) Yolo Basin/Liberty Farms, (7) Sacramento Basin, (8) Badger Creek/Willow Creek, (9) Caldoni Marsh/White Slough, (10) East Stockton--Diverting Canal & Duck Creek, (11) North and South Grasslands, (12) Mendota, and (13) Burrel/Lanare.

The known range of the giant garter snake has changed little since the time of listing. In 2005, giant garter snakes were observed at the City of Chico's wastewater treatment facility, approximately ten miles north of what was previously believed to be the northernmost extent of the species' range (D. Kelly pers. comm. 2006; E. Hansen pers. comm. 2006). The southernmost known occurrence is at the Mendota Wildlife Area in Fresno County. No sightings of giant garter snakes south of Mendota Wildlife Area within the historic range of the species have been made since the time of listing (Hansen 2002).

Essential Habitat Components. Endemic to wetlands in the Sacramento and San Joaquin valleys, the giant garter snake inhabits marshes, sloughs, ponds, small lakes, low gradient streams, and other waterways and agricultural wetlands, such as irrigation and drainage canals, rice fields and

the adjacent uplands (Service 1999). Essential habitat components consist of: (1) wetlands with adequate water during the snake's active season (early-spring through mid-fall) to provide food and cover; (2) emergent, herbaceous wetland vegetation, such as cattails and bulrushes, for escape cover and foraging habitat during the active season; (3) upland habitat with grassy banks and openings in waterside vegetation for basking; and (4) higher elevation uplands for over-wintering habitat with escape cover (vegetation, burrows) and underground refugia (crevices and small mammal burrows) (Hansen 1988). Snakes are typically absent from larger rivers and other bodies of water that support introduced populations of large, predatory fish, and from wetlands with sand, gravel, or rock substrates (Hansen 1988; Hansen and Brode 1980; Rossman and Stewart 1987). Riparian woodlands do not provide suitable habitat because of excessive shade, lack of basking sites, and absence of prey populations (Hansen 1988).

Foraging Ecology. Giant garter snakes are the most aquatic garter snake species and are active foragers, feeding primarily on aquatic prey such as fish and amphibians (Fitch 1941). Because the giant garter snake's historic prey species are either declining, extirpated, or extinct, the predominant food items are now introduced species such as carp (*Cyprinus carpio*), mosquito-fish (*Gambusia affinis*), larval and sub-adult bullfrogs (*Rana catesbiana*), and Pacific chorus frogs (*Pseudacris regilla*) (Fitch 1941; Hansen 1988; Hansen and Brode 1980, 1993; Rossman *et al.* 1996).

Reproductive Ecology. The giant garter snake breeding season extends through March and April, and females give birth to live young from late July through early September (Hansen and Hansen 1990). Although growth rates are variable, young typically more than double in size by one year of age, and sexual maturity averages three years in males and five years for females (Service 1993).

Movements and Habitat Use. The giant garter snake is highly aquatic but also occupies a terrestrial niche (Service 1999; Wylie *et al.* 2004*a*). The snake typically inhabits small mammal burrows and other soil and/or rock crevices during the colder months of winter (*i.e.,* October to April) (Hansen and Brode 1993; Wylie *et al.* 1995; Wylie *et al.* 2003a), and also uses burrows as refuge from extreme heat during its active period (Wylie *et al.* 1997; Wylie *et al.* 2004a). While individuals usually remain in close proximity to wetland habitats, the Biological Resource Division of the U.S. Geological Survey (BRD) has documented snakes using burrows as much as 165 feet (50 meters) away from the marsh edge to escape extreme heat, and as far as 820 feet (250 meters) from the edge of marsh habitat for over-wintering habitat (Wylie *et al.* 1997).

In studies of marked snakes in the Natomas Basin, snakes moved about 0.25 to 0.5 miles (0.4 to 0.8 kilometers) per day (Hansen and Brode 1993). Total activity, however, varies widely between individuals; individual snakes have been documented to move up to 5 miles (8 kilometers) over a few days in response to dewatering of habitat (Wylie *et al.* 1997) and to use up to more than 8 miles (12.9 kilometers) of linear aquatic habitat over the course of a few months, Home range (area of daily activity) averages about 0.1 mile^2 (25 hectares) in both the Natomas Basin and the Colusa National Wildlife Refuge (NWR) (Wylie 1998a; Wylie *et al.* 2002), yet can be as large as 14.5 miles^2 (3744 hectares) (Wylie and Martin 2004).

Rice fields have become important habitat for giant garter snakes, particularly associated canals and their banks for both spring and summer active behavior and winter hibernation (Hansen 2004; Wylie 1998b). While within the rice fields, snakes forage in the shallow water for prey, utilizing rice plants and vegetated berms dividing rice checks for shelter and basking sites (Hansen and Brode 1993). In the Natomas Basin, habitat used consisted almost entirely of irrigation ditches and established rice fields (Wylie 1998a; Wylie *et al* 2004a), while in the Colusa NWR, snakes were regularly found on or near edges of wetlands and ditches with vegetative cover (Wylie *et al.* 2003a). Telemetry studies also indicate that active snakes use uplands extensively, particularly where vegetative cover exceeds 50 percent in the area (Wylie 1998b).

Predators. Giant garter snakes are killed and/or eaten by a variety of predators, including raccoons (*Procyon lotor*), striped skunks (*Mephitis mephitis*), opossums (*Didelphis virginiansa*), bull frogs (*Rana catesbiana*), hawks (*Buteo* sp.), egrets (*Casmerodius albus, Egretta thula*), river otters (*Ludra canadensis),* and great blue herons (*Ardea herodias*) (Dickert 2003; Wylie *et al.* 2003c; G. Wylie pers. comm. 2006). Many areas supporting snakes have been documented to have abundant predators; however, predation does not seem to be a limiting factor in areas that provide abundant cover, high concentrations of prey items, and connectivity to a permanent water source (Hansen and Brode 1993; Wylie *et al.* 1995).

Reasons for Decline and Threats to Survival. The current distribution and abundance of the giant garter snake is much reduced from former times (Service 1999). Prior to reclamation activities beginning in the mid- to late-1800s, about 60 percent of the Sacramento Valley was subject to seasonal overflow flooding providing expansive areas of snake habitat (Hinds 1952). Now, less than 10 percent, or approximately 319,000 acres (129,000 hectares), of the historic 4.5 million acres (1.8 million hectares) of Central Valley wetlands remain (U.S. Department of Interior 1994), of which very little provides habitat suitable for the giant garter snake. Loss of habitat due to agricultural activities and flood control have extirpated the snake from the southern one-third of its range in former wetlands associated with the historic Buena Vista, Tulare, and Kern lakebeds (Hansen 1980; Hansen and Brode 1980).

Valley flood wetlands are now subject to cumulative effects of upstream watershed modifications, water storage and diversion projects, as well as urban and agricultural development. The Central Valley Project (CVP), the largest water management system in California, created an ecosystem altered to such an extent that remaining wetlands depend on highly managed water regimes (U.S. Department of Interior 1994). Further, the implementation of CVP has resulted in conversion of native habitats to agriculture, and has facilitated urban development through the Central Valley (Service 1999). For instance, residential and commercial growth with the Central Valley is consuming an estimated 15,000 acres of Central Valley farmland each year (American Farmland Trust 1999), with a project loss of more than one million acres by the year 2040 (USGS 2003). Environmental impacts associated with urbanization include loss of biodiversity and habitat, alternation of natural fire regimes, fragmentation of habitat from road construction, and degradation due to pollutants. Further,

encroaching urbanization can inhibit rice cultivation (J. Roberts pers. comm. 2006). Rapidly expanding cities within the snake's range include Chico, Yuba City, the Sacramento area, Galt, Stockton, Gustine, and Los Banos.

Ongoing maintenance of aquatic habitats for flood control and agricultural purposes eliminates or prevents the establishment of habitat characteristics required by snakes (Hansen 1988). Such practices can fragment and isolate available habitat, prevent dispersal of snakes among habitat units, and adversely affect the availability of the snake's food items (Hansen 1988; Brode and Hansen 1992). For example, tilling, grading, harvesting and mowing may kill or injure giant garter snakes (Wylie *et al.* 1997). Biocides applied to control aquatic vegetation reduce cover for the snake and may harm prey species (Wylie *et a*l. 1995). Rodent control threatens the snake's upland estivation habitat (Wylie *et a*l. 1995; Wylie *et al.* 2004a). Restriction of suitable habitat to water canals bordered by roadways and levee tops renders snakes vulnerable to vehicular mortality (Wylie *et al.* 1997). Rolled erosion control products, which are frequently used as temporary berms to control and collect soil eroding from constriction sites, can entangle and kill snakes (Stuart *et al.* 2001; Barton and Kinkead 2005). Livestock grazing along the edges of water sources degrades water quality and can contribute to the elimination and reduction of available quality snake habitat (Hansen 1988; E. Hansen, pers. comm.. 2006), and giant garter snakes have been observed to avoid areas that are grazed (Hansen 2003). Fluctuation in rice and agricultural production affects stability and availability of habitat (Paquine *et al.* 2006; Wylie and Casazza 2001; Wylie *et al.* 2003b, 2004b).

Other land use practices also currently threaten the survival of the snake. Recreational activities, such as fishing, may disturb snakes and disrupt thermoregulation and foraging activities (E. Hansen pers. comm. 2006). While large areas of seemingly suitable snake habitat exist in the form of duck clubs and waterfowl management areas, water management of these areas typically does not provide the summer water needed by the species (Beam and Menges 1997; Dickert 2005; Paquin *et al.* 2006).

Nonnative predators, including introduced predatory game fish, bullfrogs, and domestic cats, can threaten snake populations (Dickert 2003; Hansen 1986; Service 1993; Wylie *et al.* 1995; Wylie *et al.* 2003c). Nonnative competitors, such as the introduced water snake (*Nerodia fasciata*) in the American River and associated tributaries near Folsom, may also threaten the giant garter snake (Stitt *et al.* 2005).

The disappearance of giant garter snakes from much of the west side of the San Joaquin Valley was approximately contemporaneous with the expansion of subsurface drainage systems in this area, providing circumstantial evidence that the resulting contamination of ditches and sloughs with drainwater constituents (principally selenium) may have contributed to the demise of giant garter snake populations. Dietary uptake is the principle route of toxic exposure to selenium in wildlife, including giant garter snakes (Beckon *et al.* 2003). Many open ditches in the northern San Joaquin Valley carry subsurface drainwater with elevated concentrations of selenium, and green sunfish (*Lepomis cyanellus*) have been found to have concentrations of selenium within the range of concentrations associated with adverse affects on predator aquatic reptiles (Hopkins *et al.* 2002; Saiki 1998). Studies on the effects of selenium on snakes suggest that snakes with high

selenium loads in their internal organs can transfer potentially toxic quantities of selenium to their eggs (Hopkins *et al.* 2004) and also demonstrate higher rates of metabolic activity than uncontaminated snakes (Hopkins *et al.* 1999).

Status with Respect to Recovery. The draft recovery plan for the giant garter snake subdivides its range into three proposed recovery units (Service 1999): (1) Sacramento Valley Recovery Unit; (2) Mid-Valley Recovery Unit; (3) San Joaquin Valley Recovery Unit; and (4) South Valley Recovery Unit.

The Sacramento Valley Unit at the northern end of the species' range contains sub-populations in the Butte Basin, Colusa Basin, and Sutter Basin (Service 1999; Service 2006). Protected snake habitat is located on State refuges and refuges of the Sacramento National Wildlife Refuge (NWR) Complex in the Colusa and Sutter Basins. Suitable snake habitat is also found in low gradient streams and along waterways associated with rice farming. This northernmost recovery unit is known to support relatively large, stable sub-populations of giant garter snakes (Wylie *et al.* 1995; Wylie *et al.* 1997; Wylie *et al.* 2002; Wylie *et al.* 2003a; Wylie *et al.* 2004a). Habitat corridors connecting subpopulations, however, are either not present or not protected, and are threatened by urban encroachment.

The Mid-Valley Unit includes sub-populations in the American, Yolo, and Delta Basins (Service 1999; Service 2006). The status of Mid-Valley sub-populations is very uncertain; each is small, highly fragmented, and located on isolated patches of limited quality habitat that is increasingly threatened by urbanization (E. Hansen 2002, 2004; Service 1993; Wylie 2003; Wylie and Martin 2004; Wylie *et al.* 2004b; Wylie *et al.* 2005; G. Wylie pers. comm. 2006).

The American Basin sub-population, although threatened by urban development, receives protection from the Metro Air Park and Natomas Basin Habitat Conservation Plans, which share a regional strategy to maintain a viable snake sub-population in the basin.

The San Joaquin Valley Unit, which includes sub-populations in the San Joaquin Basin, formerly supported large snake populations, but numbers have severely declined, and recent survey efforts indicate numbers are extremely low compared to Sacramento Valley sub-populations (Dickert 2002, 2003; Hansen 1988; Williams and Wunderlich 2003; Wylie 1998a). Giant garter snakes currently occur in the northern and central San Joaquin Basin within the Grassland Wetlands of Merced County and the Mendota Wildlife Area of Fresno County; however, these sub-populations remain small, fragmented, and unstable, and are probably decreasing (Dickert 2003, 2005; G. Wylie pers. comm., 2006).

The South Valley Unit included sub-populations in the Tulare Basin, however, agricultural and flood control activities are presumed to have extirpated the snake from the Tulare Basin (Hansen 1995). Comprehensive surveys for this area are lacking and where habitat remains, the giant garter snake may be present.

Since 1995, BRD has studied snake sub-populations at the Sacramento, Delevan, and Colusa NWRs and in the Colusa Basin Drain within the Colusa Basin, at Gilsizer Slough within the

Sutter Basin, at the Badger Creek area of the Cosumnes River Preserve within the Badger Creek/Willow Creek area of the Delta Basin, and in the Natomas Basin within the American Basin (Hansen 2003, 2004; Wylie 1998a, 1998b, 2003; Wylie *et al.* 1995; Wylie *et al.* 2002; Wylie *et al.* 2003a, 2004a; Wylie *et al.* 2003b, 2004b). These areas contain the largest extant giant garter snake sub-populations. Outside of protected areas, however, snakes are still subject to all threats identified in the final rule. The other sub-populations are distributed discontinuously in small, isolated patches, and are vulnerable to extirpation by stochastic environmental, demographic, and genetic processes (Goodman 1987).

The draft recovery criteria require multiple, stable sub-populations within each of the three recovery units, with sub-populations well-connected by corridors of suitable habitat. This entails that corridors of suitable habitat between existing snake sub-populations be maintained or created to enhance sub-population interchange to offset threats to the species (Service 1999). Currently, only the Sacramento Valley Recovery Unit is known to support relatively large, stable giant garter snake populations. Habitat corridors connecting sub-populations, even in the Sacramento Valley Recovery Unit, are either not present or not protected. Overall, the future availability of habitat in the form of canals, ditches, and flooded fields are subject to market-driven crop choices, agricultural practices, and urban development, and are, thus, uncertain and unpredictable.

Vernal Pool Branchiopods

The vernal pool tadpole shrimp and vernal pool fairy shrimp were listed as endangered and threatened, respectively, on September 19, 1994. Complete descriptions of these species are found in 59 **FR** 48136, the final rule listing these species under the Act. These branchiopods are restricted to vernal pools and swales and other seasonal aquatic habitats. The vernal pool fairy shrimp is found in California and southern Oregon, and the vernal pool tadpole shrimp is found in California. Eng *et al.* (1990) and Simovich *et al.* (1992) provide further details about their life history and ecology. The Service did not designate any critical habitat for the vernal pool crustaceans in Sacramento County. Although the Service designated critical habitat for the vernal pool fairy shrimp in San Joaquin County, none will be affected by the proposed project.

Life history of vernal pool tadpole shrimp - The vernal pool tadpole shrimp has dorsal compound eyes, a large shield-like carapace that covers most of its body, and a pair of long cercopods at the end of its last abdominal segment (Linder 1952; Longhurst 1955; Pennak 1989). It is primarily a benthic animal that swims with its legs down. Vernal pool tadpole shrimp climb or scramble over objects, and plow along bottom sediments as they forage for food. Its diet consists of organic detritus and living organisms, such as fairy shrimp and other invertebrates (Pennak 1989; Fryer 1987). The females deposit their eggs on vegetation and other objects on the pool bottom. Tadpole shrimp eggs are known as cysts, and during the dry months of the year, they lie dormant in the dry pool sediments (Lanaway 1974; Ahl 1991).

The life history of the vernal pool tadpole shrimp is linked to the environmental characteristics of its vernal pool habitat. After winter rains fill the pools, dormant vernal pool tadpole shrimp cysts may hatch in as little as four days (Ahl 1991, Rogers *in litt* . 2001), and and tadpole shrimp may

become sexually mature within three to four weeks after hatching (Ahl 1991; Helm 1998; King 1996). A portion of the cysts hatch immediately and the rest remain dormant in the soil to hatch during later rainy seasons (Ahl 1991). The vernal pool tadpole shrimp is a relatively long-lived species (Ahl 1991), and will generally survive for as long as their habitats remain inundated, sometimes for six months or more (Ahl 1991, Gallagher 1996, Helm 1998). Adults are often present and reproductive until the pools dry up in the spring (Ahl 1991; Simovich *et al.* 1992). Mature adults may be present in pools until the habitats dry up in the spring (Ahl 1991, Gallagher 1996; Simovich *et al.* 1992).

Life history of vernal pool fairy shrimp - Vernal pool fairy shrimp have delicate elongate bodies, large stalked compound eyes, no carapace, and 11 pairs of phyllopods, or gill-like structures that also serve as legs. The swim or glide gracefully upside-down by means of complex, wavelike beating movements. Fairy shrimp feed on algae, bacteria, protozoa, rotifers, and detritus. The second pair of antennae in fairy shrimp adult males are greatly enlarged and specialized for clasping the females during copulation. The females carry eggs in an oval or elongate ventral brood sac. The eggs are either dropped to the pool bottom or remain in the brood sac until the female dies and sinks. The dormant cysts are capable of withstanding heat, cold, and prolonged desiccation, and they can remain viable in the soil for decades after deposition. When the pools refill in the same or subsequent seasons, some, but not all, of the cysts may hatch. The cyst bank in the soil may therefore be comprised of cysts from several years of breeding (Donald 1983). The early stages of the fairy shrimp develop rapidly into adults. The vernal pool fairy shrimp can mature quickly, allowing populations to persist in short-lived shallow pools (Simovich *et al.* 1992). In pools that persist for several weeks to a few months, fairy shrimp may have multiple hatches during a single season (Helm 1998; Gallagher 1996).

Vernal Pool Ecology and Species Adaptations – The hydrology that maintains the pattern of inundation and drying characteristic of vernal pool habitats is complex. Vernal pool habitats form in depressions above an impervious soil layer (duripan) or rock substrate. After winter rains begin, this impervious layer prevents the downward percolation of water and creates a perched water table causing the depression (or pool) to fill. Due to local topography and geology, the depressions are generally part of an undulating landscape, where soil mounds are interspersed with basins, swales, and drainages (Nikiforoff 1941, Holland and Jain 1978). These features form an interconnected hydrological unit known as a vernal pool complex. Although vernal pool hydrology is driven by the input of precipitation, water input to vernal pool basins also occurs from surface and subsurface flow from the swale and upland portions of the complex (Zedler 1987, Hanes *et al.* 1990, Hanes and Stromberg 1998). Surface flow through the swale portion of the complex allows vernal pool species to move directly from one vernal pool to another. Upland areas are a critical component of vernal pool hydrology because they directly influence the rate of vernal pool filling, the length of the inundation period, and the rate of vernal pool drying (Zedler 1987, Hanes and Stromberg 1998). Upland areas associated with vernal pools are also an important source of nutrients to vernal pool organisms (Wetzel 1975). Vernal pool habitats derive most of their nutrients from detritus that is washed into the pool from adjacent uplands, and these nutrients provide the foundation for the vernal pool aquatic community food chain.

Both of the vernal pool crustaceans addressed in this biological opinion have evolved unique physical adaptations to survive in vernal pools. Vernal pool environments are characterized by a short inundation phase during the winter, a drying phase during the spring, and a dry phase during the summer (Holland and Jain 1978). The timing and duration of these phases can vary significantly from year to year, and in some years vernal pools may not inundate at all. In order to take advantage of the short inundation phase, vernal pool crustaceans have evolved short reproduction times and high reproductive rates. The listed crustaceans generally hatch within a few days after their habitats fill with water, and can start reproducing within a few weeks (Eng *et al.* 1990, Helm 1998, Eriksen and Belk 1999). Vernal pool crustaceans can complete their entire life cycle in a single season, and some species may complete several life cycles. Vernal pool crustaceans can also produce numerous offspring when environmental conditions are favorable. Some species may produce thousands of cysts during their life spans.

To survive the prolonged heat and desiccation of the vernal pool dry phase, vernal pool crustaceans have developed a dormant stage. The dormant egg, or cyst, can withstand temperatures near boiling (Carlisle 1968), fire (Wells *et al.* 1997), freezing, and anoxic conditions without damage to the embryo. The cyst wall cannot be affected by digestive enzymes, and can be transported in the digestive tracts of animals without harm (Horne 1967). Most fairy shrimp cysts can remain viable in the soil for a decade or longer (Belk 1998). Because the cyst contains a well developed embryo, the animal can quickly develop into a fully mature adult. This allows vernal pool crustaceans to reproduce before the vernal pool enters the dry phase, sometimes within only a few weeks (Helm 1998, Eriksen and Belk 1999). In some species, cysts may hatch immediately without going through a dormant stage, if they are deposited while the vernal pool still contains water. These cysts are referred to as quiescent, and allow the vernal pool crustacean to produce multiple generations in a single wet season as long as their habitat remains inundated.

Distribution of vernal pool tadpole shrimp - Vernal pool tadpole shrimp are found only in ephemeral freshwater habitats in California. The vernal pool tadpole shrimp is known from 168 occurrences in the Central Valley (CNDDB 2004), ranging from east of Redding in Shasta County south to Fresno County, and from a single vernal pool complex located in the San Francisco Bay National Wildlife Refuge in Alameda County. It inhabits vernal pools containing clear to highly turbid water, ranging in size from 5 square meters (54 square feet) in the Mather Air Force Base area of Sacramento County, to the 36-hectare (89-acre) Olcott Lake at Jepson Prairie in Solano County. Although vernal pool tadpole shrimp are found on a variety of geologic formations and soil types, Helm (1998) found that over 50 percent of vernal pool tadpole shrimp occurrences were on High Terrace landforms and Redding and Corning soils.

Based on genetic differences, King (1996) separated vernal pool tadpole shrimp populations into two distinct groups. One group was comprised of animals inhabiting the floor of the Central Valley, near the Sacramento and San Joaquin Rivers. The other group contained vernal pool tadpole shrimp from sites along the eastern margin of the valley. King (1996) concluded that these two groups may have diverged because cyst dispersal by overland flooding historically connected populations on the valley floor, while populations on the eastern margin of the valley were not periodically connected by large scale flooding, and were therefore historically more

isolated. When dispersal of these foothill populations occurred, it was probably through different mechanisms such as migratory birds. King (1996) also found that populations in eastern Merced County, in the vicinity of the Flying M Ranch and the proposed University of California Merced campus, were very different from all other populations studied. She concluded, particularly because it is found on very ancient soils, that this group may have been isolated from other populations very early.

Distribution of vernal pool fairy shrimp - Vernal pool fairy shrimp are found only in ephemeral freshwater habitats in California and Southern Oregon. The vernal pool fairy shrimp is known from 342 occurrences extending from the Stillwater Plain in Shasta County through most of the length of the Central Valley to Pinnacles in San Benito County (Eng *et al.* 1990; Fugate 1992; Sugnet and Associates 1993; CNDDB 2004). Five additional, disjunct populations exist: one near Soda Lake in San Luis Obispo County; one in the mountain grasslands of northern Santa Barbara County; one on the Santa Rosa Plateau in Riverside County; one near Rancho California in Riverside County; and one on the Agate Desert near Medford, Oregon. Three of these isolated populations each contain only a single pool known to be occupied by the vernal pool fairy shrimp. The vernal pool fairy shrimp inhabits vernal pools with clear to tea-colored water, most commonly in grass- or mud-bottomed swales, basalt flow depression pools in unplowed grasslands, or even sandstone rock outcrops or alkaline vernal pools.

Although the vernal pool crustaceans addressed in this biological opinion are not often found in the same vernal pool at the same time, when coexistence does occur, it is generally in deeper, longer lived pools (Eng *et al.* 1990; Thiery 1991; Gallagher 1996; Simovich 1998). In larger pools, vernal pool crustacean species may be able to coexist by utilizing different physical portions of the vernal pool or by eating different food sources (Daborn 1978; Mura 1991; Hamr and Appleton 1991; Thiery 1991), or by hatching at different temperatures or developing at different rates (Thiery 1991; Hathaway and Simovich 1996).

Dispersal - The primary historic dispersal method for the vernal pool tadpole shrimp and vernal pool fairy shrimp likely was large scale flooding resulting from winter and spring rains which allowed the animals to colonize different individual vernal pools and other vernal pool complexes (J. King, pers. comm., 1995). This dispersal is currently non-functional due to the construction of dams, levees, and other flood control measures, and widespread urbanization within significant portions of the range of this species. Waterfowl and shorebirds may now be the primary dispersal agents for vernal pool tadpole shrimp and vernal pool fairy shrimp. The eggs of these branchiopods are either ingested (Krapu 1974; Swanson et al. 1974; Driver 1981; Ahl 1991) and/or adhere to the legs and feathers where they are transported to new habitats. Cysts may also be dispersed by a number of other species, such as salamanders, toads, cattle, and humans (Eriksen and Belk 1999).

Vernal pool crustaceans are often dispersed from one pool to another through surface swales that connect one vernal pool to another. These dispersal events allow for genetic exchange between pools and create a population of animals that extends beyond the boundaries of a single pool. Instead, populations of vernal pool crustaceans are defined by the entire vernal pool complex in which they occur (Simovich et al. 1992, King 1996). These dispersal events also allow vernal

pool crustaceans to move into pools with a range of sizes and depths. In dry years, animals may only emerge in the largest and deepest pools. In wet years, animals may be present in all pools, or in only the smallest pools. The movement of vernal pool crustaceans into vernal pools of different sizes and depths allows these species to survive the environmental variability that is characteristic of their habitats.

Reasons for Decline and Threats to Survival - The genetic characteristics of these species, as well as ecological conditions, such as watershed continuity, indicate that populations of vernal pool crustaceans are defined by pool complexes rather than by individual vernal pools (Fugate 1992). Therefore, the most accurate indication of the distribution and abundance of these species is the number of inhabited vernal pool complexes. The pools and, in some cases, pool complexes supporting these species may be small. Human-caused and unforeseen natural catastrophic events such as long-term drought, non-native predators, off-road vehicles, pollution, berming, and urban development, threaten their extirpation at some sites. Vernal pool fairy shrimp and vernal pool tadpole shrimp continue to be threatened by all of the factors which led to the original listing of this species, primarily habitat loss through agricultural conversion and urbanization (CNDDB 2004).

Environmental Baseline

Giant Garter Snake

Delta Basin. The proposed project is located within the Delta Basin snake population, in the Mid Valley Recovery Unit (Service 1999). Twenty-five CNDDB (2007) records are known from the Delta Basin. These records include Laguna Creek, Morrison Creek, Snodgrass Slough, Beach Lake, the creeks of the City of Elk Grove, Badger and Willow Creeks, Cosumnes River Preserve, Caldoni Marsh, White Slough, Duck Creek and other locations within the Basin.
During a field reconnaissance in April 2002, a giant garter snake was observed on the southwestern levee of Webb Tract. Since then, habitat evaluations and snake surveys have been conducted on Webb Tract and Beacon Island (Patterson 2004; Patterson and Hansen 2003).

Potential snake habitat in the area exists in the form of contiguous linear irrigation canals and ditches. However, although both islands possess the essential snake habitat components, two years of surveys resulted in no further sightings capture of GGS.

Recent genetic work on giant garter snake population structure indicates three genetic entities within the species which follow the pattern of subdivision revealed by the snake's mitochondrial DNA and color pattern variants: north, central, and south (Paquin 2001; Paquin *et al.* 2006). Interestingly, evidence of historical gene flow between northern and southern populations exists; however, mitochondrial DNA data reveal that the central population, analogous to the Delta Basin, is genetically isolated from both northern and southern populations. High frequencies of unique mitochondrial DNA haplotypes in the central population increase the conservation value for the Delta Basin, particularly as a source for GGS genetic diversity.

Laguna and Morrison Creek, Duck Creek, the Elk Grove creeks, as well as Beach Lake, Snodgrass Slough, Caldoni Marsh, White Slough and associated tributaries, are important GGS habitat and movement corridors for the animal. Such waterways and associated wetlands provide vital permanent aquatic and upland habitat for GGS in areas with otherwise limited habitat. The recovery strategy for the GGS includes maintenance and/or creation of habitat corridors between existing sub-populations to enhance population interchange and offset threats to the species (USFWS 2003).

According to the CNDDB (2007), the nearest snake record to the proposed project site is within 1 mile (1.6 kilometer), and there are an additional five CNDDB records within 5 mi (8 km) from the proposed project footprint. GGS have been documented to move up to 5 mi (8 km) over a few days in response to dewatering of habitat (Wylie *et al.* 1997) and to us up to more than 8 mi (12.9 km) of linear aquatic habitat over the course of a few months (Wylie and Martin 2004). The action area contains habitat components that can be used by the snake for feeding, resting, mating, and other essential behaviors, as well as for a movement corridor. These occurrences are hydrologically connected with the proposed project site through Laguna and Morrison Creeks. Because of the biology and ecology of the snake, the presence of suitable habitat within the proposed project, and observations of the species, the Service has determined that the snake is reasonably certain to occur within the action area.

Factors Affecting GGS within the Action Area

The overall status of the giant garter snake has not improved since its listing. Based on scarcity of suitable habitat and limited population size, at listing, threats to the Delta Basin population were considered imminent (Service 1993). The status of the Delta Basin sub-population has been, and continues to be, impacted by past and present Federal, state, private, and other human activities.

A number of State, local, private, and unrelated Federal actions have occurred within the action area and adjacent regions affecting the environmental baseline of the species. Some of these projects have been subject to prior section 7 consultation. These actions have resulted in both direct and indirect effects to snake habitat within the region. Projects affecting the environment in and around the action area include the improvement of the Northgate Boulevard/Arden-Garden Connector Intersection, the widening of Bond Road, construction of the Interstate 5/Consumnes River Boulevard Interchange, the Freeport Regional Water Diversion project, the Rivermont Drive Bridge project, the Rio Vista Northwest Wastewater Treatment project, the widening of Calvine Road, and the Kramer Ranch North project. In the past ten years, the Service has authorized take resulting in the permanent loss of more than 21 acres (9 hectares) of aquatic and 53 acres (22 hectare) of upland snake habitat, as well as temporary alteration of over 1,700 acres (688 hectares) of aquatic and 650 acres (263 hectares) of upland snake habitat in the Delta Basin.

Numerous recent development projects have been constructed in or near snake habitat in the rapidly developing areas in and around the cities of Sacramento, Elk Grove, Galt, and Stockton. Urban and commercial development results in direct habitat loss and also may expose snakes to secondary effects including water pollution from urban run-off and increased vehicular mortality,

both of which act in concert with rapid habitat loss and degradation to further threaten the snake in the Delta Basin. Also, development promotes road widening and bridge replacements, such as those authorized under section 7, which result in direct alteration of snake habitat. Most documented snake localities and/or movement corridors have been adversely impacted by development, including freeway construction, flood control projects, and commercial development. Further, several former localities are known to have been lost and/or depleted to that extent that continued viability is in question (Brode and Hansen 1992). The scarcity of remaining suitable habitat, flooding, stochastic processes, and continued threats of habitat loss pose a severe imminent threat to giant garter snakes in the Delta Basin.

Ongoing agricultural and flood control activities in the Delta Basin may decrease and degrade the remaining snake habitat affecting the environmental baseline for the snake. Such activities are largely not subject to section 7 consultation. Although rice fields and agricultural waterways can provide valuable seasonal foraging and upland habitat for the snake, agricultural activities such as waterway maintenance, weed abatement, rodent control, and discharge of contaminants into wetlands and waterways can degrade snake habitat and increase the risk of snake mortality (Service 2003). On-going maintenance of agricultural waterways can also eliminate or prevent establishment of snake habitat, eliminate food resources for the snake, and fragment existing habitat and prevent dispersal of snakes (Service 2003).

Flood control and maintenance activities which can result in snake mortality and degradation of habitat include levee construction, stream channelization, and rip-rapping of streams and canals (Service 2003). Flood control programs are administered by the U.S. Army Corps of Engineers (Corps), and the Corps has typically consulted on previous projects and is expected to continue to do so for future projects. The ongoing nature of these activities and the administration under various programs, however, makes it difficult to determine the continuing and accumulative effects of these activities.

In addition to projects already discussed, projects affecting the environment in and around the action area include transportation projects with Federal, county, or local involvement. The Federal Highway Administration and/or the Corps have consulted with the Service on the issuance of wetland fill permits for several transportation-related projects within the Delta Basin that affected snake habitat. The direct effect of these projects is often small and localized, but the effects of transportation projects, which improve access and therefore indirectly affect snakes by facilitating further development of habitat in the area and by increasing snake mortality via vehicles, are not quantifiable.

Vernal Pool Branchiopods

Historically, vernal pools and vernal pool complexes occurred extensively throughout the Sacramento Valley of California. Conversion of vernal pools and vernal pool complexes, however, has resulted in a 91 percent loss of vernal pool resources in California (State of California 2003d). By 1973, between 60 and 85 percent of the area within the Central Valley that once supported vernal pools had been destroyed (Holland 1978). In subsequent years, threats to this habitat type have continued and resulted in a substantial amount of vernal pool habitat being

converted for human uses in spite of Federal regulations implemented to protect wetlands. For example, between 1987 and 1992, 467 acres of wetlands within the Sacramento area were filled pursuant to Nationwide Permit 26 (Service 1992). A majority of those wetlands losses involved vernal pools, the endemic habitat of the vernal pool tadpole shrimp, the vernal pool fairy shrimp and slender and Sacramento Orcutt grasses. It was estimated in 1988 that within 20 years human activities would destroy 60 to 70 percent of the remaining vernal pools (Coe 1988). Holland (1998) estimated that almost three-quarters of vernal pool habitats in the Central Valley of California had been lost by 1997. Along the Central California coast, at least 90% of historic vernal pools have been destroyed, and most remaining vernal pools have been degraded (Farren and Pritchett 1988). In southern California, estimated loss of vernal pool habitat ranges from 95 to 100% (Bauder 1987, Oberbauer 1990, Zedler 1990, Bauder and McMillan 1998).

In addition to direct habitat loss, the two shrimp populations have been and continue to be highly fragmented throughout their ranges due to conversion of natural habitat for urban and agricultural uses. Fragmentation results in small isolated shrimp populations. Ecological theory predicts that such populations will be highly susceptible to extirpation due to chance events, inbreeding depression, or additional environmental disturbance (Gilpin and Soulé 1988; Goodman 1987a, b). If an extirpation event occurs in a population that has been fragmented, the opportunities for re-colonization would be greatly reduced due to physical (geographic) isolation from other (source) populations.

Human population growth in Sacramento County has steadily increased. On the average, Sacramento County has experienced an annual population increase of 1.38 percent for the period between 1991 and 1999 (Service 2000). For the period between 1990 and 2000, population growth in Sacramento County increased 17.5 percent (State of California 2002). This annual growth appears to be increasing, as demonstrated by the 2.63 percent and 2.2 percent increases in population growth in 2001 and 2002, respectively (State of California 2003a, 2003b). Increased housing demand and urban development accompany the population growth in Sacramento County. Between 1990 and 2000, housing units in Sacramento County increased by 1.37 percent annually (State of California 2000, 2003c). Population growth and concomitant housing demand and subsequent vernal pool resource development are projected to continue. Population projections for Sacramento County are expected to increase above 2000 levels by 19.7 percent in 2010, by 28 percent in 2015, and by 37.5 percent in 2020 (State of California 2001).

Sacramento County represents important, high quality habitat for the two shrimp populations by providing large, nearly contiguous areas of relatively undisturbed vernal pool habitat. Sacramento County contains the greatest number of occurrences of vernal pool tadpole shrimp within the range of the species, and also is one of the two counties with the greatest number of occurrences of vernal pool fairy shrimp within the range of the species. Sacramento County contains 58 (17 percent) out of the total of 342 reported occurrences of vernal pool fairy shrimp, and 58 (34 percent) out of the total of 173 reported occurrences of vernal pool tadpole shrimp (CNDDB 2004). Further, Sugnet and Associates (1993) reported that of 3,092 "discrete populations" checked, only 345 locations, or about 11 percent of all locations checked, were found to support the vernal pool tadpole shrimp. Of these 345 locations supporting the vernal pool tadpole shrimp, 219 (63 percent) were in Sacramento County. Further, of the

3,092 locations checked, 178 locations (6 percent) were found to support the vernal pool fairy shrimp. Of this total, 63 locations (35 percent) were within Sacramento County.

The vernal pool tadpole shrimp and vernal pool fairy shrimp are imperiled by a variety of human-caused activities. Their habitats have been lost through direct destruction and modification due to filling, grading, disking, leveling, and other activities. In addition, vernal pools have been imperiled by a variety of anthropogenic modifications to upland habitats and watersheds. These activities, primarily urban development, water supply/flood control projects, land conversion for agriculture, off-road vehicle use, certain mosquito abatement measures, and pesticide/herbicide use can lead to disturbance of natural flood regimes, changes in water table depth, alterations of the timing and duration of vernal pool inundation, introduction of non-native plants and animals, and water pollution. These indirect effects can result in adverse effects to vernal pool species

A number of State, local, private, and unrelated Federal actions have occurred within the project area and adjacent region affecting the environmental baseline of these species. Some of these projects have been subject to prior section 7 consultation. Based on an informal review, the Service has issued approximately 157 biological opinions to Federal agencies on proposed projects in Sacramento County that have adversely affected the shrimp species since the two species were proposed to be listed in 1994. This total does not reflect the formal consultations that were withdrawn, those that are suspended, and those that have insufficient information to conclude an effects analysis, those that were amended, or ones that the Service issued a conference opinion. No State of California actions that have taken place within Sacramento County have adversely affected the species in the action area. Although these proposed projects in Sacramento County have eliminated vernal pools and vernal pool complexes, the offsetting compensating measures are designed to minimize the effects of take of these species resulting in both negative and positive effects to the species. Thus, the trend for the two vernal pool species within the county is most likely static.

The actions listed above have resulted in both direct and indirect impacts to vernal pools within the region, and have contributed to the loss of vernal pool tadpole shrimp and vernal pool fairy shrimp populations. Although a reduction of the two shrimp populations has not been quantified, the acreage of lost habitat continues to grow.

In south Sacramento County, the Urban Services Boundary (USB) is a planning boundary that coincides with the areas north of the Cosumnes River/Deer Creek drainage system. Between 1993 and 2000, an estimated 14,950 acres were converted to urban development within the USB (pers. comm., D. Gifford, 2004), based on an analysis of the California Department of Water Resources mapping data. An independent analysis of urban growth in Sacramento County estimated that an estimated 22,000 acres were converted between 1990 and 2000, averaging 2,200 acres per year (pers. comm., Richard Radmacher, Sacramento County, 2004). As of 1998 (the most recent year for which vernal pool mapping from aerial photographs is available), there remained an estimated 23,533 acres of vernal pool grasslands within the USB, supporting approximately 946 acres of wetted vernal pool acreage (pers. comm.., Lora Konde, California Department of Fish and Game, 2003).

Vernal pool complexes, occurring north of the Cosumnes River/Deer Creek drainage and within the USB, contain a high density of occupied pool of both vernal pool tadpole shrimp and vernal pool fairy shrimp. There are 31 known occurrences of vernal pool tadpole shrimp inside the USB, compared to 17 occurrences outside the USB (CNDDB 2003). There are 25 known occurrences of vernal pool fairy shrimp inside the USB, compared to 18 occurrences outside the USB (CNDDB 2003). The data from the CNDDB do not reflect additional reported records in the Sunrise-Douglas area, where 137 occurrences of vernal pool tadpole shrimp and 46 occurrences of vernal pool fairy shrimp, and 2 occurrences of Orcutt grasses (2 slender Orcutt grass and 4 Sacramento Orcutt grass) are reported (pers. comm., Arnold Roessler, Service, 2004).

The vernal pools in Sacramento County are classified as young-terrace, old-terrace, and mudflow types (Jones & Stokes 1990). The vernal pools on the proposed project site are classified as the old-terrace type and are located on soils associated with Laguna geologic formation. Old-terrace is a rapidly disappearing habitat type in Sacramento County that consists of ancient river channel deposits that were laid down from 600,000 to more than one million years ago by the American River. By comparison, young-terrace formation dates from 100,000 to 200,000 years ago. Old-terrace formation generally has a higher density of vernal pools, deeper pools, and a greater number of special status plants and crustaceans than young-terrace formations. Some special status species found in old-terrace pools may have evolved from species inhabiting shores of ancient lakes in the Central Valley. Old-terrace pools may have served as refugia for these species as the lakes disappeared (Jones & Stokes, 1990). Sacramento County contains an estimated 764 wetted acres of vernal pools on low terrace, 1,390 wetted acres of vernal pools on high terrace, and 189 wetted acres of vernal pools on volcanic mudflow vernal pools.

There are two predominant soil types found within south Sacramento County. The Valley Springs soil type typifies Gill Ranch. Vernal pools found within the Valley Springs soil type are the young-terrace formation. Young-terrace formations, because they have a higher slope gradient, tend to have fewer vernal pools that are typically smaller and shallower. These vernal pools also are inundated for shorter durations. These factors typically result in lower species diversity. Generally, the larger the vernal pool on this soil type, the higher its biotic diversity. Vernal pool fairy shrimp, vernal pool tadpole shrimp, and Sacramento Orcutt grass are less likely to occur in young-terrace formation vernal pools found on Valley Springs soils (Holland, pers. comm. 2004).

The Laguna geologic formation and its associated soils entirely characterize the Sunrise Douglas Community Plan Area. Vernal pools found within this soil type are old-terrace types. Old-terrace types, because they have a lower slope gradient, tend to have pools that are larger, deeper, and clearer. These pools are inundated for longer periods, but dry and refill less often than the Valley Springs soil type. Generally, the smaller the vernal pool on this soil type, the higher its invertebrate diversity. Although vernal pool fairy shrimp occur in pools on both soil types, but more frequently in pools on Laguna soils. Vernal pool tadpole shrimp are found almost exclusively in old-terrace formation vernal pools found on Laguna soils.

Several areas containing old-terrace formation have been protected for their high quality vernal pool habitat and high concentration of special status species populations by the Sacramento

Valley Conservancy (SVC). This potential preserve area, the SVC's Vernal Pool Prairie Preserve, would cover 2,000 to 3,000 acres and supports a variety of special status plants and animals on relatively undisturbed grasslands containing young and old terrace formations and northern hardpan vernal pools. Within the proposed Prairie Preserve, areas already protected include the Arroyo Seco Mitigation Bank, the Excelsior 184 parcel, and the Sacramento County-owned Multi Cultural Park; outside of the proposed Prairie Preserve, the Sunrise Douglas Preservation Bank, and a portion of Howard Ranch are protected.

There are 342 records of vernal pool fairy shrimp and 173 records of vernal pool tadpole shrimp recorded in the CNDDB for the entire state of California (CNDDB 2004). Of these records, 58 vernal pool fairy shrimp records and 58 vernal pool tadpole shrimp records are from Sacramento County (CNDDB 2004). Vernal pool fairy shrimp and vernal pool tadpole shrimp have both been observed in wetlands throughout the Sunrise Douglas area.

Species Presence in the Bufferlands - Vernal pool fairy shrimp and vernal pool tadpole shrimp have both been observed in wetlands throughout the SRCSD's Bufferlands (Jones & Stokes 2002a), within which a portion of the proposed project is located. In the rapidly developing county of Sacramento, the Bufferlands provide a large area of open space and phenomenal wildlife habitat. Over 375 ac of wetlands, including 247 ac of managed seasonal wetlands, can be found on the 2,650 ac Bufferlands complex. Over 20 ac of delineated vernal pools, which harbor federally listed vernal pool branchiopods, are also found in this complex. Based on this information as well as the fact that vernal pool habitat for listed vernal pool branchiopods occurs in the immediate area of the proposed project, the Service has determined that there is a high likelihood that the vernal pool tadpole shrimp and vernal pool fairy shrimp inhabit the proposed project's action area.

Effects of the Proposed Action

Giant Garter Snake

The proposed project will result in temporary effects to approximately 0.05 acre of aquatic and 8.39 acres of upland GGS habitat. The proposed project will permanently affect approximately 0.001 acre of aquatic and 0.46 acre of upland GGS habitat. Construction activities associated with the proposed project occurring in GGS upland and aquatic habitat may harm, harass, injure, or result in the mortality of GGS. These effects may be aggravated by the initiation of construction activities in the midst of GGS reproductive season. If any dewatering of portions of Morrison Creek is required, this could directly affect GGS through the loss of reproductive, basking, and foraging habitat. Further construction activities, including excavation and movement of large equipment, will remove vegetation cover and basking sites, fill or crush burrows or crevices, and decrease the prey base, and may result in the direct disturbance, displacement, injury, and/or mortality of GGS. Earthwork activities, earth surface modifications, and the staging of equipment and vehicles will temporarily disturb upland habitats and/or obstruct GGS movement. GGS may be killed or injured by construction equipment or other vehicles accessing the project site. Restoration and re-vegetation of the project site would minimize adverse effects resulting from the temporary loss of vegetative cover. The proponents

have proposed a number of conservation measures, such as timing restrictions and worker education programs, which would minimize the effects of the proposed project on GGS.

Indirect effects are caused by or are a result of the proposed action, are later in time, and are reasonably certain to occur. Indirect effects may occur outside the area directly affected by the action. Indirect effects to GGS relative to the proposed project include the temporary displacement and reduction of aquatic prey due to construction activities as well as from increased sedimentation, oils, and other hazardous materials from access roads and staging areas which could wash into drainages. Disturbance from construction activities may also cause GGS to move into and across areas of unsuitable habitat where they may be prone to higher rates of mortality from vehicles and predation.

Vernal Pool Crustaceans

The proposed project will indirectly affect 0.99 acre, and will directly affect 0.14 acre of vernal pool crustacean habitat. Potential direct effects include temporary and permanent construction related impacts to potential habitat and potential take of individuals if the species occurs within the habitat. As currently defined, the proposed project will not impact the vernal pool on the SRCSD Bufferlands, or the seasonal wetlands at Cosumnes River College. However, the proposed project will directly and permanently impact a seasonal wetland (0.14 acre) located southeast of the confluence of Morrison Creek and Union House Creek. If any part of an aquatic feature that represents potential vernal pool crustacean habitat is proposed for impact, the entire feature is considered directly affected. Temporary construction-related impacts to the remaining potential vernal pool crustacean habitat will be avoided.

Habitat indirectly affected includes all habitat supported by destroyed upland areas and swales, and all habitat otherwise damaged by loss of watershed, human intrusion, introduced species, and pollution caused by the proposed project. Pursuant to this, potential vernal pool crustacean habitat that occurs within 250 ft (76 m) of construction activities may be considered indirectly affected.

Project-related activities will occur within 250 ft (76 m) of the remaining seasonal wetland features located southeast of the confluence of Morrison Creek and Union House Creek and the vernal pool within the SRCSD Bufferlands. Although project-related activities will occur within 250 ft (76 m) of the seasonal wetlands at Cosumnes River College, no impacts were assessed for these features. At this location, the proposed project alignment occurs along the north side of Cosumnes River Blvd, until the point where it passes over Cosumnes River Blvd and touches down southeast of the seasonal wetlands along Bruceville Rd.

Cumulative Effects

Cumulative effects include the effects of future State, Tribal, local or private actions that are reasonably certain to occur in the action area considered in this biological opinion. Future Federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of the Act.

Several large projects are occurring or proposed to occur in the Bufferlands (SRCSD 2000, 2003; Jones & Stokes 2003). These include: 10 SRCSD's Lower Northwest Interceptor Project; 2) SRCSD's Sacramento Force Main, which is a portion of the lower Northwest Interceptor Project; 3) SRCSD's Laguna Interceptor Extension Project; 4) the Interstate-5 / Cosumnes River Blvd Interchange Project, which is in the alignment of the South Sacramento Corridor Phase 2 Project; 5) Freeport's Regional Water Project; 6) Sacramento Municipal Utility District's 24-Inch Natural Gas Pipeline Project; 7) the Delta Sores Project; and 8) the Stone Family Trust Project. These various projects will contribute to cumulative losses of habitat for federally-listed species such as the GGS, VELB, and vernal pool crustaceans across their range, particularly in south Sacramento County. While these activities may alter the habitats of the GGS, VELB, and vernal pool crustaceans and can potentially harass, harm, injure, or kill these species, because they have a federal nexus, they will be subject to section 7 consultations, and, therefore, will be conducted in accordance with standard avoidance and minimization measures for listed species.

Giant Garter Snake

Additionally, an undetermined number of future land use conversions and routine agricultural practices are not subject to Federal permitting processes and may alter the habitat or increase incidental take of GGS, and are, therefore cumulative to the proposed project. These additional cumulative effects include: 1) unpredictable fluctuations in aquatic habitat due to water management; 2) dredging and clearing of vegetation from irrigation canals; 3) discing or mowing upland habitat; 4) increased vehicular traffic on access roads adjacent to aquatic habitat; 5) use of burrow fumigants on levees and other potential upland refugia; 6) human intrusion into habitat; 7) diversion of water; 8) rip-rapping or lining of canals and stream banks; and 9) use of plastic erosion control netting (Stuart *et al.* 2001). Specific cumulative effects related to the proposed project include maintenance activities and/or increased potential for vandalism during, and after construction, which may degrade or destroy habitat or cause unpredictable fluctuations in habitat. Furthermore, the valley floor wetlands, which are preferred habitat of the GGS, are subject to the cumulative effects of upstream watershed modifications, water storage and diversion projects, as well as urban and agricultural development. The majority of all natural habitats have been lost and an unquantifiable small percentage of semi-natural wetlands remain extant. Only a small percentage of extant wetlands currently provides habitat suitable for the GGS.

Vernal Pool Crustaceans

Because the vernal pool tadpole shrimp and the vernal pool fairy shrimp are endemic to vernal pools in the Central Valley, coastal ranges, and a limited number of sites in the Transverse Range and Santa Rosa Plateau of California, the Service anticipates that a wide range of activities will affect these species. Such activities include, but are not limited to: 1) urban development; 2) water projects; 3) flood control projects; 4) highway projects; 5) utility projects; 6) chemical contaminants; and 7) conversion of vernal pools to agricultural use. Many of these activities will be reviewed under section 7 of the Act as a result of the Federal nexus provided by section 404 of the Federal Water Pollution Control Act, as amended (Clean Water Act).

The proposed project is located in a region where future destruction of vernal pool crustacean habitat is anticipated. Sacramento County will continue to develop within the county's sphere of influence. This development will result in increased direct loss of vernal pool habitat. Development in the vicinity of the proposed project is expected to result in further destruction of habitat for the listed vernal pool crustaceans. Continued loss of vernal pool habitat throughout the region could conceivably affect the genetic diversity of the local populations of listed vernal pool crustaceans. Any loss of genetic diversity can have significant effects on a population's ability to respond to environmental change over time (Frankel and Soule' 1981).

Conclusion

Analytical Framework for the Jeopardy/No Jeopardy Determination

The following analysis relies on four components to support the jeopardy/no jeopardy determination for the species that may be affected by the proposed project: 1) the *Status of the Species*, which evaluates the species' range-wide condition, the factors responsible for that condition, and its survival and recovery needs; 2) the *Environmental Baseline*, which evaluates the condition of the species in the action area, the factors responsible for that condition, and the role of the action area in the species' survival and recovery; 3) the *Effects of the Action*, which determines the direct and indirect impacts of the proposed Federal action and the effects of any interrelated or interdependent activities on the species; and 4) *Cumulative Effects*, which evaluates the effects of future, non-Federal activities in the action area on the species.
In accordance with the implementing regulations for section 7 and Service policy, the jeopardy/no jeopardy determination is made in the following manner: the effects of the proposed Federal action are evaluated with the aggregate effects of everything that has led to the species' current status and, for non-Federal activities in the action area, those actions likely to affect the species in the future, to determine if, given the aggregate of all of these effects, implementation of the proposed action is likely to cause an appreciable reduction in the likelihood of both the survival and recovery of the species in the wild.

The following analysis places an emphasis on using the range-wide survival and recovery needs of the species and the role of the action area in meeting those needs as the context for evaluating the effects of the proposed Federal action combined with other relevant effects. In short, a non-jeopardy determination is warranted if the proposed action is consistent with maintaining the role of habitat and the species population in the action area for the survival and recovery of the species.

After reviewing the current status of the giant garter snake, the valley elderberry longhorn beetle, the vernal pool tadpole shrimp, and the vernal pool fairy shrimp, the environmental baselines for the action area covered by this biological opinion, the effects of the proposed project, and the cumulative effects, it is the Service's biological opinion that the proposed South Sacramento Corridor Project, as proposed, is not likely to jeopardize the continued existence of these four species. Because no critical habitat has been designated for GGS, none will be affected by the proposed project. The proposed project is not likely to destroy or adversely modify designated critical habitat for the VELB because no critical habitat for this species has been designated or

proposed within the action area of the proposed project. The proposed project is not likely to destroy or adversely modify designated critical habitat for either the vernal pool tadpole shrimp or the vernal pool fairy shrimp because no critical habitat for these species has been designated or proposed within the action area of the proposed project.

INCIDENTAL TAKE STATEMENT

Section 9(a)(1) of the Act and Federal regulation pursuant to section 4(d) of the Act prohibit the take of endangered and threatened fish and wildlife species without special exemption. Take is defined as harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. Harass is defined by the Service as an intentional or negligent act or omission which creates the likelihood of injury to a listed species by annoying it to such an extent as to significantly disrupt normal behavioral patterns which include, but are not limited to, breeding, feeding, or sheltering. Harm is defined by the Service to include significant habitat modification or degradation that results in death or injury to listed species by impairing behavioral patterns including breeding, feeding, or sheltering. Incidental take is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to and not intended as part of the agency action is not considered to be prohibited taking under the Act provided that such taking is in compliance with this Incidental Take Statement.

The measures described below are non-discretionary, and must be implemented by the agency so that they become binding conditions of any grant or permit issued to the applicant, as appropriate, in order for the exemption in section 7(o)(2) to apply. The Sacramento Regional Transit District, acting on the behalf of the Federal Transit Administration, has a continuing duty to regulate the activity covered by this incidental take statement. If the RT (1) fails to adhere to the terms and conditions of the incidental take statement through enforceable terms that are added to the permit or grant document, and/or (2) fails to retain oversight to ensure compliance with these terms and conditions, the protective coverage of section 7(o)(2) may lapse.

Amount or Extent of Take

Giant Garter Snake

The Service anticipates incidental take of GGS will be difficult to detect or quantify for the following reasons:

- GGS are cryptically colored, secretive, and known to be sensitive to human activities.
- GGS avoid detection by retreating to burrows, soil crevices, vegetation, and other cover.
- Individual GGS are difficult to detect unless they are observed, undisturbed, at a distance.

- Most close-range observations represent chance encounters that are difficult to predict.

It is not possible to make an accurate estimate of the number of GGS that would be harassed, harmed, or killed during construction activities, including in staging areas, canal banks, soil borrow areas, and roads carrying vehicular traffic to and from borrow areas. In instances when take is difficult to detect, the Service may estimate take in numbers of species per acre of habitat lost or degraded as a result of the action. Therefore, the Service anticipates that all GGS inhabiting the 0.51 acre of aquatic habitat and 8.85 acres of upland habitat on the proposed project site may be harassed or harmed by loss and destruction of habitat as a result of the project.

Vernal Pool Crustaceans

Construction activities associated with the proposed project will indirectly affect 0.99 acre, and directly affect 0.14 acre of seasonal wetland and result in the take of the vernal pool tadpole shrimp and the vernal pool fairy shrimp. The Service anticipates incidental take of these two listed vernal pool crustaceans will be difficult to detect or quantify for the following reasons:

- The aquatic nature of the organisms and their relatively small body size makes the finding of a dead specimen unlikely.

- Losses may be masked by seasonal fluctuations in numbers and other causes.

- The species occurs in habitat that makes them difficult to detect.

Due to the difficulty in quantifying the number of vernal pool fairy shrimp and vernal pool tadpole shrimp that will be killed as a result of the proposed action, the Service is quantifying take incidental to the project as the number of acres of vernal pool crustacean habitat that will become unsuitable for the listed species due to indirect affects as a result of the proposed project. Therefore, the Service estimates that all vernal pool fairy shrimp and vernal pool tadpole shrimp inhabiting 1.13 acres of vernal pool crustacean habitat will become harassed, harmed, injured, or killed as a result of the proposed project.

Upon implementation of the following reasonable and prudent measures, incidental take associated with the proposed project on the two vernal pool crustaceans in the form of harm, harassment, or death from habitat loss, injury, or direct mortality, and incidental take associated with the proposed project on GGS in the form of harm or harassment from habitat loss, will become exempt from the prohibitions described under section 9 of the Act for direct and indirect effects. The incidental take associated with the proposed project is hereby exempted from prohibitions of take under section 9 of the Act.

Effect of the Take

In the accompanying biological opinion, the Service has determined that this level of anticipated take is not likely to result in jeopardy to the GGS, VELB, the vernal pool tadpole shrimp, and/or

the vernal pool fairy shrimp. No critical habitat has been designated for the GGS; therefore none will be affected. The proposed project is not likely to destroy or adversely modify designated critical habitat for the VELB because no critical habitat for this species has been designated or proposed within the action area of the proposed project. The proposed project is not likely to destroy or adversely modify designated critical habitat for either the vernal pool tadpole shrimp or the vernal pool fairy shrimp because no critical habitat for these species has been designated or proposed within the action area of the proposed project.

Reasonable and Prudent Measures

The Service believes the following reasonable and prudent measures are necessary and appropriate to minimize the effects of take on the listed species that may be affected by the proposed project:

1. Take in the form of harassment and/or harm of the GGS, VELB, and vernal pool crustaceans during construction activities and associated with implementing the project shall be minimized.

2. The permanent and temporary loss and degradation of habitats of the GGS, VELB, and vernal pool crustaceans shall be confined to the proposed project site, and minimized and restored to the greatest extent practicable.

Terms and Conditions

In order to be exempt from the prohibitions of section 9 of the Act, the FTA must ensure compliance with the following terms and conditions, which implement the reasonable and prudent measures described above. These terms and conditions are nondiscretionary.

1. The following terms and conditions implement reasonable and prudent measure number one (1):

    a. The project proponents shall minimize the potential for harm, harassment, and direct mortality of GGS, VELB, and vernal pool crustaceans resulting from project-related activities by implementation of the project, including the conservation measures as described in the original (September 2006) and the revised (November 2007) Biological Assessments (Parsons) and as appearing in the project description of this biological opinion.

    b. The applicants shall include a copy of this biological opinion within its solicitations for design and construction of the proposed project making the primary contractor responsible for implementing all requirements and obligations included within the Bio Op, and to educate and inform all other contractors involved inn the project as to the requirements of the Bio Op. A copy of the solicitations containing the Bio Op also will be provided to the Division Chief,

Endangered Species Program, Valley Branches, at the Sacramento Fish and Wildlife Field Office.

c. At least 30 days prior to initiating construction activities, the project proponents shall submit the names and resumes of the biological monitor(s) for the proposed project for Service approval.

d. A Worker Environmental Awareness Training Program for construction personnel shall be conducted by the Service-approved biologist for all construction workers, including contractors, prior to the commencement of construction activities. The program shall provide workers with information on their responsibilities with regard to GGS, VELB, and vernal pool crustaceans, an overview of the life-history of these species, information on take prohibitions, protections afforded these animals under the Act, and an explanation of the relent terms and conditions of this Bio Op. Written documentation of the training must be submitted to the Service within thirty (30) days of the completion of the training. As needed, training shall be conducted in Spanish for Spanish language speakers.

e. Construction activity within GGS habitat shall be conducted between May 1 and October 1. This is the active period for GGS and direct mortality is lessoned, because snakes are expected actively move and avoid danger. If it appears that construction activity may go beyond October 1, the project proponents shall contact the Service as soon as possible, but not later than September 15 of the year in question, to determine if additional measures are necessary to minimize take. Construction within 200 ft from the banks of GGS aquatic habitat will be avoided during the snake's inactive season (October 2 through April 30).

f. Project construction within 100 ft of elderberry shrubs shall be prohibited during the VELB emergence and mating period (March 15 through June 15) to eliminate any indirect effects of construction on VELB or its eggs. If at the time that construction activities commence for the project, it is found that any elderberry shrubs will be impacted by the proposed project (*i.e.*, a construction schedule change), then the project proponents will be required to reinitiate, and address those impacts.

g. If aquatic habitat for GGS is required to be dewatered then it must be dewatered 15 days prior to the initiation of construction activities. If complete dewatering is not possible, potential GGS prey (*i.e.*, fish, frogs, and tadpoles) will be removed so that snakes and other wildlife are not attracted to the construction area.

h. At most 24-hours prior to the commencement of construction activities, the project site shall be surveyed for GGS by a Service-approved biologist. The biologist will provide the Service with a written report that adequately documents the monitoring efforts within 24-hours of commencement of construction

activities. The project area shall be re-inspected by the monitoring biologist whenever a lapse in construction activity of two weeks or greater has occurred.

i. A Service-approved biologist shall inspect construction-related activities at the proposed project site to ensure that no unauthorized take of federally-listed species or destruction of their habitat occurs. The biologist shall be available for monitoring throughout all phases of construction that may result in adverse affects to GGS, VELB, and vernal pool crustaceans. Furthermore, the biologist shall have the authority through communication with the resident engineer to stop construction activities in the immediate area if a GGS is encountered during construction until appropriate corrective measures have been completed or until the snake is determined to be unharmed. GGS encountered during construction activities shall be allowed to move away from the area on their own volition. The biologist will notify the Service immediately if any listed species are found on-site, and will submit a report, including date(s), location(s), habitat description, and any corrective measures taken to protect the species found. The biologist will be required to report any take of listed species to the Service immediately by telephone at (916) 414-6600 and by electronic mail or written letter addressed to the Division Chief, Endangered Species Program, Valley Branches, within three (3) working days of the incident.

j. Measures consistent with Best Management Practices (BMPs), including Storm Water Pollution Prevention Plan (SWPPP) and Water Pollution Control Program (WPCP), will be implemented to minimize effects to GGS during construction. Best management practices will be implemented to prevent sedimentation from entering ESAs and to reduce erosion, dust, noise, and other deleterious aspects of construction related activities. These BMPs may include, but are not limited to, silt fencing, temporary berms, restrictions on cleaning equipment in or near ESAs, installation of vegetative strips, and temporary sediment disposal. Runoff from dust control and hazardous materials will be retained on the construction site and prevented from flowing into the ESAs.

k. Tightly woven fiber netting or similar material will be used for erosion control and other purposes at the project site to ensure that the GGS does not get trapped or become entangled. This limitation shall be communicated to the contractor through the use of special provisions included in the bid solicitation package.

l. During construction operations, the number of access routes, number and size of staging areas, and the total area of the proposed project activity will be limited to the minimum necessary. Routes and boundaries will be clearly demarcated. Movement of heavy equipment to and from the project site will be restricted to established roadways to minimize habitat disturbance. Project-related vehicles shall observe a 20-mile-per-hour speed limit within construction areas, except on County roads and on State and Federal highways. This is particularly important during periods when GGS may be sunning or moving on roadways. All heavy

equipment, vehicles, and supplies will be stored at the designated staging area at the end of each work period.

m. During construction operations, stockpiling of construction materials, portable equipment, vehicles, and supplies will be restricted to the designated construction staging areas and exclusive of the ESAs. The applicant will ensure contamination of habitat does not occur during such operations. All workers will be informed of the importance of preventing spills and appropriate measures to take should a spill occur.

n. To eliminate an attraction to predators of GGS, all food-related trash items, such as wrappers, cans, bottles, and food scraps, must be disposed of in closed containers and removed at the end of each work day from the entire project site.

o. No application of herbicides, insecticides, and/or other chemical agents shall occur within 100-feet of elderberry plants or where they might drift or wash into the area of any elderberry plants.

p. The FTA will ensure that activities that are inconsistent with the maintenance of the suitability of vernal pool crustacean habitat and the associated on-site watershed are prohibited. These include, but are not limited to: 1) the alteration of existing topography that may alter hydrology into habitat for Federally-listed vernal pool species; 2) the placement of any new structures within suitable habitat; 3) dumping, burning, and/or burying of rubbish, garbage, or any other wastes and fill materials; 4) the placement of stormwater drains; 5) fire protection activities not required to protect existing structures at the proposed project site; and 6) use of pesticides or other toxic chemicals.

q. The project proponent shall require documentation from the contractor that aggregate, fill, or borrow material provided for the proposed project was obtained in compliance with the Act. Evidence of compliance with the Act shall be demonstrated by providing the resident engineer with one of the following: 1) a letter from the Service stating that the use of the borrow pit will not result in the incidental take of listed-species; 2) an incidental take permit for contractor-related activities issued by the Service pursuant to section 10(a)(1)(B) of the Act; 3) a biological opinion or letter concurring with a *Not likely to Adversely Affect* determination issued by the Service to the Federal agency having jurisdiction over contractor-related services; 4) a letter from the Service concurring with the *No Effect* determination for contractor-related activities; or 5) contractor submittal of information to the resident engineer indicating compliance with the State Mining and Reclamation Act (SMARA) and provision of County land use permits and California Environmental Quality Act (CEQA) clearance.

2. The following terms and conditions implement reasonable and prudent measures number two (2):

a. The project proponents shall minimize the potential for harm, harassment, and direct mortality of GGS, VELB, and vernal pool crustaceans resulting from project-related activities by implementation of the project, including the conservation measures as described in the original (September 2006) and the revised (November 2007) Biological Assessments (Parsons) and as appearing in the project description of this biological opinion.

b. Prior to the initiation of construction activities, the project proponent shall conduct a survey to assess the status of existing elderberry shrubs within the project site, if any. If elderberry shrubs are discovered within the project site, then the project proponents shall reinitiate consultation with the Service in order to analyze and assess any possible impacts to VELB regarding the proposed project.

c. The project proponents shall ensure that temporary loss of GGS, VELB, and vernal pool crustacean habitat is confined to the proposed project site.

d. Prior to the commencement of construction activities, high visibility fencing will be erected around the habitats of these federally-listed species to identify and protect these designated ESAs from encroachment of personnel and equipment. These areas will be avoided by all construction personnel. The fencing will be inspected before the start of each work day and maintained by the project proponents until completion of the project. The fencing may be removed only when the construction of the project is completed.

    i. Fencing will be established at least 200 feet from the edge of aquatic GGS habitat.

    ii. Fencing will be established at a minimum setback of 20 feet from the dripline of each elderberry shrub within 100 feet of the proposed project alignment that are not to be removed and transplanted. There will be no physical alterations of any type within the area enclosed by the fencing.

    iii. Fencing will be established at a minimum distance of 50 feet from the edge of the "seasonal wetlands" that are potential habitat for vernal pool crustaceans.

e. Signs will be posted every 50 feet along the edge of the ESAs, with the following information: "This area is habitat of federally-threatened and/or endangered species, and must not be disturbed. These species are protected by the Endangered Species Act of 1973, as amended. Violators are subject to prosecution, fines, and imprisonment." The signs should be clearly readable from a distance of 20 feet, and must be maintained for the duration of construction.

f. A post-construction walkthrough will be conducted to assess whether any damage occurred to vegetation within the buffer areas. Damage may include accidental cutting of vegetation or visible physical damage to roots, stems, and leaves. If damage is observed, vegetation within the buffer areas will be restored with appropriate native plant species. Erosion control measures and exotic weed abatement measures shall be implemented. If unanticipated damage is done to elderberry shrubs, the Service will be notified and appropriate compensation will be implemented.

g. After construction activities are complete, any temporary fill or construction debris will be removed and disturbed area restored to their pre-project conditions. An area subject to "temporary" disturbance includes any area that is disturbed during the project, but that, after project completion, will not be subject to further disturbance and has the potential to be re-vegetated.

   i. As described in the revised BA and the project description of this Bio Op, the project proponents will restore all GGS habitats subject to temporary ground disturbances, including storage and staging areas and temporary roads. This includes 8.39 acres of GGS upland habitat and 0.05 acre of GGS aquatic habitat. These areas shall be re-contoured, if appropriate, and re-vegetated with appropriate locally-collected native plant species to promote restoration of the area to pre-project conditions. Appropriate methods and plant species used to re-vegetate such areas will be determined on a site-specific basis in consultation with the Service and the CDFG. Restoration work may include replanting emergent vegetation. Refer to the Service's *Guidelines for the Restoration and/or Replacement of Giant Garter Snake Habitat*

   (USFWS 1997). A written report shall be submitted to the Service within ten (10) working days of the completion of construction at the project site.

h. The project proponents will maintain and monitor the project site for one (1) year following the completion of construction and restoration activities. Monitoring reports documenting the restoration effort should be submitted to the Service upon the completion of the restoration implantation and one (1) year after the restoration implementation. Monitoring reports should include photo-documentation, when restoration was completed, what materials were used, specified plantings, and justifications of any substitutions to the Service-recommended guidelines.

i. The FTA shall ensure compliance with the reporting requirements.

j. As described in the revised BA (Parsons 2007) and appearing in the project description of this Bio Op, prior to the commencement of construction activities

the project proponent shall compensate for the temporary and permanent loss of habitat of GGS and vernal pool crustaceans, as follows:

i. Prior to the initiation of construction activities, the project proponent will purchase the equivalent of 9.823 acres of GGS habitat credits from a Service-approved conservation bank servicing the area where the proposed project effects occur. This purchase shall compensate for 8.44 acres of temporarily affected GGS habitat and 1.383 acres of permanently affected GGS habitat. All temporary effects will be compensated at a 1:1 ratio, and all permanent effects will be compensated at a 3:1 ratio.

ii. Prior to the initiation of construction activities, the project proponents will compensate for impacts to vernal pool crustacean habitat by the proposed project through the purchase of the equivalent of 2.26 acres of preservation credits, and 0.14 acre of creation/restoration credits from a Service-approved conservation bank, or combination of banks, servicing the area where the proposed project effects occur. If a conservation bank can not be found that offers creation/restoration credits servicing the area that includes the proposed project, then, with Service approval, the project proponents may be allowed to purchase the creation/restoration credits from a conservation bank that's service area does not include the proposed project. In the choice of conservation bank from which the project proponents purchase credits, priority should be given to the closest banks to the proposed project.

Reporting Requirements

Any contractor or employee who, during routine operations and maintenance activities, inadvertently kills or injures a listed species of wildlife must immediately report the incident to their representative. The Service is to be notified within one (1) working day of the finding of any dead or injured listed wildlife species or any unanticipated take of the species addressed in this biological opinion. Injured giant garter snakes shall be treated and cared for by a licensed veterinarian or other qualified person. The Service contact persons are the Division Chief, Valley Branches, Endangered Species Program at (916) 414-6620 and the Resident Agent-in-charge at (916) 414-6660. Any killed snakes that have been taken shall be properly preserved in accordance with the Natural History Museum of Los Angeles County policy of accessioning (i.e., 10% formalin in a quart jar or freezing). Preserved specimens shall be delivered to the Service's Law Enforcement Office at 2800 Cottage Way, W-2605, Sacramento, California, 95825-1846.

The Service-approved biologist shall notify the Service within one (1) working day if any listed species are found on site, and shall submit a report including the date(s), location(s), habitat description, and any corrective measures taken to protect the species found. The Service-approved biologist shall submit locality information to the CDFG, using completed California Native Species Field Survey Forms, no more than 30 calendar days after completing the last field visit of the project site. Each form shall have an accompanying scale map of the site, such as a

photocopy of a portion of the appropriate 7.5-minute U.S. Geological Survey map and shall provide at least the following information: township, range, and quarter section; name of the 7.5-minute quadrangle; dates (day, month, year) of field work; number of individuals and life stage, where appropriate, encountered; and a description of the habitat by community-vegetation type. The Service-approved biologist shall also provide a high quality copy of this information to the California Fish and Game, 1807 13th Street, Sacramento, California, 95814, phone (916) 445-0045.

The Sacramento Fish and Wildlife Field Office is to be notified within one (1) working day of the finding of any dead or injured listed wildlife species or any unanticipated take of the species addressed in this biological opinion. Any other federally listed or candidate species found on or adjacent to the project area must be reported within three (3) working days of its finding. The Service contact person for this is the Division Chief, Valley Branches, Endangered Species Program at (916) 414-6620. Any dead or severely injured VELB found (adult, pupae, or larvae) shall be deposited in the Entomology Department of the California Academy of Sciences. The Academy's contact is the Senior Curator of Coleoptera at (415) 750-7239. All observations of VELB, live, injured, or dead, or fresh beetle exit holes shall be recorded on California Natural Diversity Data Base (CNDDB) field sheets and sent to CDFG, Wildlife Habitat Data Analysis Branch, 1416 Ninth Street, Sacramento, CA 95814.

The project proponents shall submit a post-construction compliance report prepared by the monitoring biologists to the Sacramento Fish and Wildlife Field Office within thirty (30) calendar days of the completion of construction activity. This report shall detail the following: 1) dates that construction occurred; 2) pertinent information concerning the success of the project in meeting conservation measures; 3) an explanation of failure to meet such measures, if any, and recommendations fir remedial actions and request for approval from the Service, if necessary; 4) known project effects on any of the species addressed in this biological opinion, if any; 5) occurrence of incidental take of any of the species addressed in this biological opinion, if any; and 6) other pertinent information.

CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the Act directs Federal agencies to utilize their authorities to further the purpose of the Act by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities that can be implemented to further the purposes of the Act, such as preservation of endangered species habitat, implementation of recovery actions, or development of information and data bases.

1. The FTA should work with the Service to address significant, unavoidable environmental effects resulting from projects proposed by non-Federal parties.

2. The FTA should assist the Service in implementing the draft, and, when completed, the final Recovery Plan for the giant garter snake.

3. The FTA should assist the Service in the implementation of recovery efforts for the valley elderberry longhorn beetle.

4. The FTA should assist the Service in the implementation of the *Recovery Plan for Vernal Pool Ecosystems of California and Southern Oregon.*

5. The FTA, in partnership with the Service, should develop maintenance guidelines for FTA projects that will reduce adverse effects of routine maintenance on listed species and their habitats. Such action may contribute to the recovery and delisting of these species by preventing degradation of existing habitat and increasing the amount and stability of suitable habitat.

In order for the Service to be kept informed of actions minimizing or avoiding effects or benefiting listed species or their habitats, the Service requests notification of the implementation of any conservation recommendations.

REINITIATION-CLOSING STATEMENT

This concludes formal consultation on the proposed South Sacramento Corridor Phase 2 Project in Sacramento County, California. As provided in 50 CFR § 402.16, reinitiation of formal consultation is required where discretionary Federal agency involvement or control over the action has been maintained (or is authorized by law) and if: 1) the amount or extent of incidental take is exceeded; 2) new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered in this opinion; 3) the agency action is subsequently modified in a manner that causes an effect to the listed species or critical habitat that was not considered in this opinion; or 4) a new species is listed or critical habitat designated that may be affected by the action. In instances where the amount or extent of incidental take is exceeded, any operations causing such take must cease pending reinitiation.

If you have any questions regarding this biological opinion on the proposed South Sacramento Corridor Phase 2 Project, please contact Richard Montgomery or the Chief, Sacramento Valley Branch, at the letterhead address or at telephone 916/414-6630.

Sincerely,

Peter A. Cross

Kenneth D. Sanchez
Acting Field Supervisor

cc:
Elizabeth Hughes, Parsons Corporation
Diane Nakano, Sacramento Regional Transit District
Adam Ballard, ECORP Consulting, Inc.

Enclosures:
Selected Review criteria for Conservation Banks and Section 7 Offsite Compensation.
GIS Metadata Form

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Selected Review Criteria for
Conservation Banks and Section 7 Off Site Compensation
Rev. April 11, 2006

This list is not a comprehensive list, but gives a substantial number of the basic considerations and requirements necessary to establish protection for properties designated as compensation for project impacts.

In many instances, 'Service-approval,' as stated below, may be replaced with 'Agency-approval,' where other government agencies are involved, such as in Conservation Banking (eg. USACE, CDFG, EPA).

Property Assurances and Conservation Easement

Title Report (Preliminary at proposal, and Final Title Insurance at recordation)

1. Who holds fee title to property? Should be Bank Owner/Project Applicant. If not, there may be liability and contracting issues.
2. Are there any liens or encumbrances (existing debts or easements) on the property?
    a. Review necessary supporting instruments to evaluate liens and encumbrances. Property owner should submit a "Property Assessment and Warranty" which discusses each and every exception listed on the Preliminary and Final Title Insurance Policies, evaluating any potential impacts to the conservation values that could result from the exceptions (see below).
3. Could any of these liens or encumbrances potentially interfere with either biological/habitat values or ownership? If existing easements can potentially interfere with the conservation values/habitat of the property, those portions of the land should be removed from the Conservation Easement (CE), and deducted from the total number of credits or acres attributed to the site.
4. A Subordination Agreement is necessary if there is any outstanding debt on the property. Review Subordination Agreement for adequacy – the lending bank or other lien holder must agree to fully subordinate to each lien or encumbrance.

Legal Description and Parcel Map

1. Ensure accuracy of map, location and acreage protected under CE.
2. Both the map and the legal description should explain the boundaries of the Bank and/or boundaries of each individual Bank phase or individual project compensation sites. Individual project compensation sites should *not* have "leftover" areas for later use.

Conservation Easement

1. Should use current USFWS CE template;
2. Who will hold the easement?
    a. Must have third-party oversight by a qualified non-profit or government agency. Qualifications include:
        i. Organized under IRC 501(c)(3),

ii. Qualified under CA Civil Code § 815
iii. Bylaws, Articles of Incorporation, and biographies of Board of Directors on file at, and approved by, USFWS
1. Must meet requirements of USFWS, including 51% disinterested parties on the Board of Directors

3. If not using the USFWS template, applicant should specify objections they have to the template as provided, and may substantially delay processing as they will require Solicitor review. Alternate CE's must be approved by the USFWS prior to recording.
4. Other (non-template) CE's should include, at a minimum, language to:
   a. **USFWS *must* be third-party beneficiary** or add language throughout the document in all appropriate places that will assure USFWS the right to enforce, inspect, and approve any and all uses and/or changes under the CE prior to occurrence (including land use, biological management or ownership). The alternative of adding language is difficult because we are not signatories to the CE, so you should make sure it is done through the Solicitor's Office.
   b. Reserve all mineral, air and water rights under CE as necessary to maintain and operate the Bank in perpetuity [USFWS § 2(D)]
   c. Ensure all future development rights are forfeited.
   d. Ensure all prohibited uses contained in USFWS CE template are addressed.
   e. Link the CE, the Management Plan, and the Endowment Trust fund within the document (e.g. note that each exists to support the others, and where each of the documents can be located if a copy is required).
5. There are probably many more specific concerns – should compare the content of each of the sections of the current USFWS CE to see where discrepancies lie, and to insert necessary language, particularly, but not exclusively, per:
   a. Rights of Grantee
   b. Remedies
   c. Injunctive Relief
   d. Enforcement Discretion
   e. Costs and Liabilities
   f. Taxes
   g. Hold Harmless
   h. No Hazardous Materials Liability
   i. Assignment and Transfer
   j. Amendment
   k. Funding
   l. Warranty
   m. Additional Interests

<u>Property Assessment and Warranty</u>

1. A summary and full explanation of all exceptions remaining on the title must be included, with a statement that the owner/Grantor accepts responsibility for all lands being placed under this CE as available for the primary purposes of

the easement, as stated in the easement, and assures that these lands have a free and clear title and are available to be placed under the CE.

Environmental Site Assessment – Phase I

1. Check for clear report
2. If there are issues – a proposal to address the issues should be included; remediation may be necessary

Service Area

1. Service Area for a Conservation Bank is based upon biological criteria, and must be approved by USFWS.
2. Documents should then include a map designating the proposed/approved Service Area, and a text description of the same area.

Restoration or Development Plan

1. Full plans for any habitat construction *must* be USFWS-*approved*, and all permits in place, ***prior*** to the start of construction of the habitat

Management Plan

1. Must be reviewed and approved by the USFWS for each individual Bank, or individual mitigation project, for target species baseline, adequacy of management and monitoring, and reporting requirements and schedules in perpetuity, etc.
2. Management Plan should also describe funding mechanisms, schedule, and reporting for the long term funding of the property
3. Appendices should include biological surveys, wetland delineation and USACE verification letter, and any required permitting information
4. A copy of the final Management Plan must be either recorded with the CE, or the CE must state in its body that the current management plan can be obtained upon request from any signatory wildlife agency.

Economic Analysis

1. Must be based upon the *final, approved* management plan.
2. Must include provision to adjust for CPI annually.
3. Must be based on appropriate, attainable, long-term interest rate.
4. Must address/account for all of the required funds (as below).

Performance Security, Contingency Security and Endowment Fund

All funds must be held, managed, accessed, expended and released according to agency-approved methods and procedures. There are a variety of requirements for each fund. Following is a general overview:

1. All funds must be held by qualified, Service-approved, non-profit organization or government agency [see requirements under CE, §2(a), above]
2. A full description of the trust account and investment methods must be agency-approved. All funds must be held according to minimum standards for assuring

maximum success in earning potential, and with assurances for no loss of principal

3. Disbursements or releases from each of the funds must be for documented expenditures, as they occur
4. A full economic analysis must be included to demonstrate how each of the required funding amounts was determined. This analysis must be approved by the agencies as being full, complete and adequate
5. A schedule and plan (including target date and full amount on that date) for funding each of the accounts must be submitted for approval

Agreement Contract

This would include a "Conservation Bank Agreement," "Bank Enabling Instrument," or other consolidating agreement that ties all of the associated documents together. Some general, basic (certainly not all-inclusive) concerns to include are:

1. Conservation Easement must be approved by any agencies involved prior to recording, and a recorded copy must be submitted to the agencies prior to the compensation taking effect in any way.
2. For an individual site, each of the primary documents – the CE, management plan and endowment trust – must reference the other two documents to link them together to fully address the compensation.
3. If not a Conservation Bank, individual project compensation should be addressed fully (within or by each document) as individual projects.
4. Responsible party (property owner) must be identified (and a valid party to the contract) as responsible for all funding, management, monitoring, and reporting of Bank or Compensation Site, in perpetuity.
5. Transfer and Assignment of property should be according to §9.0 of USFWS Bank Agreement template, or approved by USFWS
6. Any agreement must include remedies for any disputes per §10.0 of the USFWS Conservation Bank Agreement.
7. Applications for individual compensation sites must not include any "leftover" pre-approved acreages for future projects. Any future projects must be addressed individually.

Sacramento Fish and Wildlife Office
Metadata Form

USFWS File Number 81420-2008-F-_____

Reference Number from Letter _____

Project Title: _____
Descriptive title with project name (Ninth Hole Project boundary).

Information Originator: _____
Who is creating the data (Contractor's name, company name, address, phone number, email address).

Purpose: _____
For whom or what project is the data being created (i.e. applicant).

Information Creation Date: _____ Date or dates.

Data Status: _____ Complete / To be updated.

Process Step: _____
How was the data created or collected? What is the estimated positional accuracy and what is accuracy based on? (GPS, Aerial photo resolution, etc.)

File Format: _____ Shape file, TFW, etc.

Projection and Datum: _____ UTM Zone 10 or 11, NAD83

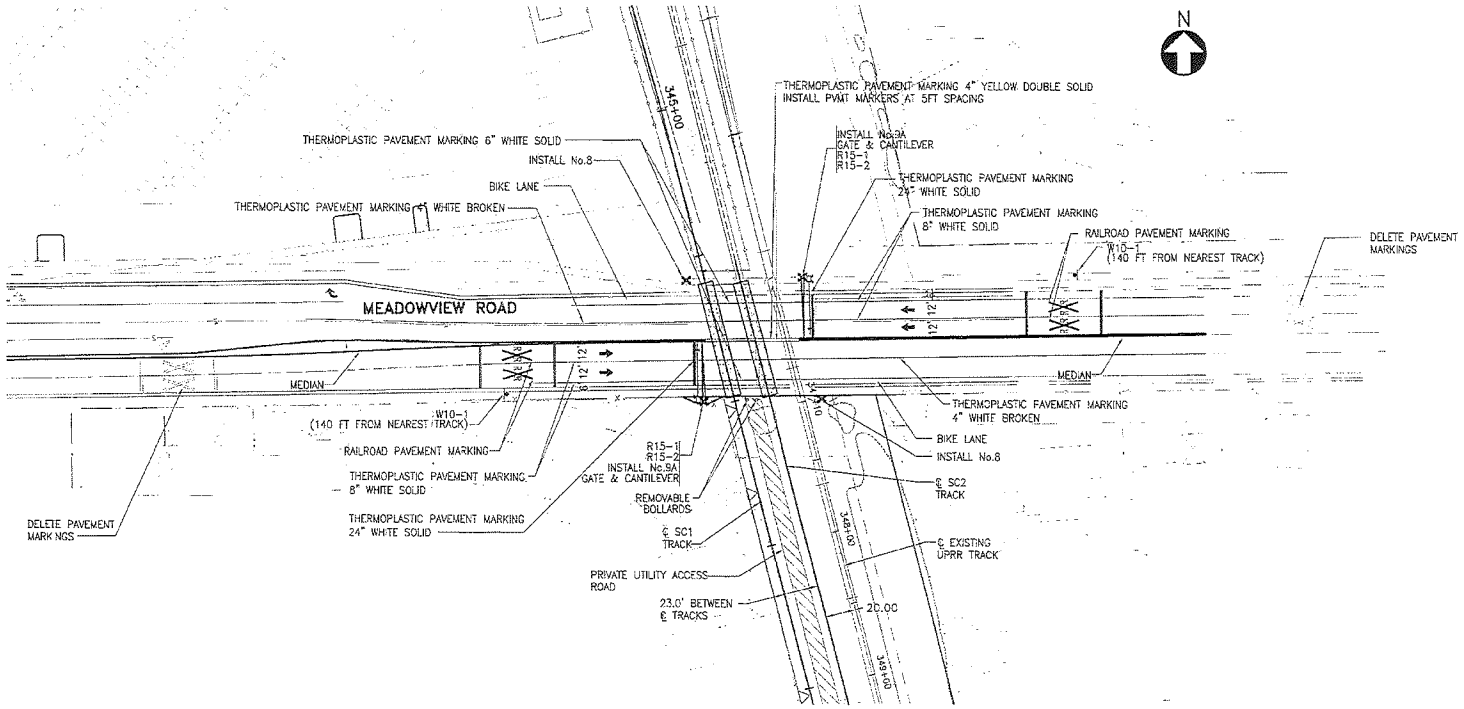
Attribute Information: _____
Information (If applicable): Data dictionary for any attribute definitions.

Data Provided In: _____ Email, CD, DVD

Metadata guidelines may be accessed at www.fgdc.gov

APPENDIX K:

Grade Crossings



PLAN
1"=40'

NOTES:

1. ELEVATIONS AND STATIONING ARE IN FEET.
2. NO PARKING WILL BE ALLOWED WITHIN 150' OF THE APPROACH OF THE TRACKS
3. ALL GRADE CROSSING WARNING DEVICES SHALL BE PER CURRENT CALIFORNIA MUTCD.
4. ALL VISUAL OBSTRUCTIONS (TREES, SIGNS, ETC.) TO ANY WARNING DEVICES SHALL BE REMOVED AND/OR TRIMMED AS NECESSARY.
5. ALL GATES SHALL BE SET BACK 12 FT MINIMUM FROM THE CENTERLINE OF THE NEAREST TRACK.
6. THE STOP BAR (LIMIT LINE) SHALL BE SET BACK 8 FT MIN. BEHIND THE GATE.
7. THE SPACING BETWEEN THE CANTILEVER AND THE GATE ARM SHALL BE 5 FT MIN.

LEGEND

CROSSING SIGNAL ASSEMBLY (No.8)

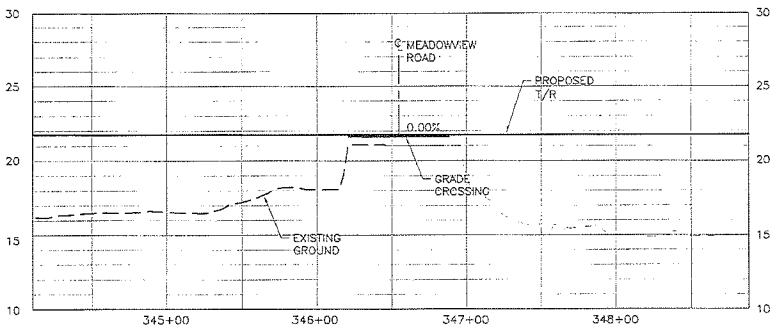
CROSSING GATE ARM WITH LIGHTS AND BELLS (No.9)

CANTILEVER STRUCTURE WITH LIGHTS (No.9A)

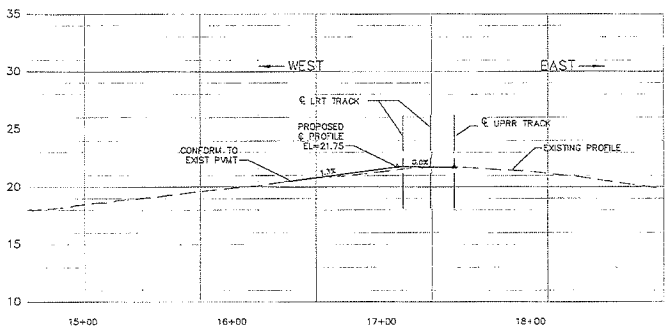
RAIL CROSSING ROAD — R15-1

R R — W10-1

3 TRACKS — R15-2



TOP OF RAIL PROFILE



TOP OF PAVING PROFILE

REVISIONS				
MARK	DATE	DESCRIPTION	BY	CHKD
△				
△				
△				
△				

SCALE: VERTICAL: 1"=4'
HORIZONTAL: 1"=40'
ORIGINAL SCALE IN INCHES FOR REDUCED PLAN
0 1 2 3

	REG. NO.	DATE
PROJECT ENGINEER: B. WRIGHT	C59331	4/25/08
DESIGNED BY: L. ROS		4/25/08
DRAWN BY: N. JARRELL & C. CUSTER		4/25/08
CHECKED BY: T. HAYES		4/25/08

PSOMAS
2295 Gateway Oaks Drive Suite 250
Sacramento, CA 95833
(916) 929-7100 (916) 929-6388 (FAX)

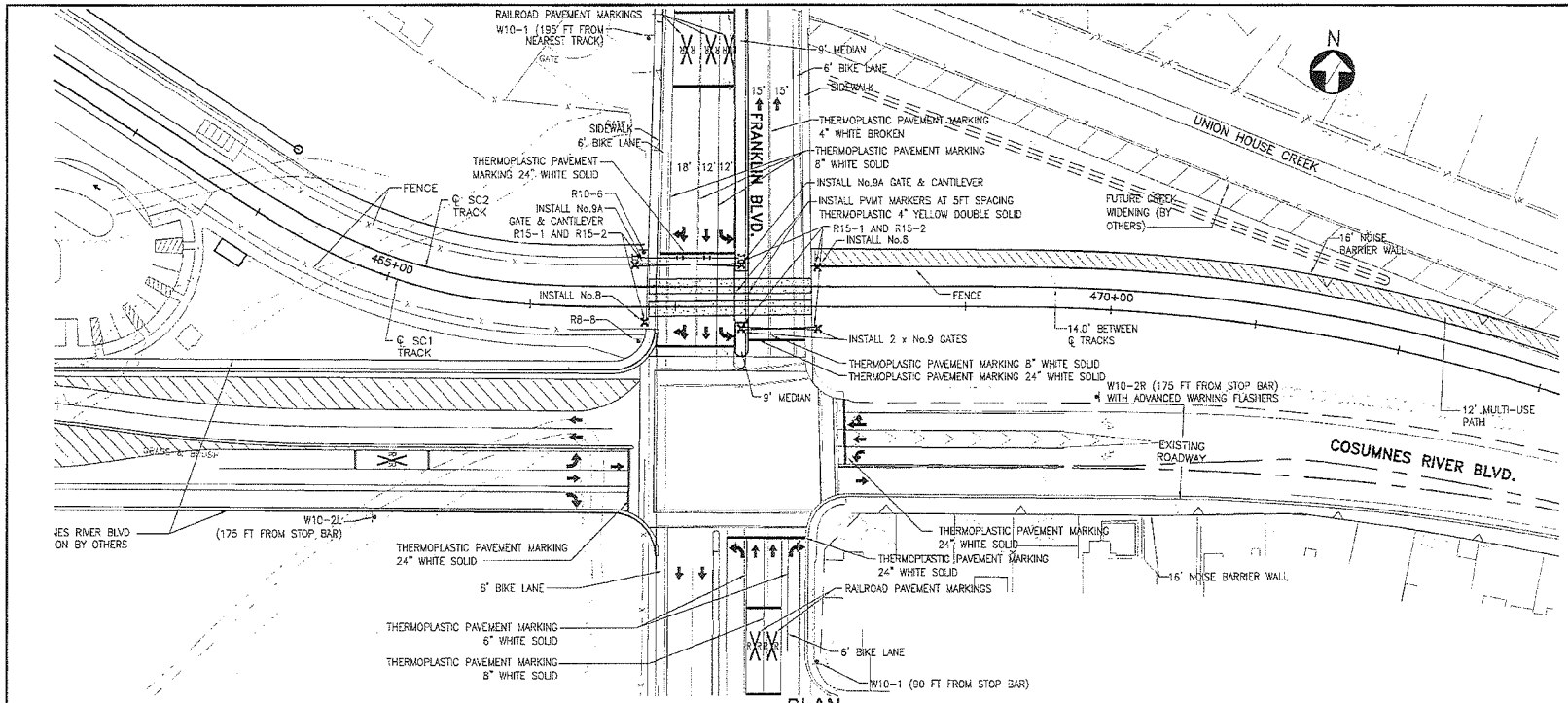
CI:
FILE: P-01.dwg
DWG#:
4/25/08

Regional Transit

SOUTH SACRAMENTO CORRIDOR PHASE 2 PROJECT
PRELIMINARY ENGINEERING

AT-GRADE CROSSING PLAN
MEADOWVIEW ROAD

P101
SHEET



PLAN
1"=40'

NOTES:

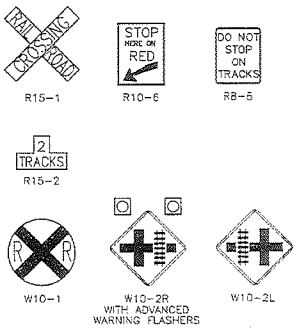
1. ELEVATIONS AND STATIONING ARE IN FEET.
2. NO PARKING WILL BE ALLOWED WITHIN 150' OF THE APPROACH OF THE TRACKS.
3. ALL GRADE CROSSING WARNING DEVICES SHALL BE PER CURRENT CALIFORNIA MUTCD.
4. ALL VISUAL OBSTRUCTIONS (TREES, SIGNS, ETC.) TO ANY WARNING DEVICES SHALL BE REMOVED AND/OR TRIMMED AS NECESSARY.
5. ALL MEDIANS WITH CROSSING GATES SHALL BE A MINIMUM OF 8.5' IN WIDTH.
6. ALL GATES SHALL BE SET BACK 12 FT MINIMUM FROM THE CENTERLINE OF THE NEAREST TRACK.
7. THE STOP BAR (LIMIT LINE) SHALL BE SET BACK 8 FT MIN. BEHIND THE GATE.
8. THE SPACING BETWEEN THE CANTILEVER AND THE GATE ARM SHALL BE 6 FT MIN.

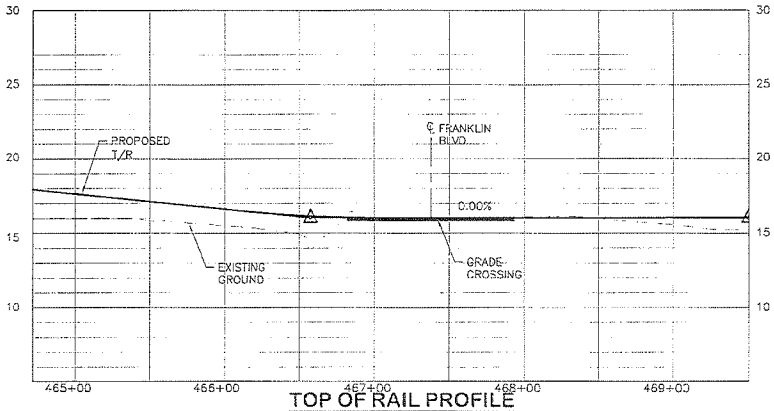
LEGEND

CROSSING SIGNAL ASSEMBLY (No.8)

CROSSING GATE ARM WITH LIGHTS AND BELLS (No.9)

CANTILEVER STRUCTURE WITH LIGHTS (No.9A)





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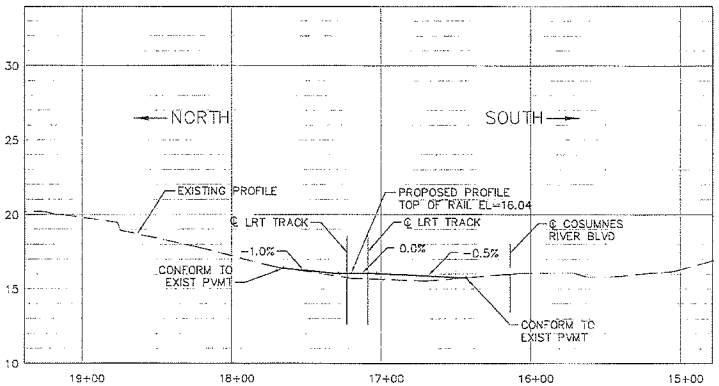

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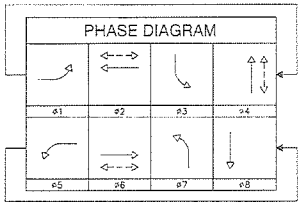

REVISIONS				
MARK	DATE	DESCRIPTION	BY	CHKD

SCALE: VERTICAL: 1"=4'
HORIZONTAL: 1"=40'
ORIGINAL SCALE IN INCHES FOR REDUCED PLAN
0 1 2 3

PROJECT ENGINEER:	B. WRIGHT	REG. NO. C5633	DATE 4/25/08
DESIGNED BY:	L. ROS		4/25/08
DRAWN BY:	N. JARRELL & C. CUSTER		4/25/08
CHECKED BY:	T. HAYES		4/25/08

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Sacramento CA 95833
(916) 929-7100 (916) 929-6380 (FAX)

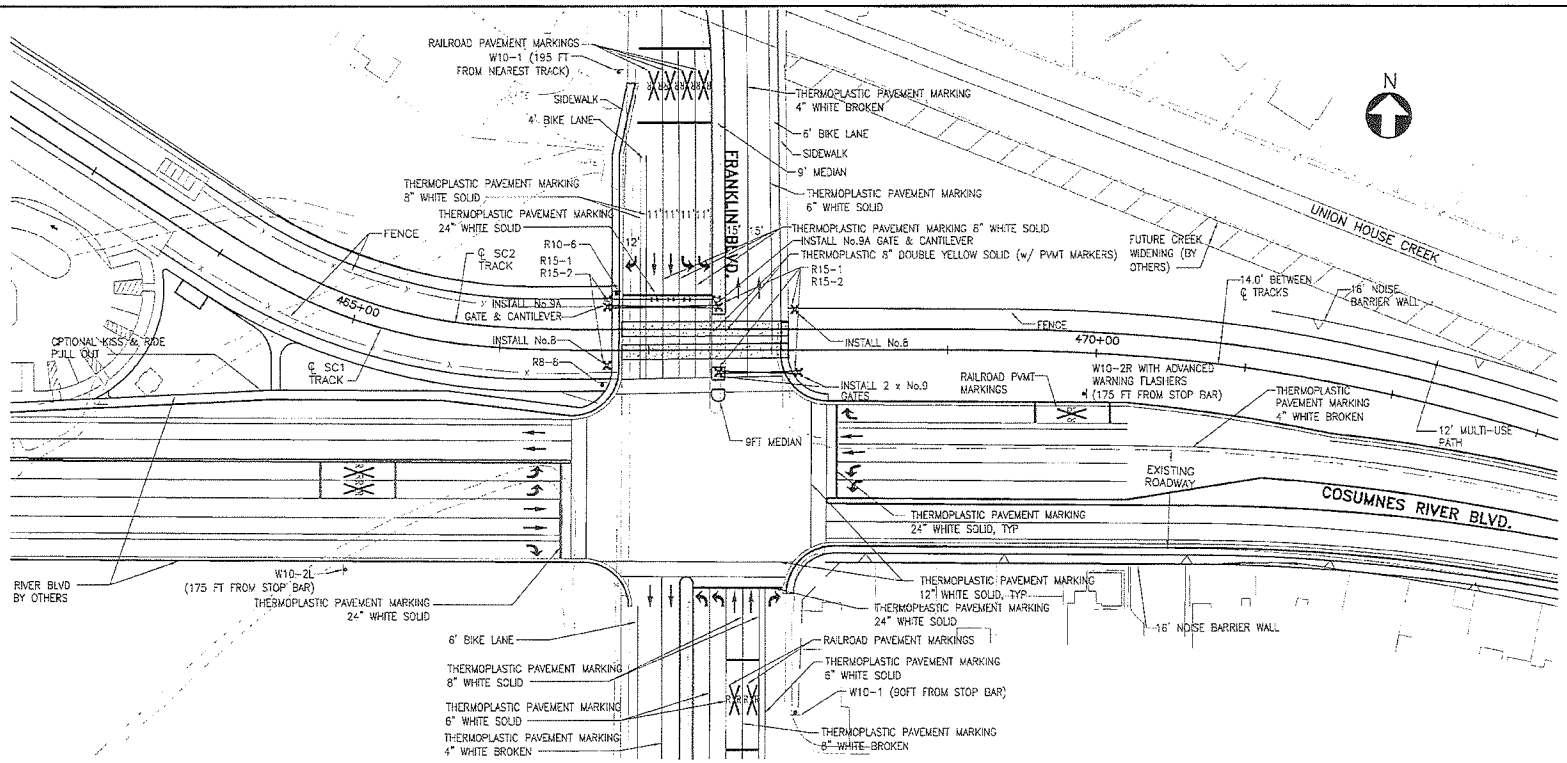
CI:	
FILE:	P-02.dwg
DWG#:	
	4/25/08

Regional Transit

SOUTH SACRAMENTO CORRIDOR PHASE 2 PROJECT
PRELIMINARY ENGINEERING

AT-GRADE CROSSING PLAN
FRANKLIN BLVD

P102
SHEET



PLAN
1" = 40'

NOTES:

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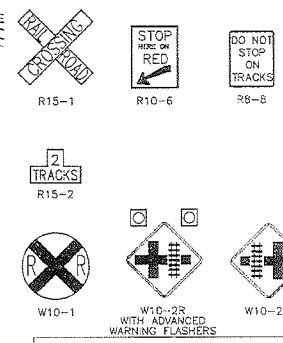
8. THE SPACING BETWEEN THE CANTILEVER AND THE GATE ARM SHALL BE 6 FT MIN.

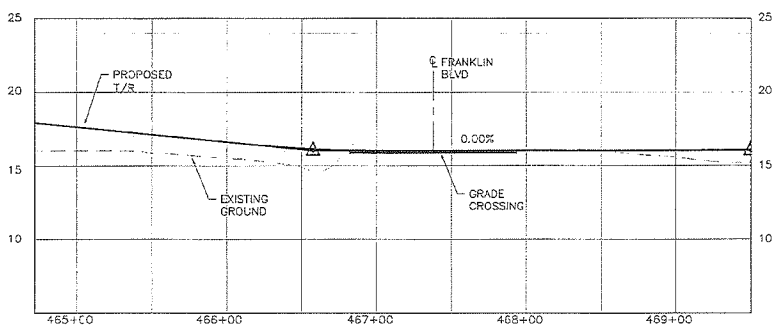
LEGEND

CROSSING SIGNAL ASSEMBLY (No.8)

CROSSING GATE ARM WITH LIGHTS AND BELLS (No.9)

CANTILEVER STRUCTURE WITH LIGHTS (No.9A)





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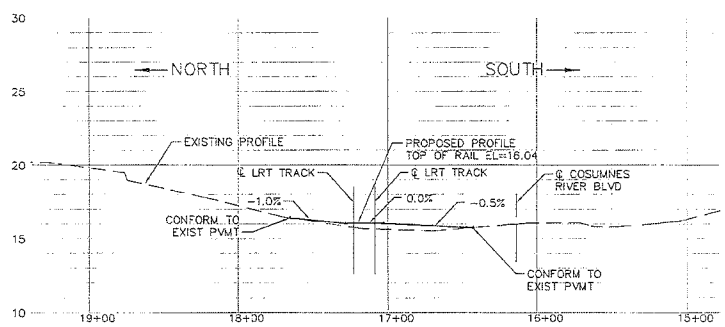

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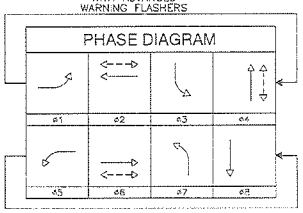

REVISIONS				
MARK	DATE	DESCRIPTION	BY	CHKD
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△				
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△				

SCALE: VERTICAL: 1"=4'
HORIZONTAL: 1"=40'
ORIGINAL SCALE IN INCHES FOR REDUCED PLAN
0 1 2 3

		REG. NO.	DATE
PROJECT ENGINEER:	H. WRIGHT	C59331	4/25/08
DESIGNED BY:	L. ROS		4/25/08
DRAWN BY:	N. JARRELL & C. CUSTER		4/25/08
CHECKED BY:	T. HAYES		4/25/08

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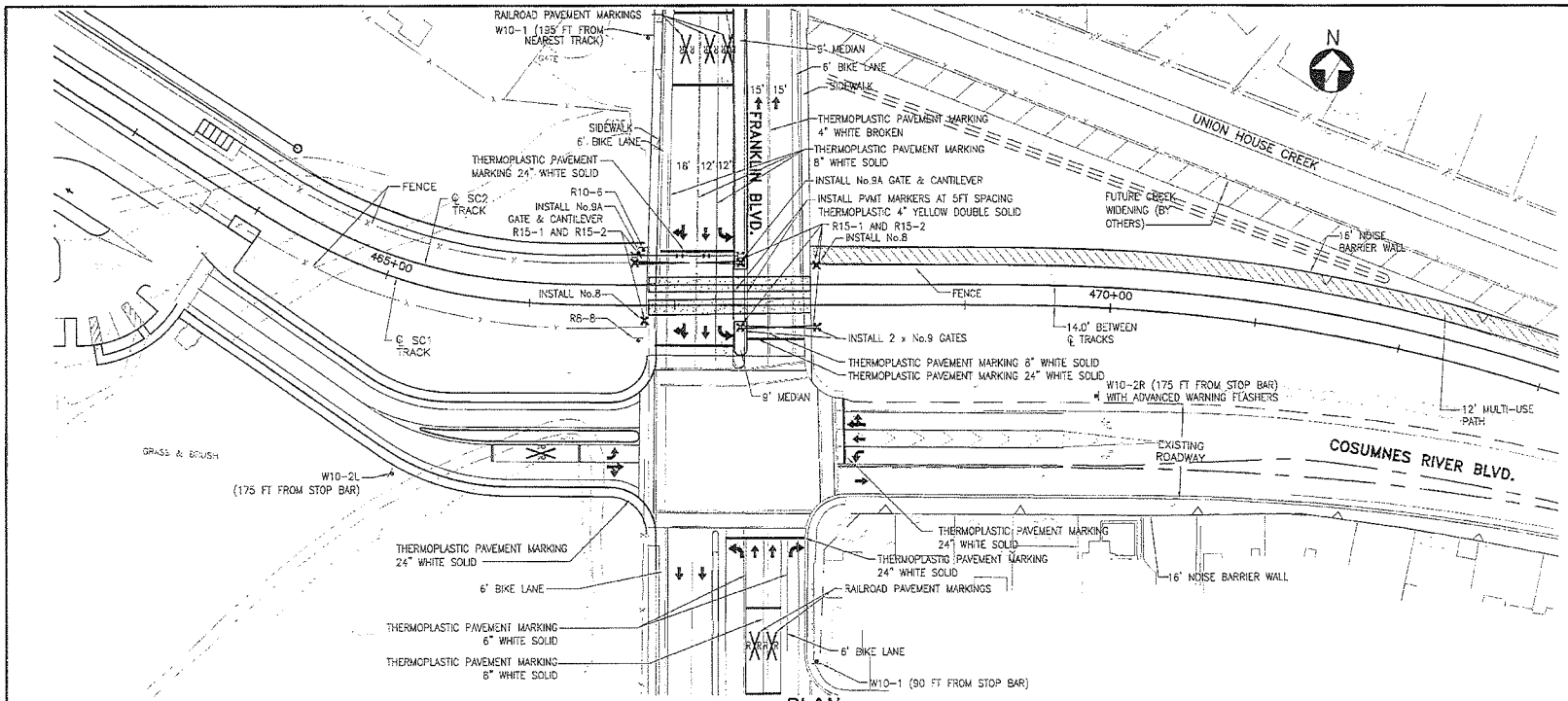
CI:
FILE: P-02a.dwg
DWG#:
4/25/08

Regional Transit

SOUTH SACRAMENTO CORRIDOR PHASE 2 PROJECT
PRELIMINARY ENGINEERING

AT-GRADE CROSSING PLAN
FRANKLIN BLVD - FUTURE

P102a
SHEET



PLAN
1"=40'

NOTES:

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2. NO PARKING WILL BE ALLOWED WITHIN 150' OF THE APPROACH OF THE TRACKS.
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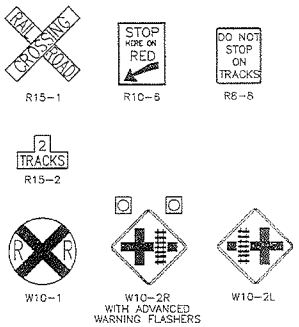
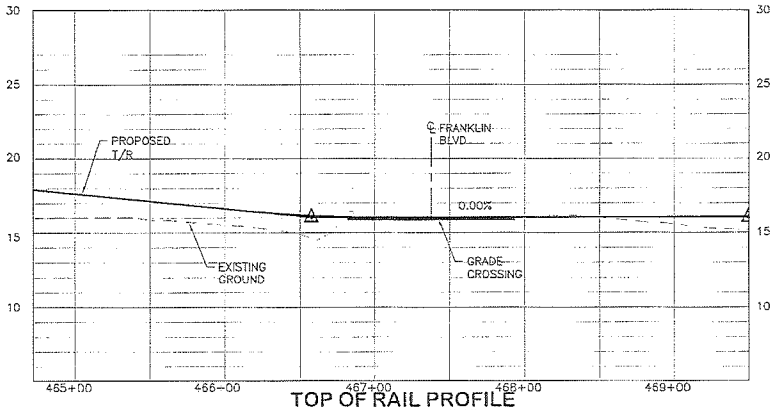
LEGEND

CROSSING SIGNAL ASSEMBLY (No.8)

CROSSING GATE ARM WITH LIGHTS AND BELLS (No.9)

CANTILEVER STRUCTURE WITH LIGHTS (No.9A)





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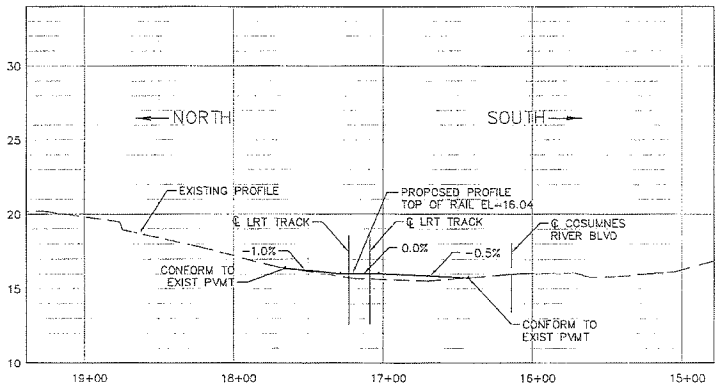

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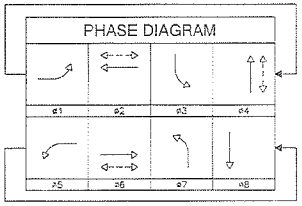

REVISIONS				
MARK	DATE	DESCRIPTION	BY	CHKD
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△				

SCALE: VERTICAL: 1"=4'
HORIZONTAL: 1"=40'
ORIGINAL SCALE IN INCHES FOR REDUCED PLAN
0 1 2 3

		REG. NO.	DATE
PROJECT ENGINEER:	S. WRIGHT	C59331	4/25/08
DESIGNED BY:	L. ROS		4/25/08
DRAWN BY:	N. JARRELL & C. CUSTER		4/25/08
CHECKED BY:	T. HAYES		4/25/08

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Sacramento, CA 95833
(916) 929-7100 (916) 929-6380 (FAX)

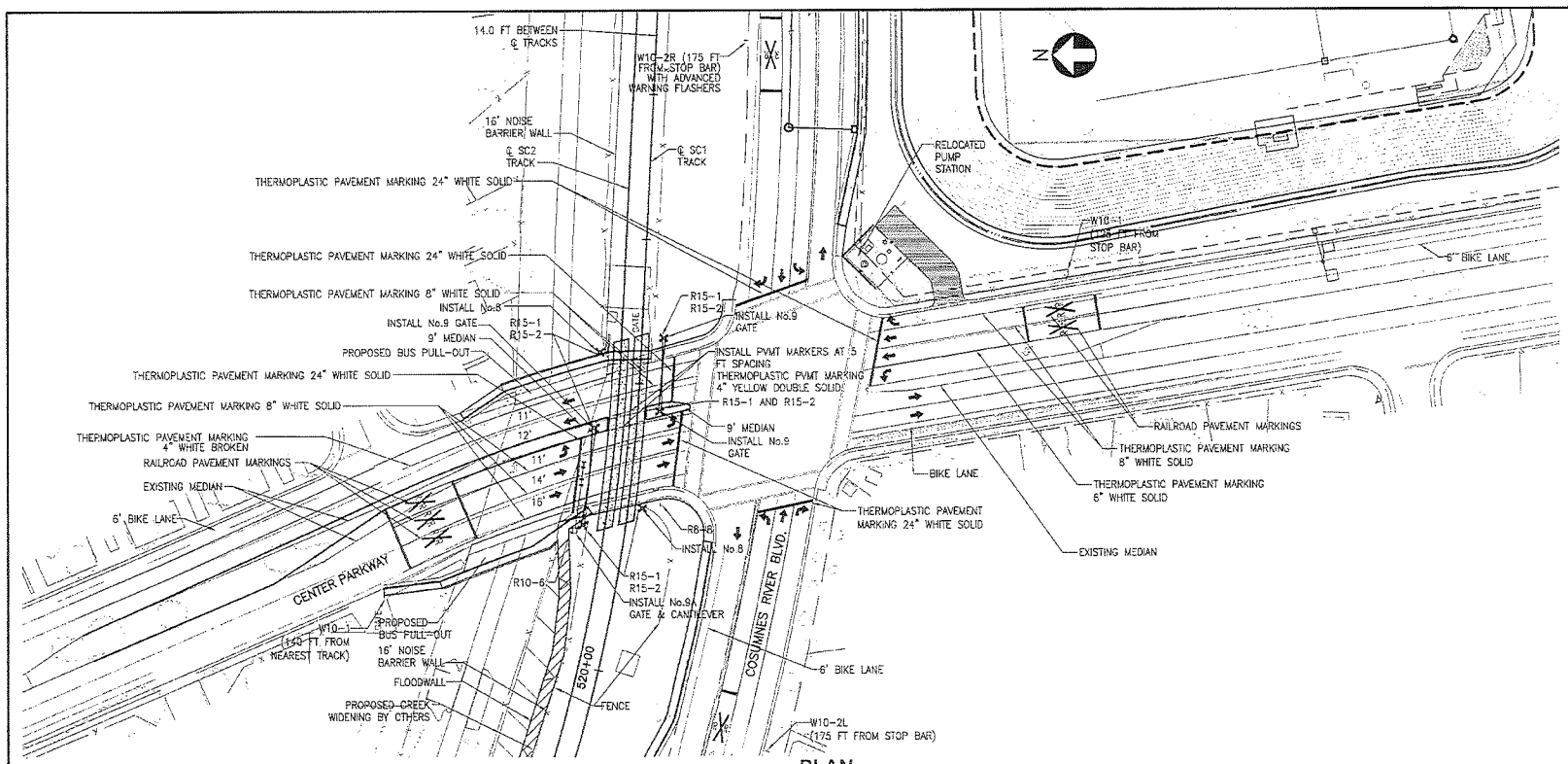
CI:
FILE: P-02.dwg
DWG#:
4/25/08

Regional Transit

SOUTH SACRAMENTO CORRIDOR PHASE 2 PROJECT
PRELIMINARY ENGINEERING

AT-GRADE CROSSING PLAN
FRANKLIN BLVD

SHEET P102b



PLAN
1"=40'

NOTES:

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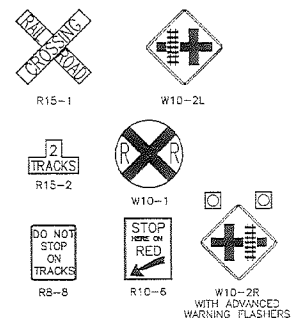
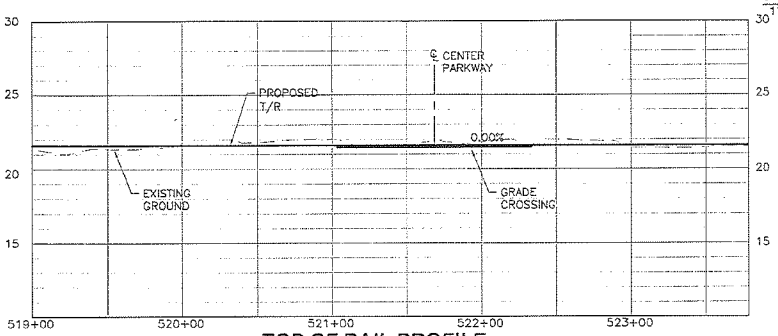
LEGEND

- CROSSING SIGNAL ASSEMBLY (No.8)
- CROSSING GATE ARM WITH LIGHTS AND BELLS (No.9)
- CANTILEVER STRUCTURE WITH LIGHTS (No.9A)





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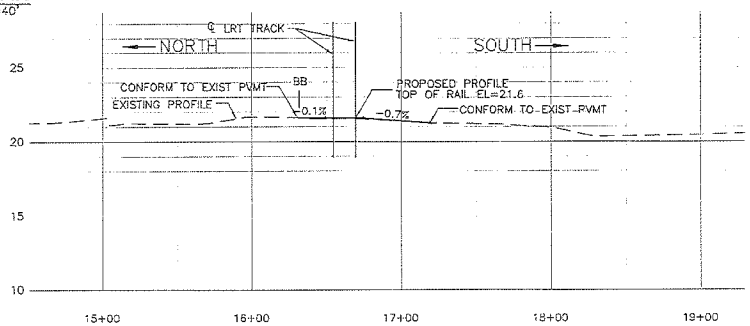

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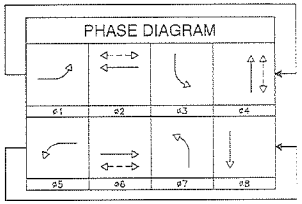

REVISIONS				
MARK	DATE	DESCRIPTION	BY	CHKD
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SCALE: VERTICAL: 1"=4'
HORIZONTAL: 1"=40'

ORIGINAL SCALE IN INCHES FOR REDUCED PLAN
0 1 2 3

		REG. NO.	DATE
PROJECT ENGINEER:	B. WRIGHT	C59331	4/25/08
DESIGNED BY:	L. ROS		4/25/08
DRAWN BY:	N. JARRELL & C. CUSTER		4/25/08
CHECKED BY:	T. HAYES		4/25/08

PSOMAS
2295 Gateway Oaks Drive Suite 250
Sacramento, CA 95833
(916) 929-7100 (916) 929-6380 (FAX)

REGISTERED PROFESSIONAL ENGINEER BRIAN C. WRIGHT No. C59331 Exp. 6-30-09 CIVIL STATE OF CALIFORNIA

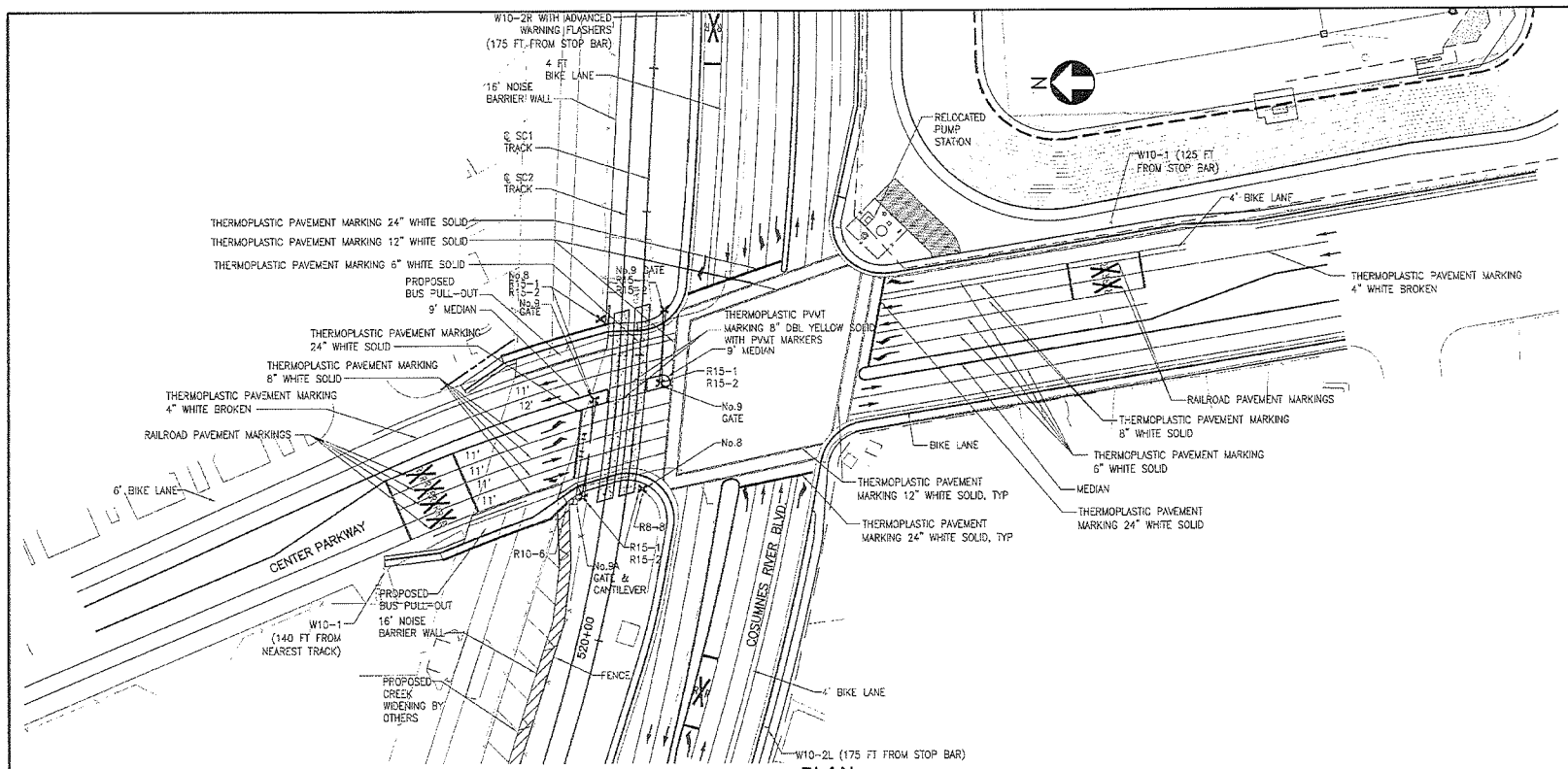
CI:
FILE: P-03dwg
DWG#:
4/25/08

Regional Transit

SOUTH SACRAMENTO CORRIDOR PHASE 2 PROJECT
PRELIMINARY ENGINEERING

AT-GRADE CROSSING PLAN
CENTER PARKWAY

P103
SHEET



PLAN

1"=40'

NOTES:

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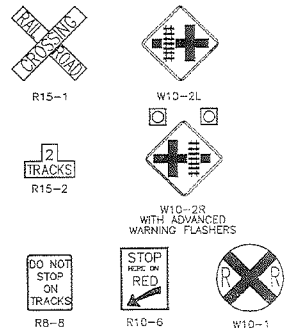
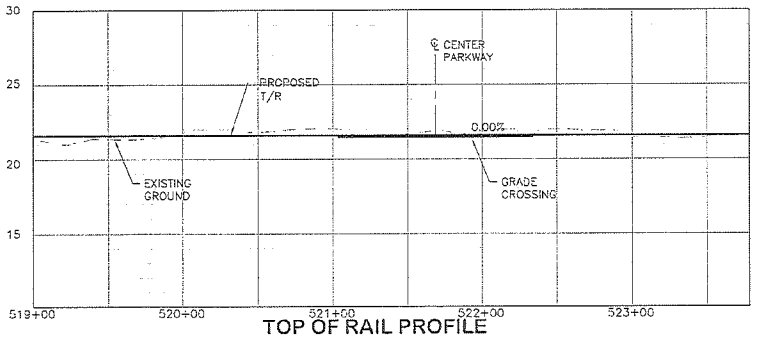
LEGEND

- CROSSING SIGNAL ASSEMBLY (No.8)
- CROSSING GATE ARM WITH LIGHTS AND BELLS (No.9)
- CANTILEVER STRUCTURE WITH LIGHTS (No.9A)





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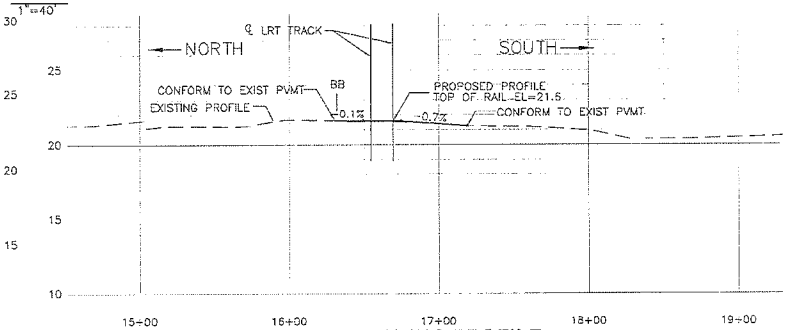

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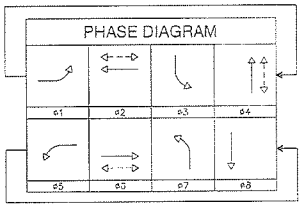


REVISIONS				
MARK	DATE	DESCRIPTION	BY	CHKD

SCALE: VERTICAL: 1"=4'
HORIZONTAL: 1"=40'
ORIGINAL SCALE IN INCHES FOR REDUCED PLAN
0 1 2 3

		REG. NO.	DATE
PROJECT ENGINEER:	B. WRIGHT	C59331	4/25/08
DESIGNED BY:	L. ROS		4/25/08
DRAWN BY:	N. JARRELL & C. CUSTER		4/25/08
CHECKED BY:	T. HAYES		4/25/08

PSOMAS
2255 Gateway Oaks Drive Suite 250
Sacramento, CA 95833
(916) 929-7100 (916) 929-6350 (FAX)

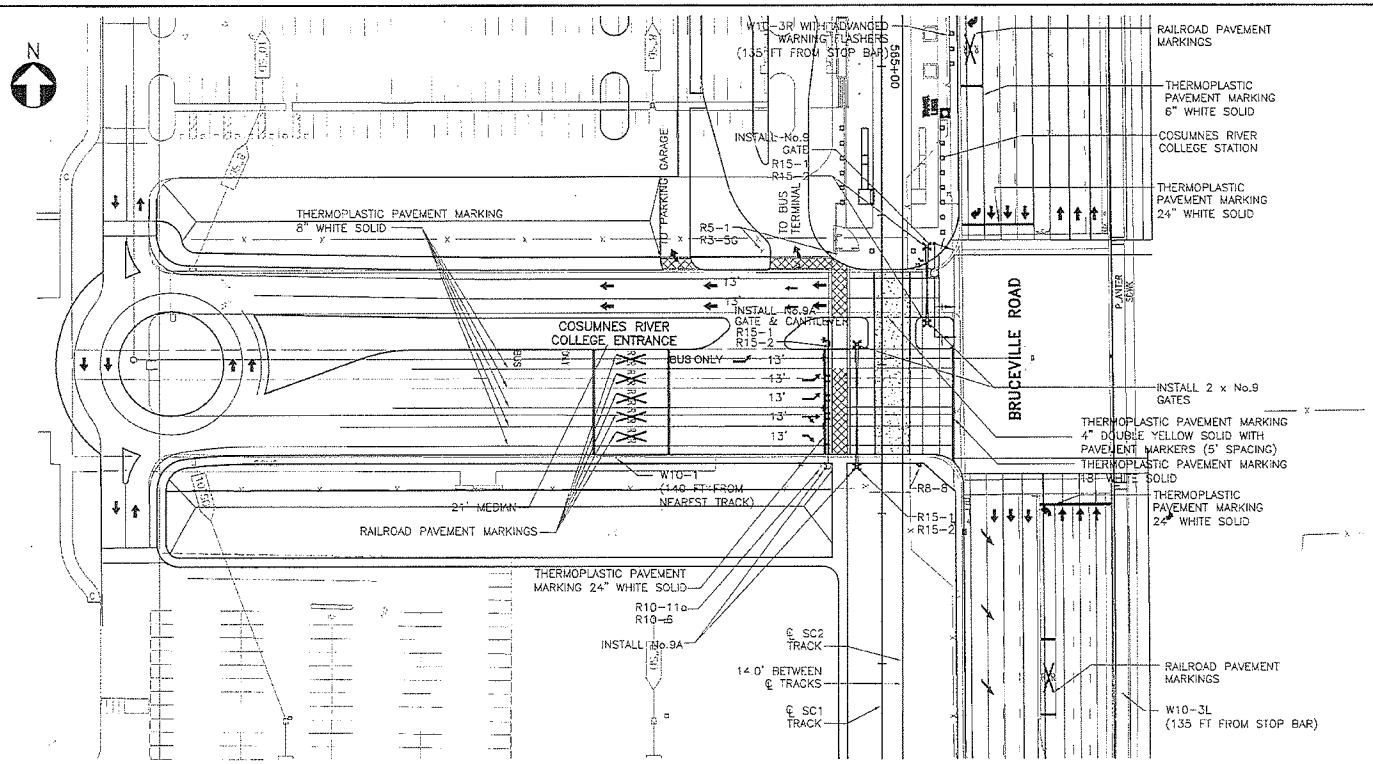
CI:
FILE: P-03a.dwg
DWG#:
4/25/08

Regional Transit

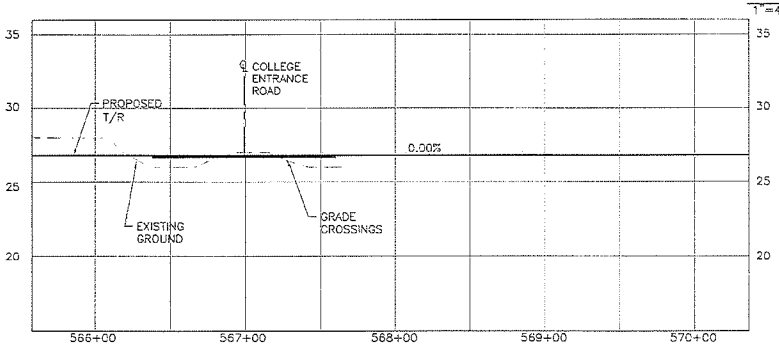
SOUTH SACRAMENTO CORRIDOR PHASE 2 PROJECT
PRELIMINARY ENGINEERING

AT-GRADE CROSSING PLAN
CENTER PARKWAY - FUTURE

P103a
SHEET



PLAN
1"=40'



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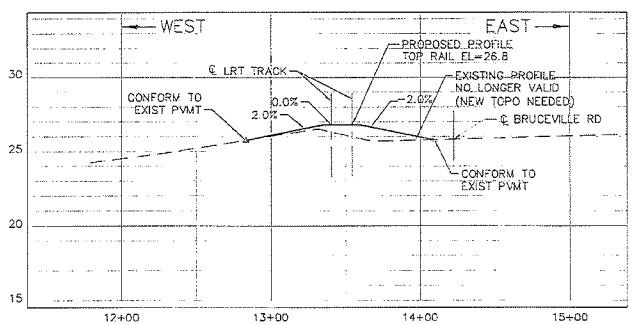

TOP OF PAVING PROFILE

NOTES:

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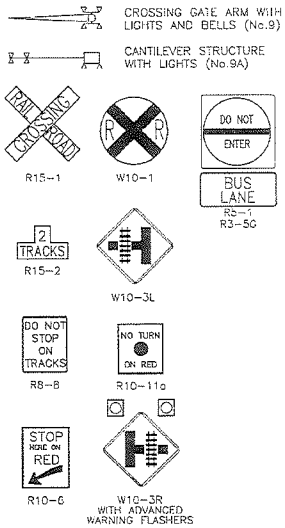
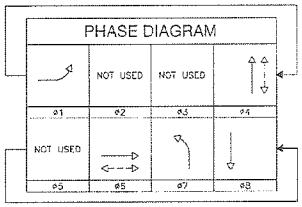
LEGEND





REVISIONS				
MARK	DATE	DESCRIPTION	BY	CHKD
△				
△				
△				
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SCALE: VERTICAL: 1"=4'
HORIZONTAL: 1"=40'
ORIGINAL SCALE IN INCHES FOR REDUCED PLAN
0 1 2 3

		REG. NO.	DATE
PROJECT ENGINEER:	B. WRIGHT	C59331	4/25/08
DESIGNED BY:	L. ROS		4/25/08
DRAWN BY:	N. JARRELL & C. CUSTER		4/25/08
CHECKED BY:	T. HAYES		4/25/08

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Sacramento, CA 95833
(916) 929-7100 (916) 929-6085 (FAX)

CI:
FILE: P-06.dwg
DWG#:
4/25/08

Regional Transit

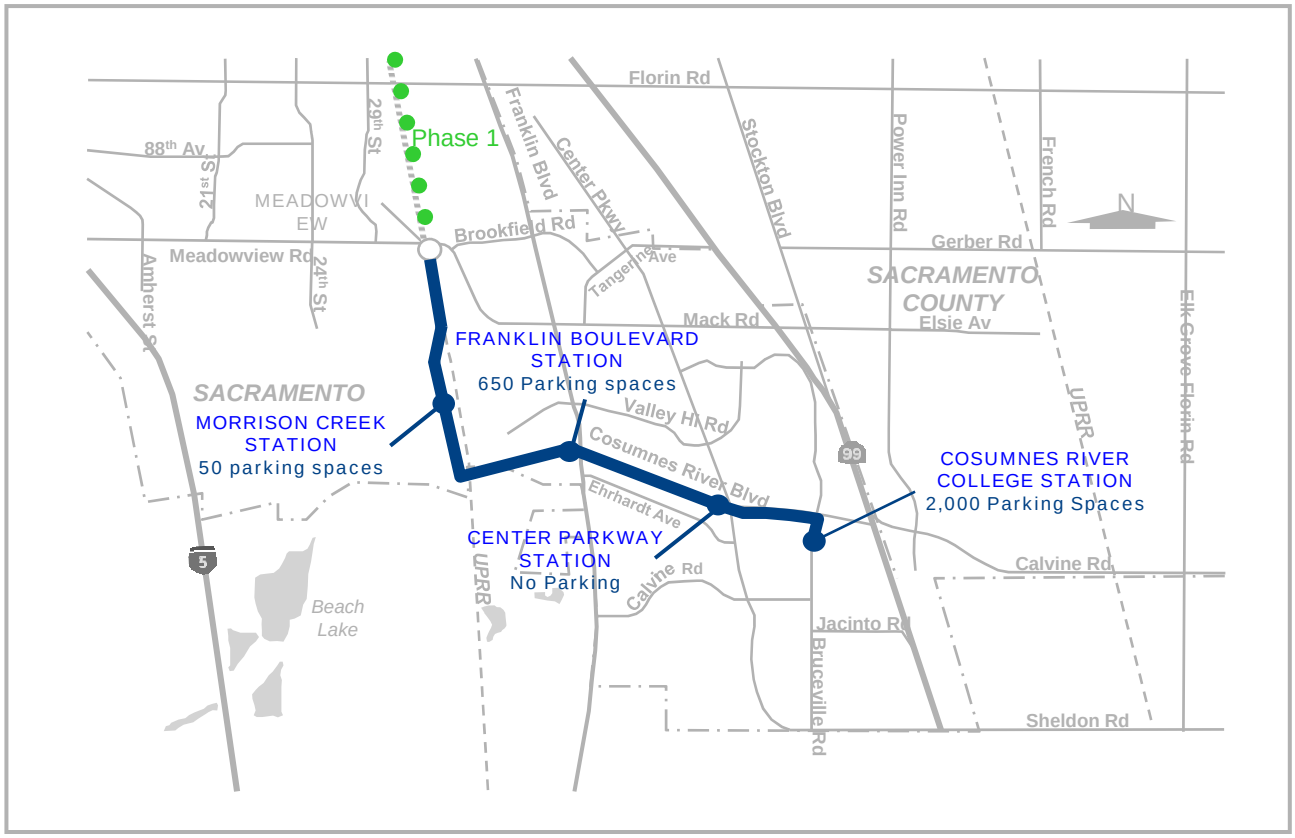
SOUTH SACRAMENTO CORRIDOR PHASE 2 PROJECT
PRELIMINARY ENGINEERING

AT-GRADE CROSSING PLAN
COLLEGE ENTRANCE ROAD

P106
SHEET

SCH # 1996052075

South Sacramento Corridor Phase 2 Project



SUPPLEMENTAL FINAL ENVIRONMENTAL IMPACT STATEMENT/ SUBSEQUENT FINAL ENVIRONMENTAL IMPACT REPORT

VOLUME II – RESPONSES TO PUBLIC COMMENTS

SEPTEMBER 2008

SOUTH SACRAMENTO PHASE 2 PROJECT

SUPPLEMENTAL FINAL ENVIRONMENTAL IMPACT STATEMENT/ SUBSEQUENT FINAL ENVIRONMENTAL IMPACT REPORT

VOLUME II – RESPONSES TO PUBLIC COMMENTS

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Introduction

This Volume II of the Supplemental Final Environmental Impact Statement/Subsequent Final Environmental Impact Report (SFEIS/SFEIR) for the South Sacramento Corridor Phase 2 provides the written comments and public testimony provided on the SDEIS/SDEIR.

Brackets are provided to identify the particular portion of the comment being responded to and the response is provided on the opposite page.

SOUTH SACRAMENTO PHASE 2 PROJECT

SUPPLEMENTAL FINAL ENVIRONMENTAL IMPACT STATEMENT/ SUBSEQUENT FINAL ENVIRONMENTAL IMPACT REPORT

VOLUME II – RESPONSES TO PUBLIC COMMENTS

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Federal Agencies

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
75 Hawthorne Street
San Francisco, CA 94105-3901

A2:A-00105

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ESD

March 28, 2007

Mr. Jerome Wiggins, Program Specialist
Office of Planning and Programming
Federal Transit Administration, Region IX
201 Mission Street, Suite 1650
San Francisco, CA 94105

Subject: Supplemental Draft Environmental Impact Statement for the South Sacramento Corridor Phase 2 Project, Sacramento, California (CEQ #20070049)

Dear Mr. Wiggins:

The Environmental Protection Agency (EPA) has reviewed the above-referenced document pursuant to the National Environmental Policy Act (NEPA), Council on Environmental Quality (CEQ) regulations (40 CFR Parts 1500-1508), and Section 309 of the Clean Air Act. Our detailed comments are enclosed.

EPA is highly supportive of the project goals to reduce vehicle miles traveled, reduce vehicle emissions, and provide expanded transportation choices. We look forward to the successful implementation of this project. While we have not identified environmental impacts requiring substantive changes to the document, we have identified areas where more information is requested. In addition, EPA strongly encourages the project proponents to implement one of the parking garage options discussed in the Supplemental Draft Environmental Impact Statement (SDEIS). EPA has rated this document LO, *Lack of Objections*. Please see the attached *Rating Factors* for a description of our rating system.

EPA commends the Sacramento Regional Transit District's work with communities in the vicinity of the proposed light rail extension. The Transit for Livable Communities Program, combined with efforts by local jurisdictions, such as the City of Sacramento to encourage transit oriented development, help to minimize the adverse environmental impacts of growth and development pressure.

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South Sacramento Corridor Phase 2 SFEIS/SFEIR

The Federal Transit Administration (FTA) and the Sacramento Regional Transit District (RT) appreciate the U.S. EPA's support of the project goals and the successful implementation of the South Sacramento Corridor Phase 2 Project.

RT and FTA have included as part of the proposed project a parking structure rather than surface parking at the Cosumnes River College (CRC) Station.

FTA and RT acknowledge the *lack of objections* rating.

RT is continuing to work directly with the City of Sacramento and the developers in Morrison Creek and CRC station areas to encourage and realize transit oriented development opportunities.

We appreciate the opportunity to review this SDEIS. When the Supplemental Final EIS is released for public review, please send two copies to the address above (mail code: CED-2). If you have any questions, please contact Connell Dunning of my staff at 415-947-4161 or dunning.connell@epa.gov.

Once available, two copies of the Supplemental Final Environmental Impact Statement / Subsequent Environmental Impact Report (SFEIS/SFEIR) will be sent to the U.S. EPA at the address provided.

Sincerely,

Connell Dunning

For Nova Blazej, Manager
Environmental Review Office

Enclosures:
EPA's Detailed Comments

cc: Ms. Diane Nakano, Sacramento Regional Transit District

2

EPA DETAILED COMMENTS ON THE SUPPLEMENTAL DRAFT ENVIRONMENTAL IMPACT STATEMENT FOR THE SOUTH SACRAMENTO CORRIDOR PHASE 2 PROJECT, MARCH 28, 2007

Coordinated Transit and Land Use Planning

The Environmental Protection Agency (EPA) commends the Sacramento Regional Transit District (RT) for its commitment to the Transit for Livable Communities Program. Working with local jurisdictions to encourage transit oriented development (TOD) around transit stations can help the region to accommodate growth pressure by providing necessary housing and services to the community, while also minimizing the conversion of critical habitat areas and farmland to new development. TOD can also better utilize the transit investment, by increasing ridership and decreasing the number of riders who must drive to transit stations, minimizing the need to provide parking as well as impacts on air quality. EPA especially supports such actions as the City of Sacramento City Council's Light Rail Station Ordinance and denial of large floor plate, auto-oriented uses proposed for areas adjacent to transit stations.

Recommendation:

- RT should continue to coordinate with local jurisdictions to encourage TOD and discourage auto-oriented uses near transit stations.

Air Quality

EPA commends RT on its commitment to improving air quality through improved transit service, the use of buses powered by compressed natural gas, and measures to reduce diesel emissions from construction equipment. EPA recommends including a discussion of the new 8-hour ozone and $PM_{2.5}$ standards in the Supplemental Final Environmental Impact Statement (SFEIS). The document should also identify sensitive receptors in the project area. Finally, the Construction Phase Impacts section should include a discussion of traffic congestion related to project construction and how any impacts will be mitigated.

Recommendations:

- The SFEIS should discuss the difference between the 1-hour and 8-hour ozone standards, and discuss the absence of monitoring data for $PM_{2.5}$.
- The SFEIS should identify sensitive receptor locations in the project area, such as schools, hospitals, parks, and athletic centers. Schedule construction to minimize impacts in these areas.
- The Construction Phase Impacts section should include a discussion of how traffic congestion related to project construction can contribute to increased levels of carbon monoxide, especially at already congested intersections.

1

South Sacramento Corridor Phase 2 SFEIS/SFEIR

RT is continuing to pursue the Transit for Livable Communities in its station areas, and RT is continuing to work directly with the City of Sacramento and the developers in Morrison Creek and CRC station areas to encourage and realize transit oriented development opportunities.

The air quality analysis has been updated to show current air quality standards and monitoring information. As such, Table 4.3-3 of the Supplemental Final Environmental Impact Statement (SFEIS) displays monitoring information for particulate matter 2.5 microns or less in diameter ($PM_{2.5}$). Previous air quality data was obtained from the T Street Monitoring Station, which is approximately 8.7 miles north of the alignment. This monitoring station was also utilized to obtain $PM_{2.5}$ data. As indicated in Table 4.3-3, the State 24-hour $PM_{2.5}$ standard was not exceeded from 2004 to 2006. However, the federal annual $PM_{2.5}$ standard was exceeded in 2005 and 2006.

(Response continued on following page)

The federal one-hour ozone standard was revoked on June 15, 2005. As such, reference to the federal one-hour ozone standard has been removed from the SFEIS and further discussion is not necessary.

Air quality sensitive receptors located within one-quarter mile of the alignment include numerous residences, Cosumnes River College soccer fields and stadium, Valley Hi Covenant Church, and the Methodist Hospital of Sacramento. School locations include Valley High School, Citadel Baptist Elementary and High Schools, Susan B. Anthony Elementary School, Edward Kemble Elementary School, and Luther Burbank High School. Neighborhood parks located along the alignment include Valley Hi Park, Mesa Grande Park, Susan B. Anthony Park, and Pollock Ranch Park. As indicated in Section 5.2.3 of the Draft Environmental Impact Statement (DEIS), the proposed project would include 14 mitigation measures designed to reduce air quality construction impacts. The DEIS concluded that construction activity would result in a less-than-significant air quality impact. As such, no additional mitigation measures are necessary.

Construction activity would potentially result in traffic delays and associated carbon monoxide (CO) hotspots. CO hotspots typically occur at severely congested intersections with high traffic volumes. Based on the CO hotspot modeling, over 4,000 vehicles would have to idle continuously for one hour to create a CO hotspot during construction activity. The Project Applicant would be required to maintain traffic flows and install diversions to remove traffic from intersections that would be congested as a result of construction activity. As such, construction activity would not result in delay to over 4,000 vehicles in one hour and construction activity would not result in the generation of a CO hotspot.

Design Options

EPA recommends that RT minimize the amount of surface parking constructed for the project, particularly at the Consumnes River College Station. The increase in impervious surface resulting from surface parking may have adverse impacts on water quality and the quantity of groundwater recharge, and increase flood hazards.

Recommendations:

- RT should select one of the parking garage options, rather than the surface parking, at the Consumnes River College Station. RT should implement measures to reduce vehicle miles traveled, such as charging for parking at all stations.
- Where surface parking is built as part of the project, EPA recommends the use of "green" or porous pavement to lessen the negative impacts on water. Where possible, integrate bioswales into drainage improvements.

Water Quality

The SFEIS should include additional information with regard to water quality in Morrison Creek. Morrison Creek is listed as impaired under the Total Maximum Daily Load (TMDL) Program established under Section 303(d) of the Clean Water Act.

Recommendations:

- The SFEIS should describe direct, indirect, and cumulative impacts that the project may have on Morrison Creek.
- The SFEIS should describe any existing restoration and enhancement efforts in local waterways, how the proposed project will coordinate with on-going protection efforts, and additional mitigation measures that may be required.

Cumulative Impacts

The various sections of the Cumulative Impacts analysis do not discuss all of the projects in the vicinity of the project area. For example, the Biological Resources section only discusses impacts from Phases 1 and 2 of the South Sacramento Corridor, and not from any of the other projects listed as "Related Projects." All known impacts of the "Related Projects" should be included in the SFEIS, as well as any known mitigation for those impacts. If impacts are unknown or there will be no impacts, these facts should be stated.

Recommendation:

- Include analysis of all related projects in all sections of the Cumulative Impacts analysis. If specific quantitative information is not available, state this fact, but disclose whether there will be an impact.

2

RT and FTA have included as part of the proposed project a parking structure rather than surface parking at the CRC Station.

A parking fee is anticipated at CRC This fee will be established through a cooperative agreement between RT and CRC/ Los Rios Community College District. The fee would apply to students and commuters who use campus parking facilities.

RT appreciates U.S. EPA's recommendation regarding the establishment of parking fees at other light rail transit stations in the RT system, but such considerations are beyond the scope of this SEIS/SEIR.

"Green" or porous pavement will be considered during final design. Bioswater are currently part of the project's preliminary design and expanded use of them will be studied further during final design.

Please see responses on following pages

Design Options

EPA recommends that RT minimize the amount of surface parking constructed for the project, particularly at the Consumnes River College Station. The increase in impervious surface resulting from surface parking may have adverse impacts on water quality and the quantity of groundwater recharge, and increase flood hazards.

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Recommendation:

- Include analysis of all related projects in all sections of the Cumulative Impacts analysis. If specific quantitative information is not available, state this fact, but disclose whether there will be an impact.

2

South Sacramento Corridor Phase 2 SFEIS/SFEIR

See response on previous page

The project includes design elements that will minimize impacts to water quality in Morrison Creek and Union House Creek to the maximum extent practicable. Stormwater quality controls related to sediment and construction materials will be implemented during construction. Following construction, permanent source and treatment controls will be in place to address non-source pollutants generated from parking lots and station structures.

Construction Controls - Stormwater runoff generated from new projects is regulated primarily under State and local stormwater programs. Prior to the start of construction, and as required by the State Water Resources Control Board, the contractor must obtain coverage under the National Pollutant Discharge Elimination System (NPDES) General Permit for Construction Related Activities (General Permit). The General Permit requires the development of a site-specific Storm Water Pollution Prevention Plan (SWPPP) and the implementation of stormwater Best Management Practices (BMPs). The SWPPP must utilize the Best Available Technologies and Best Conventional Technologies to minimize stormwater pollutants throughout the entire construction period.

[Response continued on following page]

Please see response on following pages

Post-construction Controls - The City of Sacramento is a co-permittee under the Sacramento Areawide Phase I NPDES Municipal Permit (Permit). The Permit requires that the City condition projects to implement stormwater quality control measures as a part of project development. In May 2007, the City published the Stormwater Quality Design Manual for the Sacramento and South Placer Regions (Manual). The Manual specifies the requirements and options for stormwater quality controls that fall into three categories, which include source controls, Low Impact Development (also known as runoff reduction), and treatment control. The Manual identifies nine priority categories for which controls are required. Source controls are required for all projects within the nine categories, with treatment controls required for projects over specified size thresholds. The South Sacramento Corridor Phase 2 project falls into the Parking Lots category. For this project, the Manual requires source controls and, due to the project including over 25 spaces, treatment controls. Design standards for Low Impact Development (LID) measures are provided; however, LID is not required in the Manual. The Manual allows for LID measures to be utilized within any project site to reduce the amount of stormwater that must be accommodated within the treatment facilities.

South Sacramento Corridor Phase 2 SFEIS/SFEIR

Source control measures are intended to prevent pollutants from entering the flow of stormwater as a “first line of defense.” These measures include common-sense good-housekeeping practices and are targeted for various pollutant-generating activities and sources. It is far more cost effective to use Source Controls to prevent pollutants from entering stormwater runoff than to remove pollutants through Treatment Controls. All drain inlets located within the South Sacramento Corridor Phase 2 station parking lots will be stamped with a sign indicating that the drain flows to a creek and that dumping of pollutants is prohibited.

Water collected from the Morrison Creek Station facilities will be outfalled into the adjacent residential developments’ (Stone-Boswell and Delta Shores) storm drain system. The adjacent developments’ storm drain system will flow into a proposed water quality/detention basin where it will undergo treatment before being pumped into Morrison Creek. Water collected from the Franklin Station facilities will receive on-site water quality treatment through the use of bio-swales and/or underground detention facilities before being released to adjacent City storm drain facilities which outfall into Union House Creek and ultimately Morrison Creek.

The project will incorporate LID measures such as Interceptor Trees and Porous Pavement, where feasible, based on soil type, drainage constraints, and loading requirements.

Design Options

EPA recommends that RT minimize the amount of surface parking constructed for the project, particularly at the Consumnes River College Station. The increase in impervious surface resulting from surface parking may have adverse impacts on water quality and the quantity of groundwater recharge, and increase flood hazards.

Recommendations:

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- The SFEIS should describe any existing restoration and enhancement efforts in local waterways, how the proposed project will coordinate with on-going protection efforts, and additional mitigation measures that may be required.

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Recommendation:

- Include analysis of all related projects in all sections of the Cumulative Impacts analysis. If specific quantitative information is not available, state this fact, but disclose whether there will be an impact.

2

South Sacramento Corridor Phase 2 SFEIS/SFEIR

See responses on previous pages

The text of the cumulative impacts sections has been amended to include additional projects.

Noise and Vibration

The document references the Federal Transit Administration guidance manual *Transit Noise and Vibration Impact Assessment* (April 1995). An updated version of this document was published in May 2006 and is available online at http://www.fta.dot.gov/documents/FTA_Noise_and_Vibration_Manual.pdf.

Recommendation:

- Review the updated guidance document to insure that analyses included in the SFEIS are based on the most current analysis standards.

3

RT has done a revision to the Noise / Vibration Section of the SFEIS/SFEIR. Please see Section 4.12, Volume I.

Department of Energy
Western Area Power Administration
Sierra Nevada Customer Service Region
114 Parkshore Drive
Folsom, California 95630-4710

A2:A-00084

RECEIVED
MAR 23 2007
ESD

MAR 22 2007

Ms. Diane Nakano, P.E.
Sacramento Regional Transit District
1400 29th Street
Sacramento, CA 95812

Dear Ms. Nakano:

Thank you for the opportunity to comment on the South Sacramento Corridor Phase 2 Supplemental Draft Environmental Impact Statement/Subsequent Draft Environmental Impact Report/Draft Section 4(f) Notice of Preparation/Initial Study. The United States Department of Energy, Western Area Power Administration (Western) does not have any objections to the proposed use of Western's Hurley-Tracy No. 1 and No. 2 transmission line easements provided the project does not interfere with Western's easement rights and are in accordance with our general guidelines. The developers should obtain license agreements from Western prior to construction. Please have the developer submit the project specific improvement plans to Western for review and approval prior to construction.

Enclosed is a copy of Western's General Guidelines for the use of the easement area. If you have any questions, please contact Ms. Susan Sinclair at (916) 353-4600.

Sincerely,

Susan Sinclair
for
Heidi R. Miller
Realty Officer

Enclosure

The project does not interfere with the stated facilities or easements as they are approximately three miles to the east of the project.

South Sacramento Corridor Phase 2 SFEIS/SFEIR

WESTERN AREA POWER ADMINISTRATION
GENERAL GUIDELINES CONCERNING THE USE OF
ELECTRIC TRANSMISSION LINE RIGHTS-OF-WAY

RE: Hurley-Tracy No. 1 and No. 2 230-kV Transmission Line

Western Area Power Administration (Western) owns two 125-foot easements along the length of the referenced transmission lines. Western's rights within the easement include the right to construct, reconstruct, operate, maintain, and patrol the transmission line.

Rights usually reserved to the landowner include the right to cultivate, occupy, and use the land for any purpose that does not conflict with Western's use of its easement. To avoid potential conflicts, it is Western's policy to review all proposed uses within the transmission line easement. We consider (1) Safety of the public, (2) Safety of our Employees, (3) Restrictions covered in the easement, (4) Western's maintenance requirements, and (5) Protection of the transmission line structures and (6) Road or street crossings.

The outline below lists the considerations covered in the review. Please note that some items may overlap. This outline has been prepared only as a guide; each right-of-way encroachment is evaluated on an individual basis.

1. Safety Of The Public

A. Approval depends, to a large extent, on the type and purpose of the development. Western takes our obligation to public safety very seriously. To insure our obligation, any use of the easement that will endanger the public will not be allowed or strongly discouraged (e.g., kite flying is prohibited).

B. Metal fences must be grounded in accordance with applicable safety codes.

C. Lighting standards shall not exceed a maximum height of 15 feet and not placed directly under the conductors. All lighting standards must be grounded.

D. All vegetation on the easement shall not exceed a maximum height of 12 feet at maturity.

E. Structures are not allowed on the easement. Structures include, but are not limited to, buildings, sheds, swimming pools, basketball courts, tennis courts, gazebos, etc.

F. No ground elevation changes are allowed which would reduce the ground to conductor clearance below 30 feet.

2. Safety Of Our Employees

Vegetation and encroachments into our right-of-way requires our crews to take action, which places them at risk. Therefore, any vegetation or encroachments that present a risk to our employees will not be allowed.

3. Restrictions Covered In The Easement

The easement prohibits the following: (1) any use that will interfere with or damage the equipment of the United States, (2) digging or drilling of a well, (3) erecting buildings or structures, (4) placing or piling up material within the easement boundaries. The easement gives Western the right to remove trees, brush or other objects interfering with the safe operation and maintenance of the line.

4. Maintenance Requirements

A. Berms shall not be placed next to the base of the transmission line tower.

B. Any proposed improvements to the easement (including grading, parking lot, lighting, landscaping, fences, etc.), must be reviewed by Western to assure that they will not interfere with the safe operation and maintenance of the transmission line.

C. A 14-foot gate is required in any fences that cut off access along our easement.

D. Thirty (30) feet of unobstructed access is to be maintained around towers.

5. Protection Of The Transmission Line Structure (Towers, Guy Wires, etc.)

A. If the proposed use increases the possibility of a motor vehicle hitting the transmission line structure, an appropriate guard rail shall be installed to protect the structure (e.g., parking lots or roads).

B. Trench digging, which would weaken or damage the structure, is prohibited.

C. No ground elevation changes are allowed within 20 feet of the structure, and in no case shall the conductor to ground clearance be reduced below code limitation.

6. Roads Or Street Crossings

Western's policy is to have roads or streets cross the easement at right angles, or as nearly at right angles as possible, so that a minimum area of the road or street lies within the transmission line easement.

Requests for permission to use the transmission line right-of-way should be submitted to: Western Area Power Administration, Sierra Nevada Regional Office, Attn: Realty Officer, 114 Parkshore Drive, Folsom, CA 95630.

State of California Agencies

STATE OF CALIFORNIA
Governor's Office of Planning and Research
State Clearinghouse and Planning Unit

Arnold Schwarzenegger
Governor

A2:A-00088

Cynthia Bryant
Director

RECEIVED
MAR 27 2007
ESD

March 26, 2007

Diane Nakano
Sacramento Regional Transit District
P.O. Box 2110
Sacramento, CA 95812

Subject: South Sacramento Phase 2 Corridor
SCH#: 1996052075

Dear Diane Nakano:

The State Clearinghouse submitted the above named Supplemental EIR to selected state agencies for review. On the enclosed Document Details Report please note that the Clearinghouse has listed the state agencies that reviewed your document. The review period closed on March 23, 2007, and the comments from the responding agency (ies) is (are) enclosed. If this comment package is not in order, please notify the State Clearinghouse immediately. Please refer to the project's ten-digit State Clearinghouse number in future correspondence so that we may respond promptly.

Please note that Section 21104(c) of the California Public Resources Code states that:

> "A responsible or other public agency shall only make substantive comments regarding those activities involved in a project which are within an area of expertise of the agency or which are required to be carried out or approved by the agency. Those comments shall be supported by specific documentation."

These comments are forwarded for use in preparing your final environmental document. Should you need more information or clarification of the enclosed comments, we recommend that you contact the commenting agency directly.

This letter acknowledges that you have complied with the State Clearinghouse review requirements for draft environmental documents, pursuant to the California Environmental Quality Act. Please contact the State Clearinghouse at (916) 445-0613 if you have any questions regarding the environmental review process.

Sincerely,

Terry Roberts

Terry Roberts
Director, State Clearinghouse

Enclosures
cc: Resources Agency

1400 TENTH STREET P.O. BOX 3044 SACRAMENTO, CALIFORNIA 95812-3044
TEL (916) 445-0613 FAX (916) 323-3018 www.opr.ca.gov

RT and FTA appreciate the State Clearinghouse circulating the SDEIS/SDEIR to state agencies for review. The State Clearinghouse Number is shown on the cover of the SFEIS/SFEIR.

Document Details Report
State Clearinghouse Data Base

SCH# 1996052075
Project Title South Sacramento Phase 2 Corridor
Lead Agency Sacramento Regional Transit District

Type SIR Supplemental EIR

Description Sacramento Regional Transit District (RT) proposes to extend light rail transit (LRT) service 4.2 miles from the South Sacramento Corridor Phase 1 terminus at Meadowview Road southward along the UPRR right-of-way, turning east crossing the UPRR and Union House Creek, continuing east to the north of the proposed extension of Cosumnes River Boulevard (CRB), crossing Franklin Boulevard, traveling along the northern side of CRB, turning south along the western side of Bruceville Road and terminating at Cosumnes River College (CRC).

Lead Agency Contact

Name Diane Nakano
Agency Sacramento Regional Transit District
Phone (916) 321-3853 **Fax**
email
Address P.O. Box 2110
City Sacramento **State** CA **Zip** 95812

Project Location

County Sacramento
City Sacramento, Elk Grove
Region
Cross Streets Meadowview/UPRR to Bruceville Road
Parcel No. Multiple
Township **Range** **Section** **Base**

Proximity to:

Highways SR 99 and I-5
Airports
Railways UPRR
Waterways Union House Creek and Morrison Creek
Schools
Land Use Railroad & Street Right-of-Way / Vacant Land / University Land / County Sanitation District Land / Commercial Property

Project Issues Aesthetic/Visual; Agricultural Land; Air Quality; Archaeologic-Historic; Cumulative Effects; Economics/Jobs; Flood Plain/Flooding; Geologic/Seismic; Growth Inducing; Landuse; Noise; Population/Housing Balance; Public Services; Recreation/Parks; Schools/Universities; Toxic/Hazardous; Traffic/Circulation; Vegetation; Water Quality; Wetland/Riparian

Reviewing Agencies Resources Agency; Regional Water Quality Control Bd., Region 5 (Sacramento); Department of Parks and Recreation; Native American Heritage Commission; Public Utilities Commission; Office of Emergency Services; Office of Historic Preservation; Department of Fish and Game, Region 2; Department of Water Resources; California Highway Patrol; Caltrans, District 3; Air Resources Board, Transportation Projects; Department of Toxic Substances Control

Date Received 02/07/2007 **Start of Review** 02/07/2007 **End of Review** 03/23/2007

Note: Blanks in data fields result from insufficient information provided by lead agency.

STATE OF CALIFORNIA – THE RESOURCES AGENCY

ARNOLD SCHWARZENEGGER, Governor

DEPARTMENT OF WATER RESOURCES
1416 NINTH STREET, P.O. BOX 942836
SACRAMENTO, CA 942360001
(916) 653-5791

RECEIVED
MAR 07 2007
STATE CLEARING HOUSE

CLEAR
3/23/07
e

February 20, 2007

Diane Nakano
Sacramento Regional Transit District
Post Office Box 2110
Sacramento, California 95812

South Sacramento Phase 2 Corridor
State Clearinghouse (SCH) Number: 1996052075

The project corresponding to the subject SCH identification number has come to our attention. The limited project description suggests your project may be an encroachment on the State Adopted Plan of Flood Control. You may refer to the California Code of Regulations, Title 23 and Designated Floodway maps at http://recbd.ca.gov/. Please be advised that your county office also has copies of the Board's designated floodways for your review. If indeed your project encroaches on an adopted food control plan, you will need to obtain an encroachment permit from the Reclamation Board prior to initiating any activities. The attached Fact Sheet explains the permitting process. Please note that the permitting process may take as much as 45 to 60 days to process. Also note that a condition of the permit requires the securing all of the appropriate additional permits before initiating work. This information is provided so that you may plan accordingly.

If after careful evaluation, it is your assessment that your project is not within the authority of the Reclamation Board, you may disregard this notice. For further information, please contact me at (916) 574-1249.

Sincerely,

Christopher Huitt
Staff Environmental Scientist
Floodway Protection Section

cc: Governor's Office of Planning and Research
State Clearinghouse
1400 Tenth Street, Room 121
Sacramento, CA 95814

To initiate appropriate early coordination with the State Department of Water Resources, RT has submitted, at the urging of the Department, a preliminary permit application – Reclamation Board Application 18166.

Chapter 4, Section 4.9, Volume I of the SEIS/SEIR reviews the impacts and mitigation for the flood areas affected by the proposed LPAP2. RT will be pursuing the appropriate permits as the final design and project implementation process move forward. RT acknowledges receipt of the fact sheet.

Encroachment Permits Fact Sheet

Basis for Authority
State law (Water Code Sections 8534, 8608, 8609, and 8710 – 8723) tasks the Reclamation Board with enforcing appropriate standards for the construction, maintenance, and protection of adopted flood control plans. Regulations implementing these directives are found in California Code of Regulations (CCR) Title 23, Division 1.

Area of Reclamation Board Jurisdiction
The adopted plan of flood control under the jurisdiction and authority of the Reclamation Board includes the Sacramento and San Joaquin Rivers and their tributaries and distributaries and the designated floodways.

Streams regulated by the Reclamation Board can be found in Title 23 Section 112. Information on designated floodways can be found on the Reclamation Board's website at http://recbd.ca.gov/designated_floodway/ and CCR Title 23 Sections 101 - 107.

Regulatory Process
The Reclamation Board ensures the integrity of the flood control system through a permit process (Water Code Section 8710). A permit must be obtained prior to initiating any activity, including excavation and construction, removal or planting of landscaping within floodways, levees, and 10 feet landward of the landside levee toes. Additionally, activities located outside of the adopted plan of flood control but which may foreseeable interfere with the functioning or operation of the plan of flood control is also subject to a permit of the Reclamation Board.

Details regarding the permitting process and the regulations can be found on the Reclamation Board's website at http://recbd.ca.gov/ under "Frequently Asked Questions" and "Regulations," respectively. The application form and the accompanying environmental questionnaire can be found on the Reclamation Board's website at http://recbd.ca.gov/forms.cfm.

Application Review Process
Applications when deemed complete will undergo technical and environmental review by Reclamation Board and/or Department of Water Resources staff.

Technical Review
A technical review is conducted of the application to ensure consistency with the regulatory standards designed to ensure the function and structural integrity of the adopted plan of flood control for the protection of public welfare and safety. Standards and permitted uses of designated floodways are found in CCR Title 23 Sections 107 and Article 8 (Sections 111 to 137). The permit contains 12 standard conditions and additional special conditions may be placed on the permit as the situation warrants. Special conditions, for example, may include mitigation for the hydraulic impacts of the project by reducing or eliminating the additional flood risk to third parties that may caused by the project.

Additional information may be requested in support of the technical review of

your application pursuant to CCR Title 23 Section 8(b)(4). This information may include but not limited to geotechnical exploration, soil testing, hydraulic or sediment transport studies, and other analyses may be required at any time prior to a determination on the application.

Environmental Review
A determination on an encroachment application is a discretionary action by the Reclamation Board and its staff and subject to the provisions of the California Environmental Quality Act (CEQA) (Public Resources Code 21000 et seq.). Additional environmental considerations are placed on the issuance of the encroachment permit by Water Code Section 8608 and the corresponding implementing regulations (California Code of Regulations – CCR Title 23 Sections 10 and 16).

In most cases, the Reclamation Board will be assuming the role of a "responsible agency" within the meaning of CEQA. In these situations, the application must include a certified CEQA document by the "lead agency" [CCR Title 23 Section 8(b)(2)]. We emphasize that such a document must include within its project description and environmental assessment of the activities for which are being considered under the permit.

Encroachment applications will also undergo a review by an interagency Environmental Review Committee (ERC) pursuant to CCR Title 23 Section 10. Review of your application will be facilitated by providing as much additional environmental information as pertinent and available to the applicant at the time of submission of the encroachment application.

These additional documentations may include the following documentation:

- California Department of Fish and Game Streambed Alteration Notification (http://www.dfg.ca.gov/1600/),
- Clean Water Act Section 404 applications, and Rivers and Harbors Section 10 application (US Army Corp of Engineers),
- Clean Water Act Section 401 Water Quality Certification, and
- corresponding determinations by the respective regulatory agencies to the aforementioned applications, including Biological Opinions, if available at the time of submission of your application.

The submission of this information, if pertinent to your application, will expedite review and prevent overlapping requirements. This information should be made available as a supplement to your application as it becomes available. Transmittal information should reference the application number provided by the Reclamation Board.

In some limited situations, such as for minor projects, there may be no other agency with approval authority over the project, other than the encroachment permit by Reclamation Board. In these limited instances, the Reclamation Board

may choose to serve as the "lead agency" within the meaning of CEQA and in most cases the projects are of such a nature that a categorical or statutory exemption will apply. The Reclamation Board cannot invest staff resources to prepare complex environmental documentation.

Additional information may be requested in support of the environmental review of your application pursuant to CCR Title 23 Section 8(b)(4). This information may include biological surveys or other environmental surveys and may be required at anytime prior to a determination on the application.

STATE OF CALIFORNIA

Arnold Schwar

A2 : A - 00101

PUBLIC UTILITIES COMMISSION
505 VAN NESS AVENUE
SAN FRANCISCO, CA 94102-3298

RECEIVED
MAR 22 2007
ESD

March 20, 2007

Diane Nakano
Sacramento Regional Transit District
P.O. Box 2110
Sacramento, CA 95812

RE: South Sacramento Phase 2 Corridor, SCH# 1996052075

Dear Ms. Nakano:

As the state agency responsible for rail safety within California, we recommend that any development projects planned adjacent to or near the rail corridor in the County be planned with the safety of the rail corridor in mind. New developments may increase traffic volumes not only on streets and at intersections, but also at at-grade highway-rail crossings. This includes considering pedestrian circulation patterns/destinations with respect to railroad right-of-way.

Safety factors to consider include, but are not limited to, the planning for grade separations for major thoroughfares, improvements to existing at-grade highway-rail crossings due to increase in traffic volumes and appropriate fencing to limit the access of trespassers onto the railroad right-of-way. Any project that includes a modification to an exiting crossing or proposes a new crossing is legally required to obtain authority to construct from the Commission. If the project includes a proposed new crossing, the Commission will be a responsible party under CEQA and the impacts of the crossing must be discussed within the environmental documents.

The above-mentioned safety improvements should be considered when approval is sought for the new development. Working with Commission staff early in the conceptual design phase will help improve the safety to motorists and pedestrians in the County.

If you have any questions in this matter, please call me at (415) 703-2795.

Very truly yours,

Kevin Boles
Environmental Specialist
Rail Crossings Engineering Section
Consumer Protection and Safety Division

Safety has been an overriding consideration in the planning and design of the LPAP2 including both vehicular and pedestrian grade crossings.

RT developed and submitted to the California Public Utilities Commission (CA PUC) a hazards analysis report evaluating the safety of the proposed LPAP2 project.

RT has met with the CA PUC regarding this hazard evaluation, consistent with RT's desire for early coordination with the PUC. Following these early coordination meetings, the CA PUC sent a letter to RT dated April 2, 2008 (see Appendix E, Agency Correspondence) stating the following:

•"We agree that given the current progress of the crossing designs that further discussion on the specific design elements may be deferred until SRTD has advanced its designs sufficiently to define all elements"

•"General Order 164-D Section 10 requires in the 'initial phase' of review that we reach agreement on which crossings will remain at grade. In its evaluation, (CA PUC) Staff had recommended Cosumnes River Boulevard be grade separated and that SRTD seek elimination of the Cosumnes River College Access Road crossing. Additionally, we recommended that SRTD fully explore whether a pedestrian grade separation at Center Parkway, over the SRTD tracks and Cosumnes River Boulevard, is feasible and necessary. Staff noted that the remaining at-grade crossing of Meadowview Road, Franklin Road, Center Parkway, and the Cosumnes River College Main Entrance were reasonable to remain at-grade, although specific comments were provided regarding the preliminary designs."

[Continued on next page]

•"We appreciate that SRTD has committed to a grade separation of the highly skewed crossing at Cosumnes River Boulevard. Staff had significant concerns with that crossing remaining at-grade. Additionally, SRTD's commitment to either include the Cosumnes River College Access Road crossing in an extension of the grade separation of Cosumnes River Boulevard, or work with the college to re-route it, eliminates that crossing."

•"The remaining current issue is the pedestrian grade separated crossing of Center Parkway at Cosumnes River Boulevard. SRTD outlines several arguments against such a structure that are compelling. Additionally, we recognize SRTD efforts in meeting with the City to explore alternatives to a grade separation structure that assures pedestrian safety and adequate refuge areas between the SRTD tracks and the parallel Cosumnes River Boulevard for an at-grade solution at this location that appear more practicable. The City has agreed to work cooperatively with the SRTD during final design of their respective infrastructure. We agree that with the existing and planned infrastructure at this location and the limited space, as well as the established pedestrian travel patterns and the inability to develop channelization to limit at-grade pedestrian movements along Cosumnes River Boulevard at this location, a pedestrian over crossing of the SRTD tracks and Cosumnes River Boulevard, while technically feasible, is not practical nor justified. We are confident that SRTD is committed to reach consensus on the treatments of the refuge area and crossing at his location, and are satisfied that hazards can be eliminated or minimized to provide for the safety of the crossing of the SRTD tracks and adjacent roadway."

STATE OF CALIFORNIA

ARNOLD S.

A2 : A - 00113

PUBLIC UTILITIES COMMISSION
515 L STREET, SUITE 1119
SACRAMENTO, CA 95814

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APR 26 2007
ESD

April 25, 2007

Diane Nakano, PE
Assistant General Manager for Engineering & Construction
Sacramento Regional Transit District
1400 29th Street, P.O. Box 2110
Sacramento, CA 95812-2110

RE: Sacramento Regional Transit District (SRTD) South Line Phase 2, Supplemental Draft Environmental Impact Report (SDEIR)

Dear Ms. Nakano:

As the state agency responsible for railroad, rail transit and crossing safety within California, we have reviewed the SDEIR distributed by SRTD on its South Line –Phase 2 project. In general, we recommend that any addition of track resulting in road configuration changes or disruption of current pedestrian pathways be planned with the public safety of the rail corridor as the primary goal. This includes considering pedestrian circulation patterns/destinations with respect to the transit system right-of-way when planning the location and configuration of facilities.

Safety factors to consider include, but are not limited to, the planning for grade separations for major thoroughfares and installation of appropriate fencing to limit the access onto the railroad right-of-way. Any project that includes a modification to an existing crossing or proposes a new crossing is legally required to obtain authority to construct from the Commission. If the project includes a proposed new crossing, the Commission will be a responsible party under CEQA and the impacts of the crossing must be discussed within the environmental documents.

We have identified in the SDEIR specific concerns with the project, including:

1. In the Commission's Rules of Practice and Procedure that pertain to new rail crossings. Rule 3.7 (c) (2) requires "a statement showing why a separation of grades is not practicable". Therefore, the SRTD SDEIR should acknowledge that the Commission has final authority regarding this matter and should justify its decision not to grade separate the crossings within the SDEIR, specifically addressing the following crossings:

A. Meadowview Road
The report lists a current Average Daily Traffic (ADT) of 24,200 and a projected 2025 count of 27,400.

B. Franklin Boulevard
The report lists a current ADT of 21,000 and a projected 2025 count of 28,300.

Safety has been an overriding consideration in the planning and design of the LPAP2 including both vehicular and pedestrian grade crossings.

Grade separations are included and evaluated in the SDEIS/SDEIR as design options. RT has developed and submitted to the California Public Utilities Commission (CA PUC) a hazards report evaluating the safety of the proposed LPAP2 project. RT has continued to coordinate with the CA PUC regarding this hazard evaluation, consistent with RT's desire for early coordination with the PUC. Please see the response to the CA PUC letter on the previous pages regarding this continued coordination and resolutions.

RT acknowledges that the CA PUC has final authority regarding new rail crossings and modifications to existing crossings. RT has included in the SFEIS/SFEIR a discussion of the reasons for inclusion or exclusion of grade separations as part of the LPAP2. Please see Volume I, Section 4.16 – Safety.

Diane Nakano
April 25, 2007
Page 2

C. Center Parkway
The report lists a current ADT of 8,000 and a projected 2025 count of 16,400.

D. Cosumnes River Boulevard
The report lists a current ADT of 13,700 and a projected 2025 count of 31,000. This crossing is also proposed to cross four lanes at-grade at a 17 degree skew angle. This very flat skew angle creates extra hazards for motorists including poor visibility of approaching trains and an extra long distance for trains to clear the road (over 300 feet) and cars to clear the tracks (over 200 feet). This complicates the warning device timing and may require significant additional circuitry, detection loops and/or pre-signals.

Because of these potential hazards and a forecasted 2025 ADT of over 31,000 and a Level of Service (LOS) E at the nearby intersection of Cosumnes River Boulevard and Bruceville Road, we highly recommend that this crossing be grade separated.

2. Due to the fact that there are three schools in the vicinity of the proposed Center Parkway crossing, we recommend that the pedestrian bridge option be implemented and that it cross not only Cosumnes River Boulevard, but the LRT tracks as well to assure the safety of the large number of pedestrians that these schools generate.

3. We recommend the installation of vandal-resistant fencing along the entire rail corridor, particularly east of Franklin Boulevard, within the project limits.

The above-mentioned safety improvements should be considered when approval is sought for the new rail corridor. Working with Commission staff early in the conceptual design phase will help improve the safety to motorists and pedestrians.

If you have any questions in this matter, please call me at (916) 324-7134.

Very truly yours,

David Stewart
Utilities Engineer
Rail Crossings Engineering Section
Consumer Protection and Safety Division

cc: Kevin Boles, CPUC
Raed Dwairi, CPUC

See prior page regarding the discussion of hazards that has been added to this SFEIS/SFEIR – Section 4.16: Safety. RT has now included in the LPAP2 Project a flyover bridge of Cosumnes River Boulevard. Please see response to the first CA PUC letter on the previous pages.

RT's policy for providing fencing along its corridor is to provide it when safety of pedestrians in and around the light rail stations and at-grade crossings can be improved by channeling them to designated areas to cross streets or the LRT tracks. Therefore for this project, fencing installation is limited primarily to these areas. Final determination will be made during final design. However, noise walls are included as part of the LPAP2, as described in Volume I, Chapter 4, Section 4.12, of the SEIS/SEIR. These walls provide a physical barrier between the light rail extension and adjoining land uses specifically along the UPRR right of way and along Cosumnes River Boulevard (east of Franklin). These noise walls will act in similar capacity to vandal-resistant fencing.

RT has developed and submitted to the California Public Utilities Commission (CA PUC) a hazards report evaluating the safety of the proposed LPAP2 project. RT has continued to coordinate with the CA PUC regarding this hazard evaluation, consistent with RT's desire for early coordination with the PUC. Please see the response to the CA PUC first letter on the previous pages regarding this continued coordination and resolution.

Regional Agencies / Utilities

LOS RIOS
COMMUNITY COLLEGE DISTRICT

A2 : A - 00094
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American River College
Cosumnes River College
Folsom Lake College
Sacramento City College

1919 Spanos Court
Sacramento, CA 95825
Phone: 916 568-3021
Fax: 916 568-3023
www.losrios.edu

March 28, 2007

Ms. Diane Nakano, P.E.
Assistant General Manager for Engineering & Construction
Sacramento Regional Transit District
1400 29th Street P.O. Box 2110
Sacramento, CA 95812-2110

Dear Ms. Nakano:

Please allow this letter to serve as comments from the Los Rios Community College District (LRCCD) to the South Sacramento Corridor Phase 2 Supplemental Draft Environmental Impact Statement/Report, dated January 2007.

1. The District strongly supports the Locally Preferred Alternative Phase 2 (LPAP2) option to either the No-Action alternative or the Transportation Systems Management alternative. The issues of traffic, area growth, and air quality require the significant improvements LPAP2 will bring to the region.
2. Reconfiguration of the Bruceville entrance to align with the Cotton Lane extension should be considered and included.
3. The District requests an evaluation of an alternative to move the parking structure north from the southeast campus corner to an area immediately south of the Bruceville entrance. Alternatively, consideration of 2 lower level structures (not obscuring visibility into the campus) adjacent to either/both sides of the Bruceville entrance should be undertaken.
4. The District requests implementation of mitigation measures to address street closures and traffic interruption, identified in Table S-3 Sections 5.2.17, to minimize disruption of student attendance. Special attention to peak attendance times and periods should be undertaken.
5. Line of sight into the campus from Bruceville and the north side of the entrance is critical as new College facilities are planned west of the parking lot adjacent to the proposed CRC Station. The alternative listed in figure 2.4-17 would be unacceptable if the height of the structure obscured this line of sight.
6. The tailtracks south of the Bruceville/CRC entrance should be concealed by landscaping.
7. Section 2.4.5.4 indicates that the structure "would be constructed by LRCCD and CRC, with future financial participation from RT." LRCCD looks to be a partner in the

South Sacramento Corridor Phase 2 SFEIS/SFEIR

RT and FTA appreciate the Los Rios Community College District's support for implementation of the LPAP2.

RT has discussed with the City of Sacramento and the anticipated developer of the property across from the Bruceville Road college entrance the ultimate alignment of Cotton Lane in relation to the college entrance. On its current Preliminary Engineering (PE) plans, RT has proposed that the college entrance be designed such that the current southerly curb line along the entrance road remain in its current location.

RT has met with CRC and the Los Rios Community College District and agrees that the parking should be place in the location requested by the District immediately south of the main college entrance off of Bruceville Road.

RT will adopt a Mitigation Monitoring Plan assuring implementation of the mitigation measures provided in this SFEIS/SFEIR. RT has added the following mitigation measure in response to the District's request.

> "RT will communicate and coordinate with the CRC and Los Rios Community College District regarding the timing of any street closures during construction of the LPAP2, with particular attention to peak student travel periods.

Please see response on the following pages.

LOS RIOS
COMMUNITY COLLEGE DISTRICT

A2 : A - 00094

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American River College
Cosumnes River College
Folsom Lake College
Sacramento City College

1919 Spanos Court
Sacramento, CA 95825
Phone: 916 568-3021
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March 28, 2007

Ms. Diane Nakano, P.E.
Assistant General Manager for Engineering & Construction
Sacramento Regional Transit District
1400 29th Street P.O. Box 2110
Sacramento, CA 95812-2110

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5. Line of sight into the campus from Bruceville and the north side of the entrance is critical as new College facilities are planned west of the parking lot adjacent to the proposed CRC Station. The alternative listed in figure 2.4-17 would be unacceptable if the height of the structure obscured this line of sight.
6. The tailtracks south of the Bruceville/CRC entrance should be concealed by landscaping.
7. Section 2.4.5.4 indicates that the structure "would be constructed by LRCCD and CRC, with future financial participation from RT." LRCCD looks to be a partner in the

Please see responses on prior page.

This comment would preclude the parking structure option(s) north of the CRC College entrance on Bruceville Road. As noted above, RT agrees that the parking should be placed immediately south of the main college entrance. RT will work directly with the CRC and Los Rios Community College District regarding the design of the other facilities on or adjacent to the LRT platforms north of the entrance.

RT is proposing to provide landscaping on both sides of the trail tracks to reduce visual impacts associated with storage of light rail vehicles.

RT continues to pursue financial participation from beneficiaries of LRT rail extensions and lines in its service district. In response to this objective, CRC and the Los Rios Community College District have agreed to provide the right-of-way for the light rail track, platforms, parking structure, bus bays, and tail track at no charge to the project. RT will pursue sufficient funding from various funding sources to construct the entire LPAP2 and all related facilities including the parking structure.

construction of the facility, but maintains the expectation that funding for the project will come from RT sources, not LRCCD.

8. Traffic surrounding the Bruceville and Calvine entrances needs to be mitigated and improved from the potential "E" level identified in 3.3.8.4. Consideration of additional entrances/exits onto Calvine and Bruceville should be undertaken.
9. Traffic mitigation considerations should also evaluate the feasibility of a north entrance into the College off of CRB.
10. Perimeter campus fencing needs to be maintained during construction of the light rail on campus property.

Thank you for the opportunity to respond to this important project. If you have any questions regarding these comments please feel free to contact our office at (916) 568-3058.

We look forward to your response regarding these issues.

Sincerely,

Jon Sharpe
Deputy Chancellor

JS:jd

cc: Brice Harris
Francisco Rodriguez

Please see response on previous page.

Improvements to the Bruceville Road entrance to the College are shown as mitigation for the project in Volume I, Section 3.3.9.2. An additional entrance off of Old Calvine Road is also proposed to relieve traffic pressure on the main entrance. Refer to revised Figure 2.4-16 in the SFEIS/SFEIR plans.

The north entrance to the Campus was proposed for the surface parking option, which is no longer under consideration. This north campus entrance is not proposed as part of the project for the selected parking garage option.

It is anticipated that campus perimeter fencing will be able to be maintained during construction. Temporary fencing locations may be required to accommodate construction. Upon completion of construction, permanent fencing would be installed.

SACRAMENTO METROPOLITAN
AIR QUALITY
MANAGEMENT DISTRICT

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A2:A-00099

Larry Greene
AIR POLLUTION CONTROL OFFICER

April 3, 2007

Ms. Diane Nakano, P.E.
Assistant General Manager for
Engineering & Construction
Sacramento Regional Transit District
P.O. Box 2110
Sacramento, CA 95812

RE: Supplemental Draft EIR/EIS for South Sacramento Corridor Phase 2 Project
SMAQMD No. : SAC200701097

Dear Ms. Nakano:

Thank you for the opportunity to review and comment on the above referenced project. The consideration of the other large projects to take place over the course of the construction of South Sacramento Corridor Phase 2 and the inclusion of our Standard Construction Mitigation is commendable. Ongoing coordination with the other projects in the area can only be a benefit to all concerned. Additional Sacramento Metropolitan Air Quality Management District staff comments are as follows:

1. Regional Transit may wish to consider whether the environmental document needs to contain a discussion of climate change. The emerging issue of climate change has gained a great deal of attention in the past several years. As you know, on September 27, 2006, the State of California passed into law AB32, the Global Warming Solutions Act of 2006 which requires the State to reduce its carbon emissions by approximately 25% by the year 2020. In addition, California Attorney General Bill Lockyer raised the issue of global warming in his comment letter (3/20/06) on the Orange County Transportation Authority's 2006 Long-Range Transportation Plan Draft Program EIR. His precedent-setting letter pointed out that one of the most important environmental impacts of vehicle emissions is greenhouse gases (GHG) and the resulting climate change. In addition to transportation sources, greenhouse gases are also generated by industry and agricultural activities.

   The major anthropogenic greenhouse gases are; carbon dioxide, methane, and nitrous oxide. Neither the District, state, nor federal government have specific thresholds of significance for project-related greenhouse gases. That makes discussions on a project's cumulative impact to global warming problematic. Over time, we expect the scientific community to develop more tools help analyze and effectively mitigate greenhouse gases. In the meantime, the next version of URBEMIS, to be released shortly, will include CO^2 emissions estimates for land use projects, and the District's revised Guidance for Land Use Emissions Reductions includes information on mitigation options for development projects. District staff would be happy to provide information on other resources as they become available.

2. Construction emissions were calculated using EMFAC2001 which may not reflect the most current information available. The EMFAC model has been updated twice since the 2001 version, most recently in late 2006 (EMFAC 2007). At a minimum the use of the Sacramento Metropolitan Air Quality Management District's Roadway Construction Emissions Model (v.5.2), recommended for linear projects such as this one, may produce emission results that are more reflective of the Sacramento area.

3. Regarding emissions associated with the parking structure; encouraging other local transit providers, specifically ETran and Paratransit, to include the Cosumnes River College Station and other stations as appropriate in their routes, will further reduce light duty trips.

777 12th Street, 3rd Floor ‖ Sacramento, CA 95814-1908
916/874-4800 ‖ 916/874-4899 fax
www.airquality.org

A discussion of climate change and greenhouse gases has been added to the SFEIS/SFEIR, Volume I, Section 4.3.3.

The New construction emissions model has been applied, and Section 5.2.3 has been updated accordingly.

E-Tran has shown considerable interest in the Cosumnes River College as an important multi-modal station for its system – please see letter from City of Elk Grove on page II-124.

Ms. Nakano
South Line Phase 2 SDEIR
4/3/07
Page 2

4. This project is also subject to any and all District rules in effect at the time of construction. The attached sheet enumerates some of those rules for your convenience. Additional information about those and all other rules that may be applicable can be found at www.airquality.org or by calling Compliance Assistance at (916) 874-4884.

RT will review the District's rules again in advance of construction.

Sincerely,

Charlene McGhee
Associate Air Quality Analyst

Attachment

c: Larry Robinson, Land Use and Transportation Program Coordinator, Sacramento Metropolitan AQMD

South Sacramento Corridor Phase 2 SFEIS/SFEIR

SMAQMD Rules & Regulations Statement

*The following statement is recommended as standard condition of approval or construction document language for **all** construction projects within the Sacramento Metropolitan Air Quality Management District (SMAQMD):*

All projects are subject to SMAQMD rules and regulations in effect at the time of construction. A complete listing of current rules is available at www.airquality.org or by calling 916.874.4800. Specific rules that may relate to construction activities may include, but are not limited to:

Rule 201: General Permit Requirements. Any project that includes the use of equipment capable of releasing emissions to the atmosphere may require permit(s) from SMAQMD prior to equipment operation. The applicant, developer, or operator of a project that includes an emergency generator, boiler, or heater should contact the District early to determine if a permit is required, and to begin the permit application process. Portable construction equipment (e.g. generators, compressors, pile drivers, lighting equipment, etc) with an internal combustion engine over 50 horsepower are required to have a SMAQMD permit or a California Air Resources Board portable equipment registration.

Rule 403: Fugitive Dust. The developer or contractor is required to control dust emissions from earth moving activities or any other construction activity to prevent airborne dust from leaving the project site.

Rule 442: Architectural Coatings. The developer or contractor is required to use coatings that comply with the volatile organic compound content limits specified in the rule.

Rule 902: Asbestos. The developer or contractor is required to notify SMAQMD of any regulated renovation or demolition activity. Rule 902 contains specific requirements for surveying, notification, removal, and disposal of asbestos containing material.

Other general types of uses that require a permit include dry cleaners, gasoline stations, spray booths, and operations that generate airborne particulate emissions.

South Sacramento Corridor Phase 2 SFEIS/SFEIR

FREEPORT
REGIONAL WATER AUTHORITY

A2 : A - 00089

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BOARD MEMBERS
John Coleman
Katy Foulkes
Don Nottoli
Jimmie Yee

ASSOCIATE BOARD MEMBER
Bonnie Pannell

GENERAL MANAGER
Eric F. Mische

SECRETARY
Cindy H. Turner

GENERAL COUNSEL
John F. Whisenhunt

TREASURER
Gary M. Breaux

March 5, 2007

Ms. Diane Nakano, P.E.
Assistant General Manager for Engineering & Construction
Sacramento Regional Transit District
1400 29th Street, P.O. Box 2110
Sacramento, CA 95812-2110

Subject: South Sacramento Corridor Phase 2 Project Draft EIR

Dear Ms. Nakano:

The Freeport Regional Water Authority (FRWA) has received the Draft EIR for the above-referenced project. We note that the Draft EIR, on page 2-58, describes the Freeport Regional Water Project as a related project, and states that "One of the project alternatives would locate the diversion pipe along CRB". We wish to clarify that the pipeline along Cosumnes River Boulevard is part of Segment 1 of our selected project, for which design is almost complete. Construction of this segment will take place from June 18, 2007 through December 31, 2008. We realize that there is a potential for the end of our construction phase for Segment 1 to overlap with the beginning of construction for the South Sacramento Corridor Phase 2 Project. To ensure that we address any potential conflicts, FRWA will continue our ongoing coordination with your staff. Thank you for working with us to ensure that both of these important projects move forward successfully.

Chapter 2, Volume I has been edited to note that that portion of the Freeport Diversion Project along Cosumnes River Boulevard is part of the FRWA's Segment 1 project.

RT also anticipates continuation of the coordination that has already occurred between RT and the FRWA.

Sincerely,

Eric F. Mische, Ph.D., P.E.
General Manager

2710 GATEWAY OAKS DRIVE • SUITE 320-South • SACRAMENTO • CA 95833
Tel. (916) 643-1717 • Fax. (916) 929-2984
www.freeportproject.org

EAST BAY
MUNICIPAL UTILITY DISTRICT

A2:A-00083

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March 21, 2007

Diane Nakano, P.E.
Assistant General Manager for Engineering & Construction
Sacramento Regional Transit District
1400 29th Street, P.O. Box 2110
Sacramento, CA 95812-2110

Re: Supplemental Draft Environmental Impact Statement/Subsequent Draft Environmental Impact Report/Draft Section 4(f) for Sacramento Regional Transit District's South Sacramento Corridor, Phase II

Dear Ms. Nakano:

East Bay Municipal Utility District (EBMUD) appreciates the opportunity to comment on the Supplemental Draft Environmental Impact Statement/Subsequent Draft Environmental Impact Report/Draft Section 4(f) for Sacramento Regional Transit District's South Sacramento Corridor, Phase II. This project is located outside of EBMUD's service area; EBMUD has no comments regarding environmental issues for this project.

If you have any questions concerning this response, please contact David J. Rehnstrom, Senior Civil Engineer, Water Service Planning at (510) 287-1365.

Sincerely,

William R. Kirkpatrick
Manager of Water Distribution Planning

WRK:TNS:sb
sb07_042.doc

cc: Mr. Jerome Wiggins, Program Specialist
Office of Planning and Programming
U.S. Department of Transportation
Federal Transit Administration, Region IX
201 Mission Street, Suite 1650
San Francisco, CA 94105

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RT and FTA appreciate East Bay Municipal Utility District's review of the SDEIS/SDEIR.

South Sacramento Corridor Phase 2 SFEIS/SFEIR

A2 : A - 00095

Pacific Gas and Electric Company
Land Services Office
343 Sacramento Street
Auburn, CA 95603

Direct: (530) 889-5089
Fax: (530) 889-3392
Email: dlkn@pge.com

April 3, 2007

Ms Diane Nakano, P.E., Assistant G.M. Engineering and Construction
Sacramento Regional Transit District
P.O. Box 2110
Sacramento, CA 95812-2110

RE: RT South Sacramento Corridor Phase 2, Supplemental DEIS

Dear Ms. Nakano:

Thank you for the opportunity to comment on the Supplemental Draft Environmental Impact Statement for the Regional Transit (RT) South Sacramento Corridor Phase 2 project. Pacific Gas and Electric Company (PG&E) owns and operate both gas and electric transmission facilities within the project area.

Due to the design of the South Sacramento Corridor Phase 2 project both gas and electric transmission facilities will be required to relocate to avoid conflicts with the proposed RT facilities. Electric and gas relocation requirements are separately discussed below.

Electrical Facilities

PG&E operates and maintains the Brighton – Davis 115kV within the proposed project boundaries. Land Use is restricted within the easement. One of PG&E's concerns is for continued access to the structures and lines with heavy equipment for maintenance and repair of the towers, insulators, and wires. Another is for adequate ground clearance from the wires as set forth in California Public Utilities Commisssoin General Order No. 95. The relocation of the electric transmission tower is accurately described in the DEIS Section 2.4.4.4 Bruceville Road on Page 2-42. RT will be responsible for 100% of the costs associated in the relocation/replacement of the lattice steel tower. RT will also

RT will be responsible for all reasonable costs associated with the relocation / replacement of the subject PG&E tower. RT will design its facilities to allow for continued access for heavy equipment for maintenance and repair of PG&E towers, insulators, and wires with adequate clearance from the wires consistent with CPUC General Order No. 95.

South Sacramento Corridor Phase 2 SFEIS/SFEIR

be responsible in acquiring satisfactory replacement rights or modification to existing rights should they be needed. Please note that after the new location has been engineered for the requested Tubular Steel Pole, the ordering of steel materials requires long lead times. This process should be initiated as soon as possible as to not delay the project's schedule. In the relocation of PG&E electric transmission facilities, you may contact Tom Prindiville at (916) 408-3328 to initiate this process.

Gas Facilities

PG&E owns and operates gas transmission facilities which are located within the proposed project boundaries. To promote the safe and reliable maintenance and operation of utility facilities, the California Public Utilities Commission (CPUC) has mandated specific clearance requirements between utility facilities and surrounding objects or construction activities. To ensure compliance with these standards, project proponents should coordinate with PG&E early in the development of their plans. Any proposed development plans should provide for unrestricted utility access and prevent easement encroachments that might impair the safe and reliable maintenance and operation of PG&E's facilities. RT will be responsible for 100% of the costs associated in the relocation of PG&E's gas facilities.

While PG&E has met with RT several times over the past 2 years a route for the relocation of the existing gas line has **not been agreed to by PG&E**.

The gas pipeline route as shown on Figure 4.17-1 is not entirely acceptable to PG&E as has been conveyed to RT in previously meetings due to accessibility issues with the proposed pipeline being located within backyards of private residences.

PG&E prefers the pipeline continue southerly from the current terminus of Detroit Boulevard along the proposed alignment of Detroit Boulevard to the northerly boundary of the proposed RT Morrison Creek Station, then turning easterly to the existing pipeline alignment and tie-in within Morrison Creek. This alignment will require a 25 foot easement if contiguous to a franchise street corridor (50 foot wide easement if not contiguous to a street) from the terminus of Detroit Boulevard to the "tie-in" point with the existing pipeline. RT is responsible to acquire satisfactory land rights necessary for the relocation of these facilities at no cost to PG&E

In addition, in order to assure the timely relocation of these facilities PG&E strongly suggests that RT enter into the necessary relocation agreements with PG&E as soon as possible and include PG&E facilities in all permit applications with agencies such as US Army Corp of Engineers, California Department of Fish and Game, Regional Water Quality Control Board, Sacramento County Regional Sanitation District, etc. The continuing delay in establishing this agreement has

RT understands that it must acquire satisfactory replacement rights or modifications to existing rights, as required. RT acknowledges the long lead time for ordering and delivery of the pole and will act accordingly.

RT will continue to work with PG&E during project design to assure adequate clearances and unrestricted access to PG&E gas line facilities. RT will be responsible for all reasonable costs associated with the relocation of the PG&E gas facilities.

RT agrees to revise the end of gas line relocation alignment by extending it further south before turning easterly to connect with the existing pipeline within Morrison Creek. Except for its crossing under the LRT tracks, creek levee and Morrison Creek, the pipeline would be located in franchise street corridors to be constructed by the Dunmore Homes Development. Satisfactory land rights would be obtained for PG&E by RT.

RT will progress execution of the necessary agreements with PG&E in order to progress timely engineering and construction of the facilities to be relocated and replaced. for assistance in review RT plans and developing the ultimate pipeline relocation route.

RT will include the work to be performed by PG&E in all permit applications as is appropriate for the permit being procured.

placed a 2008 relocation of PG&E facilities at risk. To initiate the relocation process of PG&E gas facilities, you may contact Joseph Pennington at (916) 408-3309.

FYI: A couple of the other alternatives are also acceptable (Morrison Creek route, Cal Ag Dept route), but we can discuss those when we start route negotiations with RT.

PG&E is dedicated to providing safe and reliable electrical power and gas service to meet California's growing needs. If you have further questions, please contact me at (530) 889-5089.

Sincerely,

Donald Kennedy

Donald Kennedy
Land Agent

RT has reviewed other gas line relocation routes and is willing to review and discus these and/or other PG&E alternatives as the design for the South Sacramento Corridor Phase 2 project advances. RT notes that the use of Morrison Creek would introduce additional environmental issues and additional coordination / permit requirements with the U.S. Fish and Wildlife Service, the U.S. Army Corps of Engineers, the Sacramento Area Flood Control Agency, the State Department of Water Resources, the State Board of Reclamation, and the City of Sacramento Utilities Division.

A2:A-00103

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April 5, 2007

Ms. Diane Nakano, P.E.
Assistant General Manager for Engineering and Construction
Sacramento Regional Transit District
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Sacramento, CA 95812-2110

SOUTHGATE
RECREATION & PARK DISTRICT

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Administrative Headquarters
6000 Orange Avenue
Sacramento, CA 95823-3225
Phone 916-428-1171
Facsimile 916-428-7334
www.southgaterecandpark.net

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Maureen Casey

SUBJECT: Comments on the South Sacramento Corridor Phase 2 Supplemental Draft Environmental Impact Statement/Subsequent Draft Environmental Impact Report/Draft Section 4(f)

Dear Diane;

The District thanks the Sacramento Regional Transit District for the opportunity to comment on the South Sacramento Corridor Phase 2 Supplemental Draft Environmental Impact Statement/Subsequent Draft Environmental Impact Report/Draft Section 4(f). The project Study Area encompasses approximately 1.5 square miles of the southwestern corner of the Southgate Recreation and Park District as shown on the attached map. The project proposes to include an optional shuttle lot within the District's boundaries along Calvine Road.

The three project alternatives were reviewed; the No-Action Alternative, the Transportation Systems Management Alternative (TSM), and the Locally Preferred Alternative Phase 2 (LPAP2). The No-Action Alternative would not result in direct long-term impacts on parks or recreational facilities. The TSM and LPAP2 alternatives would both improve accessibility for area residents to parks and recreational facilities within and outside of the Study Area.

Table 4.15-1 Existing Parks and Recreational Facilities in the Study Area lists the following Southgate District parks: Calvine Station Park, Countryside Community Park, Danbury Parkway (this is actually part of the Tillotson Parkway), Toby Johnson Park, Tillotson Parkway, and Hardester Park. Please delete Danbury Parkway and add Cottonwood Park to the table.

Figure 4.15-1 Parks and Recreational Facilities incorrectly displays the Southgate District park site locations. The accompanying graphic shows the correct Southgate Recreation and Park District park site names and locations within the Study Area. The District would be happy to provide a GIS Shapefile upon request.

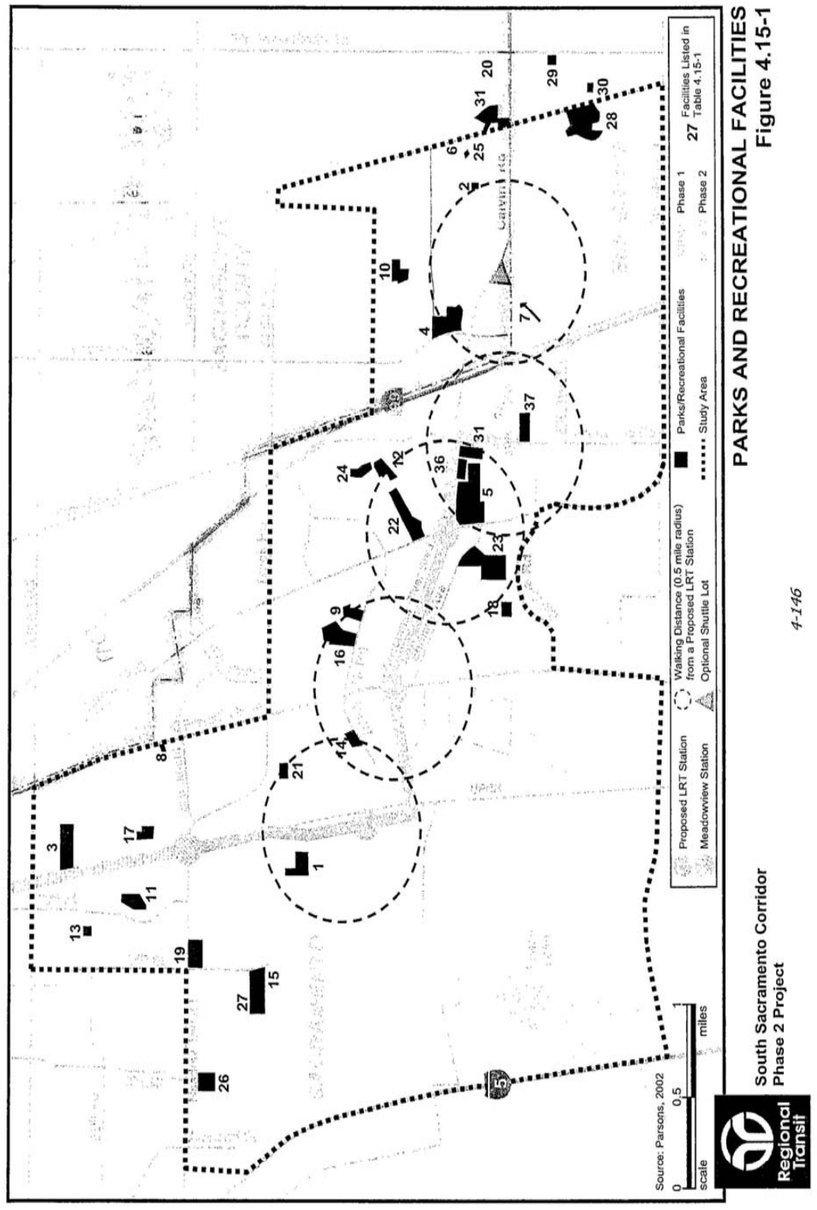
Danbury Parkway has been deleted from, and Cottonwood Park has been added to, Table 4.15-1 in Section 4.15, Volume I, of the SFEIS/SFEIR. Figure 4.15-1, Section 4.15, Volume I of the SFEIS/SFEIR has been revised to be consistent with the graphic provided with this letter.

Thank you again for the opportunity to comment on the South Sacramento Corridor Phase 2 Supplemental Draft EIR/EIS. Please continue to forward documentation related to this project to the District. Should there be any questions regarding the information contained in this comment letter, please feel free to contact me at (916) 428-1171, ext. 29.

Sincerely,

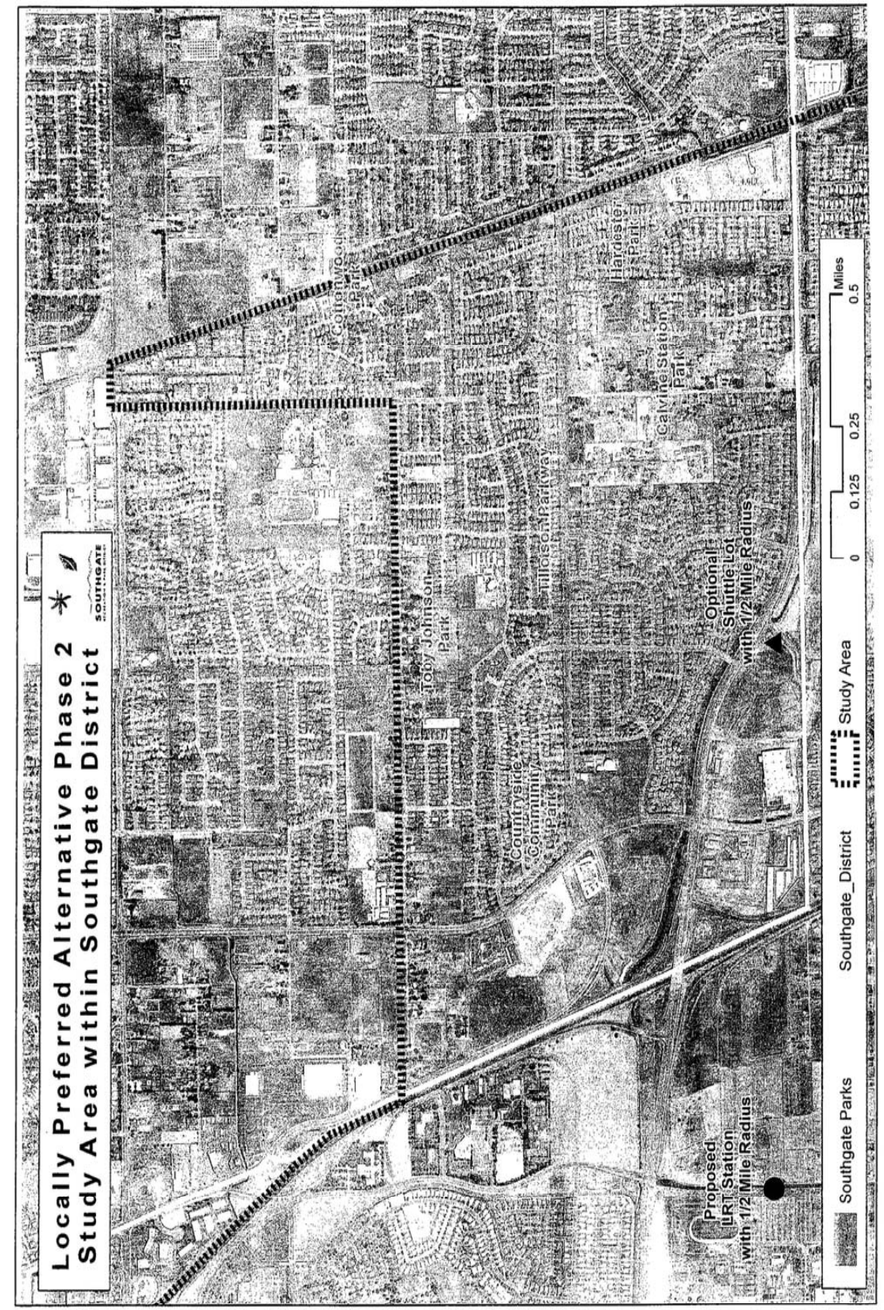
Maureen Casey

Maureen Casey
Assistant General Manager



PARKS AND RECREATIONAL FACILITIES
Figure 4.15-1

4-146



SMUD
SACRAMENTO MUNICIPAL UTILITY DISTRICT ☐ 6201 S Street, P.O. Box 15830, Sacramento, CA 95852-1830. (916) 452-3211
AN ELECTRIC SYSTEM SERVING THE HEART OF CALIFORNIA

April 10, 2007

Diane Nakano, Assistant General Manager
Sacramento Regional Transit District
1400 29th Street
Sacramento, CA 95812-2110

Dear Ms. Nakano

The Sacramento Municipal Utility District (SMUD) appreciates the opportunity to review and comment on the South Sacramento Corridor Project- SDEIS/SDEIR.

SMUD operates and maintains existing underground and overhead sub-transmission and distribution facilities for the delivery of electrical services in this area.

SMUD request the Final –Supplemental EIR note the following SMUD facilities along the planned Light Rail route include: 1) future 69kV line along the planned Cosumnes River Blvd and Light Rail route east of the UP railroad, heading east to connect to the 69kV line at the existing SMUD-Franklin/Erhardt Substation Site. This is shown in orange on the attached drawing; and 2) Underground 12kV along the east side of Bruceville Road.

Any relocation of existing or alignment of future facilities should be closely coordinated with SMUD by contacting Gary Shmizu at (916) 732-6749 and/or Gene Hoppes at (916) 732-5789.

Sincerely,

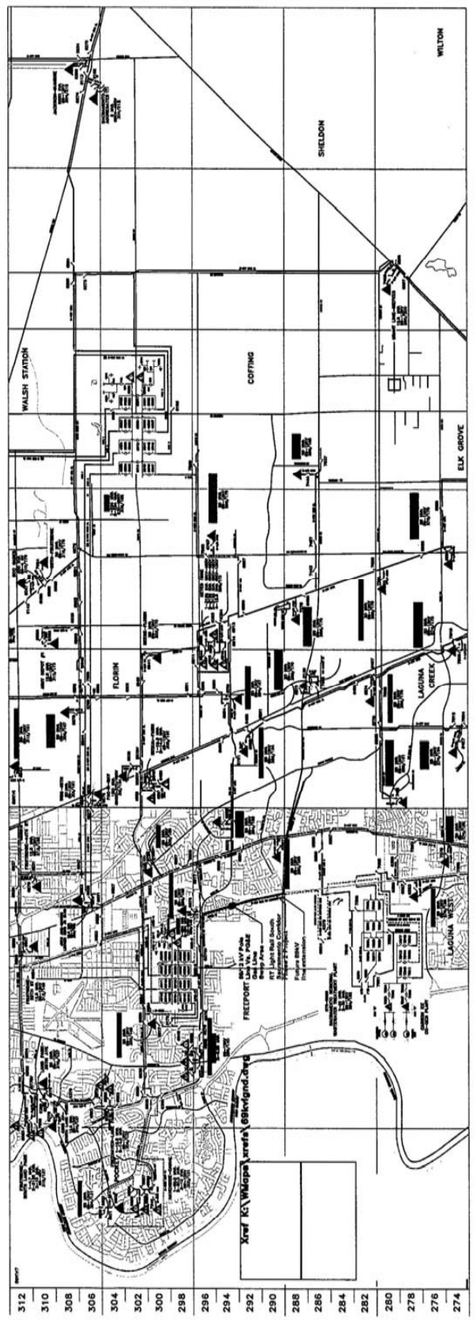
Katherine E. Knourek, Land Specialist
REAL ESTATE SERVICES
(916) 732-6499

RT South Sac
Corridor Ph 2 Pro...

Encl:

cc

Section 4.17, Utilities, in Volume I of the SFEIS/SFEIR now notes the SMUD facilities identified in the letter. RT will continue to coordinate with SMUD as the design of the light rail extension advances, including any coordination that may be necessary regarding future SMUD facilities.


WALSH STATION
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SHELDON
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LAGUNA WEST
FREEPORT
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April 3, 2007

Ms. Diane Nakano
Assistant General Manager for Engineering
and Construction
Sacramento regional Transit District
1400 29th Street, P.O. Box 2110
Sacramento, CA 95812-2110

SUBJECT: Supplemental Draft Environmental Impact Statement/
Subsequent Draft Environmental Impact Report
South Sacramento Corridor Phase 2

Dear Ms. Nakano:

The Department of Utilities, City of Sacramento has prepared and submitted extensive comments on this project. We fully endorse the comments made by City Utilities and support their position.

Sincerely,

Pete Ghelfi
Director of Engineering

Office 916-874-7606
FAX 916-874-8289

1007 - 7th Street, 7th Floor
Sacramento, CA 95814-3407

Please see responses to City of Sacramento, Department of Utilities letter. RT has in the past and will continue to coordinate closely with SAFCA on the South Sacramento Corridor Phase 2 Project.

Sacramento County Agencies

SRCSD

10545 Armstrong Avenue
Mather, CA 95655
Tele: [916] 876-6000
Fax: [916] 876-6160
Website: www.srcsd.com

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A2:A-00104

April 4, 2007

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Technology in balance with nature

Ms. Diane Nakano
Assistant General Manager for Engineering and Construction
Sacramento Regional Transit
1400 29th St.
P.O. Box 2110
Sacramento, CA 95812

Dear Ms. Nakano:

Subject: SRCSD and CSD-1 Comments on Regional Transit South Sacramento Corridor Phase 2 SDEIS/SDEIR

The Sacramento Regional County Sanitation District (SRCSD) and County Sanitation District 1 (CSD-1) have reviewed the Regional Transit South Sacramento Corridor Phase 2 SDEIS/SDEIR.

The corridor located between the City of Sacramento's detention basin and Union House Creek contains the CSD-1 Central Trunk Project. CSD-1 will be providing rehabilitation of an existing 60-inch sanitary sewer located north of Union House Creek. The Central Trunk Rehabilitation Project crosses underneath Union House Creek and the proposed alignment of the Light Rail Tracks (LRT), then travels south, parallel to the Union Pacific Railroad Tracks. This rehabilitation project is currently in the design phase. Construction is anticipated spring 2008. SRCSD does not have plans for a future interceptor in the area between the detention basin owned by the City of Sacramento and future LRT tracks.

Both CSD-1 and SRCSD sewer lines pass under the proposed LRT alignment at various locations. Close coordination with CSD-1 and SRCSD shall be required to ensure that both districts have continuous access to facilities for maintenance and repair purposes. An operating agreement between Sacramento Regional Transit Authority and SRCSD will be required and shall provide for coordination of emergency and scheduled activities required to maintain or repair SRCSD pipelines or facilities.

CSD-1 pipes at Franklin Boulevard and Center Parkway as well as those under the proposed LRT alignment in Bufferland, south of Union House Creek and east of UPRR shall be protected.

The sewer lift station, **S-025**, at the northeast corner of Consumes River Blvd. and Center Parkway is capacity constrained. The CSD-1 Master Plan includes the SEA-17 Center Parkway Pump Station Improvements project which will increase the capacity and upsize the existing sewer along Center Parkway.

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Sacramento Regional County Sanitation District

RT is aware of the location of the Central Trunk Sanitary Sewer and has designed the LPAP2 project so as to not adversely affect it.

RT will continue to work with the CSD-1 and SRCSD as the LRT design progresses to ensure that the rail extension facilities allow for continuous access to facilities for maintenance and repair purposes. RT will develop in cooperation with the SRCSD an operating agreement specifying the requirements and coordination procedures for emergency and scheduled activities for maintenance and repair of SRCSD pipelines or facilities.

RT will work with CSD-1 and SRCSD during the design and construction of the LRT extension to assure that the CSD-1 pipes are protected.

As noted in Figure 2.4-12, RT proposes to relocate this pump station as part of the LRT project. RT will continue to coordinate with CSD-1 during future design development to coordinate the relocation of the pump station with the Pump Station Improvements Project.

South Sacramento Corridor Phase 2 SFEIS/SFEIR

Ms. Diane Nakano
April 4, 2007
Page 2

Modification of CSD-1 Manhole 119-008-018 is indicated in Figure 2.4-7, but not included in Table 4.17-2.

The Franklin, Cosumnes River and Bruceville flyover options cross over SRCSD facilities and the location of foundation and towers for these flyovers may have potential conflicts with these facilities. The pedestrian bridge identified in Figure 2.4-12 may conflict with the operation of an existing SRCSD gate structure.

Agricultural impacts will occur on SRCSD property and compensation for damages will be required for the tenant farmer east of Morrison Creek, South of Stone-Boswell. Additionally, the SRCSD Bufferlands segment between the Union Pacific Railroad and Franklin Blvd. is currently in a cattle grazing lease. Impacts to this agricultural operation will also need to be addressed.

A subheading for Valley Oaks should be added. Numerous Valley Oaks occur within the footprint of this project. These oaks are part of the SRCSD Trail of Trees tree planting effort. Impacts to this resource, as well as other native trees should be identified. Appropriate mitigation for all impacted native trees should be included per City of Sacramento and County of Sacramento Tree Ordinance.

Table 4.4.2 recognizes the wetland features south of Union House Creek as a possible habitat for special status species crustaceans. A protocol level survey should be conducted to demonstrate presence or absence of these species.

Impacts to special status species invertebrates should be characterized as direct or indirect. As with direct impacts, mitigation for indirect impacts should be defined and/or revised through the consultation process.

Mitigation for impacts to Valley Elderberry Longhorn Beetles should be based on a quantification of elderberry shrub stems immediately prior to project construction. VELB credits will be purchased based on number of stems, not number of transplants.

It is stated that the light rail project between UPRR and Franklin Blvd. will be built up to an elevation above the 100-year flood plain. Identification or assurance against any changes in local surface hydrology that would create new ponding or disrupt surface water flow into existing wetland features is needed.

Security impacts associated with the LPAP2 pedestrian path across Union House Creek to the Franklin Station needs to be addressed. The area will be screened from the activity centered around the station and the CRB by a large sound wall. Appropriate mitigation should be discussed. The pedestrian pathway to the Franklin Station located within the Bufferland properties raises security concerns and should also be addressed.

Modification to manhole 119-008-018 is no longer needed. The Morrison Creek/UPRR Flyover Bridge has been extended thus eliminating the conflict with the manhole. Refer to revised Figure 2.4-7. Table 4.17-2 is therefore correct in this regard.

These conflicts and potential impacts have been added to Section 4.17, Utilities, Volume I of the SFEIS/SFEIR.

Additional information regarding these agricultural land impacts is now included in Section 4.2, Agriculture, Volume I of the SFEIS/SFEIR.

Please see responses on following pages.

Ms. Diane Nakano
April 4, 2007
Page 2

Modification of CSD-1 Manhole 119-008-018 is indicated in Figure 2.4-7, but not included in Table 4.17-2.

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Agricultural impacts will occur on SRCSD property and compensation for damages will be required for the tenant farmer east of Morrison Creek, South of Stone-Boswell. Additionally, the SRCSD Bufferlands segment between the Union Pacific Railroad and Franklin Blvd. is currently in a cattle grazing lease. Impacts to this agricultural operation will also need to be addressed.

Please see responses on previous page.

A subheading for Valley Oaks should be added. Numerous Valley Oaks occur within the footprint of this project. These oaks are part of the SRCSD Trail of Trees tree planting effort. Impacts to this resource, as well as other native trees should be identified. Appropriate mitigation for all impacted native trees should be included per City of Sacramento and County of Sacramento Tree Ordinance.

A qualified arborist shall survey all trees, with a diameter at breast height (dbh) greater than 6 inches, located within the project corridor, to record location, species, dbh, and canopy diameter, prior to initiation of construction activities. Removal of mature riparian trees and other protected trees, if any, will be avoided to the maximum extent possible. Project-related impacts to protected trees will be compensated for on an inch-for-inch (dbh) replacement basis, in accordance with the City of Sacramento Heritage Tree Ordinance. Prior to project construction, orange construction fencing shall be installed around the driplines of all protected trees to be avoided in the construction area. The fencing will be checked and maintained on a regular basis until construction activities are completed.

Table 4.4.2 recognizes the wetland features south of Union House Creek as a possible habitat for special status species crustaceans. A protocol level survey should be conducted to demonstrate presence or absence of these species.

Impacts to special status species invertebrates should be characterized as direct or indirect. As with direct impacts, mitigation for indirect impacts should be defined and/or revised through the consultation process.

Mitigation for impacts to Valley Elderberry Longhorn Beetles should be based on a quantification of elderberry shrub stems immediately prior to project construction. VELB credits will be purchased based on number of stems, not number of transplants.

It is stated that the light rail project between UPRR and Franklin Blvd. will be built up to an elevation above the 100-year flood plain. Identification or assurance against any changes in local surface hydrology that would create new ponding or disrupt surface water flow into existing wetland features is needed.

Security impacts associated with the LPAP2 pedestrian path across Union House Creek to the Franklin Station needs to be addressed. The area will be screened from the activity centered around the station and the CRB by a large sound wall. Appropriate mitigation should be discussed. The pedestrian pathway to the Franklin Station located within the Bufferland properties raises security concerns and should also be addressed.

The Cosumnes River Boulevard (CRB) Extension Project is anticipated to affect the Trail of Trees. The LPAP2 may affect a small number of these trees to the north of the CRB Extension Project. The CRB Extension Project will be responsible for mitigation associated with impacts to trees affected by that project. Project-related effects and proposed mitigation measures associated with the CRB Project are addressed in the Draft Environmental Impact Statement/Environmental Impact Report prepared for that project. For any remaining trees that may be affected by the LPAP2, please see paragraph above regarding mitigation.

Please see responses on the following pages.

Ms. Diane Nakano
April 4, 2007
Page 2

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Agricultural impacts will occur on SRCSD property and compensation for damages will be required for the tenant farmer east of Morrison Creek, South of Stone-Boswell. Additionally, the SRCSD Bufferlands segment between the Union Pacific Railroad and Franklin Blvd. is currently in a cattle grazing lease. Impacts to this agricultural operation will also need to be addressed.

A subheading for Valley Oaks should be added. Numerous Valley Oaks occur within the footprint of this project. These oaks are part of the SRCSD Trail of Trees tree planting effort. Impacts to this resource, as well as other native trees should be identified. Appropriate mitigation for all impacted native trees should be included per City of Sacramento and County of Sacramento Tree Ordinance.

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Security impacts associated with the LPAP2 pedestrian path across Union House Creek to the Franklin Station needs to be addressed. The area will be screened from the activity centered around the station and the CRB by a large sound wall. Appropriate mitigation should be discussed. The pedestrian pathway to the Franklin Station located within the Bufferland properties raises security concerns and should also be addressed.

Please see responses on previous page.

The LPAP2 Project is located within the recognized range of these listed crustaceans, and potential habitat is present on-site and in the immediate vicinity. Each of these species has been previously documented as occurring within the project vicinity. In the BO for the I-5/CRB Project (USFWS 2005), the USFWS determined that vernal pool tadpole shrimp and vernal pool fairy shrimp are reasonably certain to inhabit the project's action area, which overlaps or is immediately adjacent to portions of the LPAP2 area within the SRCSD Bufferlands, based on known occurrences of these two species in wetlands throughout the Bufferlands and the occurrence of potential habitat for these species on-site. Based on this, the USFWS determined that there is a high likelihood that vernal pool tadpole shrimp and vernal pool fairy shrimp inhabit the LPAP2 Project area (USFWS 2008). Therefore, the presence of vernal pool branchiopods is assumed within features on-site that represent potential habitat and potential project-related effects are mitigated accordingly.

Indirect impacts typically include project-related affects that do not directly impact potential habitat for listed vernal pool branchiopods, but that occur within 250 feet of it. Direct and indirect impacts to potential habitat for vernal pool fairy shrimp and vernal pool tadpole shrimp were defined through the Section 7 consultation process with the USFWS. According to the USFWS's BO, approximately 0.14 acre will be directly impacted and 0.99 acre will be indirectly impacted by the project. Prior to initiation of construction activities, RT will compensate for project-related-impacts to vernal pool crustacean habitat through purchase of the equivalent of 2.26 acres of preservation credits, and 0.14 acre of creation/restoration credits from a USFWS-approved conservation bank, or combination of banks, servicing the area where the project effects occur. If a conservation bank can not be found that offers creation/restoration credits servicing the area that includes the project, then, with USFWS approval, RT may be allowed to purchase creation/restoration credits from a conservation bank that's service area does not include the proposed project (USFWS 2008).

Please see responses on following pages.

Ms. Diane Nakano
April 4, 2007
Page 2

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Agricultural impacts will occur on SRCSD property and compensation for damages will be required for the tenant farmer east of Morrison Creek, South of Stone-Boswell. Additionally, the SRCSD Bufferlands segment between the Union Pacific Railroad and Franklin Blvd. is currently in a cattle grazing lease. Impacts to this agricultural operation will also need to be addressed.

A subheading for Valley Oaks should be added. Numerous Valley Oaks occur within the footprint of this project. These oaks are part of the SRCSD Trail of Trees tree planting effort. Impacts to this resource, as well as other native trees should be identified. Appropriate mitigation for all impacted native trees should be included per City of Sacramento and County of Sacramento Tree Ordinance.

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It is stated that the light rail project between UPRR and Franklin Blvd. will be built up to an elevation above the 100-year flood plain. Identification or assurance against any changes in local surface hydrology that would create new ponding or disrupt surface water flow into existing wetland features is needed.

Security impacts associated with the LPAP2 pedestrian path across Union House Creek to the Franklin Station needs to be addressed. The area will be screened from the activity centered around the station and the CRB by a large sound wall. Appropriate mitigation should be discussed. The pedestrian pathway to the Franklin Station located within the Bufferland properties raises security concerns and should also be addressed.

Please see responses on previous pages.

Project related affects to potential habitat (i.e., elderberry shrubs [*Sambucus* species]) for the Valley elderberry longhorn beetle (VELB) (*Desmocerus californicus dimorphus*), if any, will be mitigated in accordance with the *Conservation Guidelines for the Valley Elderberry Longhorn Beetle* (USFWS 1999). 33 elderberry shrubs occur adjacent to Franklin Boulevard on the SRCSD Bufferlands. A biologist conducted a survey of these shrubs in February 2002. No exit holes or other evidence of VELB occurrence were observed during the survey (City of Sacramento & FHWA 2006). No other elderberry shrubs have been observed within the LPAP2 alignment. In 2007, 14 of these elderberry shrubs were directly affected by the Freeport Regional Water Project and transplanted to an off-site conservation bank (pers. comm. C. Consolini).

According to the City of Sacramento, the CRB Project is anticipated to initiate construction ahead of the LPAP2 at the location where the elderberry shrubs are located. The six elderberry shrubs that may be affected by the LPAP2, if it were to be constructed prior to the CRB Extension, are a subset of the elderberry shrubs that will be directly affected by the CRB Extension. Should the CRB Extension precede the LPAP2 Project, as currently anticipated, the CRB Project would be responsible for addressing impacts to affected elderberry shrubs. Impacts and proposed mitigation measures associated with the CRB Extension Project are addressed in the EIS/EIR for that project. In the unlikely event that project timing is modified and LPAP2 Project construction activities occur at this location prior to the CRB Extension Project, it will be necessary for FTA and RT to reinitiate consultation with the USFWS and address impacts on VELB.

Please see responses on following page.

Ms. Diane Nakano
April 4, 2007
Page 2

Modification of CSD-1 Manhole 119-008-018 is indicated in Figure 2.4-7, but not included in Table 4.17-2.

The Franklin, Cosumnes River and Bruceville flyover options cross over SRCSD facilities and the location of foundation and towers for these flyovers may have potential conflicts with these facilities. The pedestrian bridge identified in Figure 2.4-12 may conflict with the operation of an existing SRCSD gate structure.

Agricultural impacts will occur on SRCSD property and compensation for damages will be required for the tenant farmer east of Morrison Creek, South of Stone-Boswell. Additionally, the SRCSD Bufferlands segment between the Union Pacific Railroad and Franklin Blvd. is currently in a cattle grazing lease. Impacts to this agricultural operation will also need to be addressed.

A subheading for Valley Oaks should be added. Numerous Valley Oaks occur within the footprint of this project. These oaks are part of the SRCSD Trail of Trees tree planting effort. Impacts to this resource, as well as other native trees should be identified. Appropriate mitigation for all impacted native trees should be included per City of Sacramento and County of Sacramento Tree Ordinance.

Table 4.4.2 recognizes the wetland features south of Union House Creek as a possible habitat for special status species crustaceans. A protocol level survey should be conducted to demonstrate presence or absence of these species.

Impacts to special status species invertebrates should be characterized as direct or indirect. As with direct impacts, mitigation for indirect impacts should be defined and/or revised through the consultation process.

Mitigation for impacts to Valley Elderberry Longhorn Beetles should be based on a quantification of elderberry shrub stems immediately prior to project construction. VELB credits will be purchased based on number of stems, not number of transplants.

It is stated that the light rail project between UPRR and Franklin Blvd. will be built up to an elevation above the 100-year flood plain. Identification or assurance against any changes in local surface hydrology that would create new ponding or disrupt surface water flow into existing wetland features is needed.

Security impacts associated with the LPAP2 pedestrian path across Union House Creek to the Franklin Station needs to be addressed. The area will be screened from the activity centered around the station and the CRB by a large sound wall. Appropriate mitigation should be discussed. The pedestrian pathway to the Franklin Station located within the Bufferland properties raises security concerns and should also be addressed.

Please see responses on previous pages.

The project proposes to provide hydraulic conveyance of water (culverts) through the raised LRT embankment to maintain existing local surface hydrologic features. Further investigation, analysis and design of improvements to assure maintenance of existing hydrology will continue during final design of the project, together with further coordination with SRCSD.

The revised Noise & Vibration Section 4.12, Volume I of the SFEIS/SFEIR notes that a noise wall will not be required along the LRT alignment as it crosses the Bufferlands.

South Sacramento Corridor Phase 2 SFEIS/SFEIR

Ms. Diane Nakano
April 4, 2007
Page 3

For Table 4.17-1, SRCSD facilities should be as follows:

- Sewer lines pass under the proposed LPAP2 LRT alignment at various locations
- The Center Parkway Station sits on top of two large sewer interceptor pipelines.

Table 4.17-1 in the SFEIS/SFEIR, Volume I, has been changed consistent with this comment.

For Table 4.14-2, SRCSD facilities should be as follows:

- No relocations expected
- Protect SRCSD facilities, including pipes, manholes and other facilities as required.
- Provide all weather maintenance access for crews and vehicles to manholes, structures, etc. at Center Parkway Station

Table 4.12-2 in the SFEIS/SFEIR, Volume I, has been changed consistent with this comment.

If you have any questions regarding these comments please contact me at 916. 876.9944.

Sincerely,

Sarenna Deeble

Sarenna Deeble
CSD-1/SRCSD
Policy and Planning

cc: Michael Meyer, Ruben Robles, SRCSD Development Services, CSD-1 Development Services

Municipal Services Agency

Department of Regional Parks
Gary Kukkola, Director

Terry Schutten, County Executive
Robert F. Shanks, Interim
Agency Administrator

County of Sacramento

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March 21, 2007

Ms. Diane Nakano, P.E.
Assistant General Manager for Engineering and Construction
Sacramento Regional Transit District
1400 29th Street, P.O. Box 2110
Sacramento, CA 95812-2110

RE: SOUTH SACRAMENTO CORRIDOR PHASE 2 DRAFT SUPPLEMENTAL DEIS/DEIR

Ms: Nakano:

The County of Sacramento Department of Regional Parks has reviewed the Sacramento Regional Transit District's South Sacramento Corridor Phase 2 Draft Supplemental EIS/EIR/Section (4f), and has the following comment:

On pages 4-48 to 4-49, mitigation measures for impacts to special-status species include purchasing credits at state and federally-approved mitigation banks and consulting with the manager of the SCRSD to create mitigation habitat at the Bufferlands. Parks requests that RT also include the option to conduct habitat restoration on County-owned lands at Stone Lakes National Wildlife Refuge, Gene Andal Regional Park, and other County park lands for project mitigation needs. Located in close proximity to project actions, these lands are suitable for enhancing habitat values for burrowing owl, Swainson's hawk, giant garter snake, and vernal pool species. County Parks supports habitat mitigation where the type and location of enhanced habitat is consistent with park management goals and objectives. As public open space, enhanced habitats also provide wildlife viewing and other compatible and enjoyable recreation opportunities to the public that are not available at mitigation banks or the Bufferlands. From our experience, the CDFG and USFWS favor mitigation on Park lands where they are situated in the vicinity of project impacts and offer bioregional connections to similar habitat types.

County Parks charges mitigation project applicants a Habitat Restoration Program (HRP) Fee that is placed in a trust fund account for the sole purpose of acquiring more park land and open space in the County. Mitigating on County Park lands then increases recreation opportunities and regional habitat conservation, and may offset growth inducing impacts. Finally, creating mitigation on County Park lands is normally a lower cost option.

Sincerely,

Trevor Burwell, Ph.D. Senior Natural Resource Specialist
County of Sacramento Regional Parks
3711 Branch Center Road
Sacramento, CA 95827

3711 Branch Center Road • Sacramento, California 95827 • phone (916) 875-6961 • fax (916) 875-6050 • www.saccounty.net

The occurrence of additional lands in the region that provide potential opportunities to fulfill project mitigation needs is beneficial. The potential opportunity to conduct habitat restoration on County-owned lands will be evaluated during final design in coordination with the U.S. Fish and Wildlife Service (USFWS), California Department of Fish and Game, and U.S. Army Corps of Engineers, and County Parks Department, and other agencies as appropriate.

Cities

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DEVELOPMENT SERVICES DEPARTMENT

CITY OF SACRAMENTO
CALIFORNIA

NORTH PERMIT CENTER
2101 ARENA BLVD., SECOND FLOOR
SACRAMENTO, CA 95834

ENVIRONMENTAL PLANNING SERVICES

916-808-2762
FAX 916-566-3968

MEMORANDUM

DATE: April 3, 2007

TO: Diane Nakano, P.E.

FROM: Dana Allen, Senior Planner

RE: RT's South Sacramento Corridor Phase 2 Project, Supplemental DEIR

In response to the Notice of Availability on the Regional Transit's South Sacramento Corridor Phase 2 Project, enclosed are comments from the City of Sacramento's Department of Utilities, Department of Transportation, and Development Services Department concerning the proposed project.

Thank you for the opportunity to comment on the proposed project. Please let me know if you have any questions. We look forward to receiving a copy of the Final EIR with responses to our comments. We would appreciate copy mailed directly to each respondent.

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RT appreciates the continuing cooperation with the City of Sacramento on this project. Copies of both volumes of the SFEIS/SFEIR has been mailed to each of the respondents.

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DEPARTMENT OF UTILITIES
ENGINEERING SERVICES DIVISION

CITY OF SACRAMENTO
CALIFORNIA

1395 35th AVENUE
SACRAMENTO, CA
95822-2911

PH 916-808-1400
FAX 916-808-1497/1498

April 3, 2007
70177:MN:sw

Diane Nakano, P.E.
Assistant General Manager for
Engineering & Construction
Sacramento Regional Transit District
PO Box 2110
Sacramento, CA 95812-2110

Subject: RT's South Sacramento Corridor Phase 2 Project, Supplemental DEIR, January 2007

Thank you for the opportunity to review the supplemental Draft Environmental Impact Statement/ Subsequent Draft Environmental Impact Report, Draft Section 4(f) for the *South Line* project. The City of Sacramento Department of Utilities offers the following comments:

1.) **RT's South Line in Morrison Creek, near the UPRR Bridge**

Where RT power lines cross the levee or access route to the levee (e.g., access from Ann Arbor Way to Morrison Creek west levee near UPRR bridge), raise power lines to provide minimum vertical clearance of 18 feet, plus any additional clearance required in vicinity of power lines.

Provide access for flood control maintenance equipment to enter Morrison Creek from right bank / west levee downstream of UPRR bridge. Provide minimum vertical clearance of 18 feet, plus any additional clearance required for safety in vicinity of RT power lines.

For RT at-grade crossings of levee crown, in addition to provisions for private road crossing, provide alarm & warning system for RT trains approaching crossings.

Bridge / bridge piers shall not restrict access for maintenance vehicles to Morrison Creek. Bridge piers & bents shall be designed so as not to restrict low flows or flood flows, or cause erosion. RT shall be responsible for repairing any erosion to flood control facilities in vicinity of the bridge piers & bents. Consider paving waterside levee sideslope at bridge abutments and along entire bridge length because of restricted access for levee maintenance equipment.

This proposed RT bridge will restrict flood control operation, maintenance, inspection and flood fight activities. Consult with California Reclamation Board for criteria for running RT tracks on and/or even "diagonally across" the levee at-grade. The Utility Department, which is responsible for this section of levee maintenance, strongly recommends realigning the new RT tracks so that they will be entirely off (west) of the Morrison Creek levee and out of Morrison Creek.

CITY OF SACRAMENTO
DEPARTMENT OF UTILITIES
Making a Difference in Your Neighborhood

The LRT alignment has been revised so that it does not now cross the levee. The existing levee access road will cross the LRT alignment and an 18 foot minimum vertical clearance will be provided.

RT has revised the LRT alignment based on comments received from the Department of Utilities, City of Sacramento. As shown on Figure 2.4-5 SFEIS/SFEIR, Volume I, the revised alignment does not impact access into the creek. Therefore no new access into the creek is proposed. A new access road has been provided for flood control maintenance equipment access from Ann Arbor Way. The access road will provide access to the top of existing levee at the current location. Where this road crosses the LRT 18 foot minimum clearance will be provided.

The LRT alignment has been revised so that it does not cross the levee road. The levee access road from Ann Arbor Way will continue to cross the LRT alignment. Given the light and sporadic usage of the access road and the fact that it will not be a public crossing, crossing protection per California Public Utilities Commission Standard No. 1-C (stop sign with Private Railroad Crossing sign) is proposed. Use of active warning devices does not appear to be warranted and if used would present an adverse noise impact to the adjacent residences from the warning bells.

RT has conferred with the Department of Utilities of the City of Sacramento and has revised the LRT alignment at this location so that it will be west of the current levee with no bridge over Morrison Creek or tracks crossing the levee. Rather, the tracks will run west of the existing levee on a "super levee" – a widened levee – to the west of where the bridge had been proposed at the corner of the creek. Once south of this super levee section, the alignment swings out further to the west off the levee right of way. Refer to Figure 2.4-5, Volume I of the SFEIS/SFEIR.

So. Sac Corridor, Phase 2 SDEIR
Letter to Diane Nakano
April 3, 2007
Page 2 of 3

2.) **Morrison Creek Station**

Move tracks and station west to keep RT facilities out of levee right-of way and to allow sufficient area for levee operation, maintenance, and flood patrol and flood fight activities.

Consult with California Reclamation Board and Corps of Engineers to determine maintenance responsibility for maintenance and inspection of "levee inspection road" west of RT tracks. If this is determined to be part of flood control project, Reclamation Board should obtain land rights to allow for maintenance, and Corps of Engineers should include maintenance requirements in operation and maintenance manual for flood control project.

Consult with California Reclamation Board and Corps of Engineers to determine requirements for embankment and drainage along landside toe of levee.

3.) **Morrison Creek / UPRR Overhead Bridge**

Provide minimum vertical clearance of 18 feet between levee and bridge soffit for flood control operation and maintenance equipment.

Bridge piers / bents shall be designed so as not to restrict low flows or flood flows, or cause erosion. RT shall be responsible for repairing any erosion to flood control facilities in vicinity of bridge piers / bents.

4.) **Unionhouse Creek, between Morrison Creek and Franklin Blvd**

(a.) **Bufferlands Modified Detention Basin**

Do not reduce capacity of detention basin. Provide specifications for construction.

Do not construct RT facilities (including facilities for Franklin Station) on or over detention basin embankment.

Currently there is no direct hydraulic connection from Unionhouse Creek to the detention basin, and one should not be added.

(b.) **Deer Lake Dr pedestrian bridge and pedestrian path along south side of Unionhouse Creek**

Flood control project requires a minimum of 60 feet of open flowage area (from centerline of creek) along south side of creek. Move southern bridge abutment as required so as not to impair flood flows.

Path may be in 100-yr floodplain; consider moving path out of floodway.

Bridge soffit should be above top of floodwall. Check with Corps of Engineers for floodwall information and for plans for turnout at this location. Bridge approaches shall be designed so as to allow vehicle access along flood control maintenance road on north / right bank. Provide details for gates & fencing at bridge.

5.) **Unionhouse Creek, between Franklin Blvd and Center Parkway**

Contact Corps of Engineers for information on 100-year flood plane for Unionhouse Creek through this entire reach. The Corps of Engineers' *Limited Reevaluation Report, South Sacramento County Streams*, dated December 2004, indicates the 100-year water flood plane through this reach of the flood control project will be higher than Elev. 16 feet.

Do not put Noise Barrier Wall on top of floodwall. Provide for mixed-use trail to also be used for flood control operation, maintenance and inspection.

Refer to the previous comment response. The revised LRT alignment shown in Figure 2.4-5 and 2.4-6 Volume I of the SFEIS/SFEIR allows for levee operation, maintenance, and flood patrol and flood fight activities.

RT will provide land rights as may be requested from California Reclamation Board and Corps of Engineers for a flood levee inspection road for a fee simple purchase, but RT will need access to this road via an easement for LRT maintenance activities.

RT has consulted with the California Department of Water Resources/Reclamation Board and Corps of Engineers during preliminary engineering and will continue to coordinate with these agencies during final design regarding the requirements for embankment and drainage along the landside toe of the levee.

RT has provided for an 18-foot vertical clearance between the levee and the bridge soffit for flood control operation and maintenance equipment.

The piers for the bridge over Morrison Creek will be designed so as not to restrict low flows or flood flows or cause erosion. RT understands its obligation to repair erosion that may be caused by placement of the piers for this bridge.

RT will design and reconstruct the detention basin so that there is no net loss in detention capacity. RT facilities will be on the land side of the existing or reconstructed detention basin embankments.

No hydraulic connection between Union House Creek and the detention basin will be established.

The southerly abutment has been moved outside the creek right of way and will provide the minimum 60 feet of open flowage along south side of creek.

Please see responses on the following page.

So. Sac Corridor, Phase 2 SDEIR
Letter to Diane Nakano
April 3, 2007
Page 2 of 3

2.) **Morrison Creek Station**

Move tracks and station west to keep RT facilities out of levee right-of way and to allow sufficient area for levee operation, maintenance, and flood patrol and flood fight activities.

Consult with California Reclamation Board and Corps of Engineers to determine maintenance responsibility for maintenance and inspection of "levee inspection road" west of RT tracks. If this is determined to be part of flood control project, Reclamation Board should obtain land rights to allow for maintenance, and Corps of Engineers should include maintenance requirements in operation and maintenance manual for flood control project.

Consult with California Reclamation Board and Corps of Engineers to determine requirements for embankment and drainage along landside toe of levee.

3.) **Morrison Creek / UPRR Overhead Bridge**

Provide minimum vertical clearance of 18 feet between levee and bridge soffit for flood control operation and maintenance equipment.

Bridge piers / bents shall be designed so as not to restrict low flows or flood flows, or cause erosion. RT shall be responsible for repairing any erosion to flood control facilities in vicinity of bridge piers / bents.

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Path may be in 100-yr floodplain; consider moving path out of floodway.

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Contact Corps of Engineers for information on 100-year flood plane for Unionhouse Creek through this entire reach. The Corps of Engineers' *Limited Reevaluation Report, South Sacramento County Streams*, dated December 2004, indicates the 100-year water flood plane through this reach of the flood control project will be higher than Elev. 16 feet.

Do not put Noise Barrier Wall on top of floodwall. Provide for mixed-use trail to also be used for flood control operation, maintenance and inspection.

Please see responses on the previous page.

RT intends to place its LRT tracks and station above the 100-year level. The pedestrian trail leading to the station from Deer Lake Drive is proposed to be a more natural setting, consistent with the Bufferlands area and is therefore not proposed to be on an elevated embankment. During a high water event the trail will be out of service.

The bridge soffit has been revised to be above the top of floodwall. RT will work with City Department of Utilities, SAFCA and the Corps of Engineers during final design to assure an appropriate bridge design that is coordinated with the flood control maintenance road and turnaround. Appropriate fencing and gates will also be coordinated with all agencies.

RT will continue to consult with the Corps of Engineers during Preliminary Engineering to procure the most current flood plain elevations so that the LRT trackbed and station are above the defined flood elevations.

Following extensive coordination with the Department of Utilities, SAFCA, and the U.S Corps of Engineers, RT has moved the sound wall to the south side of the multiuse trail. Due to this, RT will be incurring an additional cost to install a transparent wall to assure safety on the multiuse trail. RT notes that it cannot design the multiuse trail to carry heavy flood maintenance equipment using FTA funds. Such costs would be viewed as a "betterment" for the transit project. If this multiuse trail is to be used for this purpose, RT will need supplemental funding from the Corps/SAFCA/DOU so that a combined trail/roadway can be constructed for use by heavy equipment and the public.

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Letter to Diane Nakano
April 3, 2007
Page 3 of 3

At Center Parkway Station, provide for minimum12-foot wide joint use area to south of floodwall for flood control operation, maintenance and inspection.

Soffit of Valley Green Drive pedestrian bridge should be above top of floodwall. Contact Corps of Engineers for information on 100-year flood plane for Unionhouse Creek. The Corps of Engineers' *Limited Reevaluation Report, South Sacramento County Streams*, dated December 2004, indicates the 100-year water surface in vicinity of Valley Green Drive will be Elev. 17 feet or higher. Provide details for gates / fencing plans at bridge.

Center Parkway Pedestrian Bridge Design Option: A Cantilever Pedestrian Access ramp to bridge would further limit access along Unionhouse Creek for flood control operation, maintenance and inspection. Design so as not to interfere with flood control project.

6.) **Center Parkway Bridge**

Check with Corps of Engineers for information on planned flood control project modifications to Center Parkway Bridge over Unionhouse Creek.

Provide information on relocation of pump house north of Cosumnes River Blvd.

7.) **Unionhouse Creek upstream of Center Parkway**

Check with Corps of Engineers for information of 100-year flood stage in Unionhouse Creek. The Corps of Engineers' *Limited Reevaluation Report, South Sacramento County Streams*, dated December 2004, indicates the 100-year water surface upstream of Center Parkway to be Elev. 20.2 feet.

Cosumnes River Blvd Flyover Design Option: This design option moves RT facilities further north toward Unionhouse Creek, thereby reducing the area for future flood control improvements. DOU recommends against this option, i.e., DOU is in favor of the design that moves RT facilities further south of Unionhouse Creek.

Corps of Engineers will be evaluating this reach for necessary flood control improvements to be consistent with flood protection improvements downstream. Maintain minimum 78-foot width for Unionhouse Creek, and allow for additional 12 feet for flood control operation, maintenance and inspection.

DOU is planning construction of a 24-inch diameter transmission water main in this reach of Cosumnes River Blvd, between Center Pkwy and Bruceville Road. The shallow skew angle of RT's at-grade crossing near sta 538+00 will make for a long reach where the water main is under the South Line tracks. Consider and coordinate with DOU placement of a casing pipe for the future 24" pipe.

We appreciate your consideration of these comments. Attached is a copy of a letter from SAFCA in support of these comments and suggestions. If you have any questions regarding this letter, please contact Stu Williams, Senior Engineer with DOU at 808-1410, or me at 808-1423.

Sincerely,

Dave Schamber
Supervising Engineer

Cc: DOU -- Dave Brent, Jeff Heard, Mike Nolan, Jim Peifer, Stu Williams, Inthira Southiyanon
SAFCA – Grant Kreinberg

The Center Parkway Station northerly platform abuts the flood wall and there is no available space to provide for a separate 12-foot joint use area immediately south of the flood wall. It appears to be infeasible for the LRT corridor and station to be moved to the south due to conflicts with the existing sewer interceptors and the future widening of Cosumnes River Blvd. However RT is willing to consider this request for accommodation as design of the RT project progresses.

The bridge soffit has been revised to be above the top of floodwall. RT will work with City Department of Utilities, SAFCA and the Corps of Engineers during final design to assure an appropriate bridge design that is coordinated with the flood control maintenance road and turnaround. Appropriate fencing and gates will also be coordinated with all agencies.

The optional pedestrian bridge over Cosumnes River Boulevard is not proposed to be constructed as part of the project. Should this optional facility be added to the project its final design will be coordinated with City Department of Utilities, SAFCA and Corps of Engineers.

RT will continue to consult during preliminary engineering and final design with the Corps of Engineers regarding its planned flood control project modification to the Center Parkway Bridge.

As currently designed, the LRT track is above the 100 year water surface elevation. RT will continue to coordinate with the Corps of Engineers during further design development to receive the latest 100-year water surface elevations along Union House Creek.

Please see responses on the following page.

So. Sac Corridor, Phase 2 SDEIR
Letter to Diane Nakano
April 3, 2007
Page 3 of 3

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Provide information on relocation of pump house north of Cosumnes River Blvd.

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Check with Corps of Engineers for information of 100-year flood stage in Unionhouse Creek. The Corps of Engineers' *Limited Reevaluation Report, South Sacramento County Streams*, dated December 2004, indicates the 100-year water surface upstream of Center Parkway to be Elev. 20.2 feet.

Cosumnes River Blvd Flyover Design Option: This design option moves RT facilities further north toward Unionhouse Creek, thereby reducing the area for future flood control improvements. DOU recommends against this option, i.e., DOU is in favor of the design that moves RT facilities further south of Unionhouse Creek.

Corps of Engineers will be evaluating this reach for necessary flood control improvements to be consistent with flood protection improvements downstream. Maintain minimum 78-foot width for Unionhouse Creek, and allow for additional 12 feet for flood control operation, maintenance and inspection.

DOU is planning construction of a 24-inch diameter transmission water main in this reach of Cosumnes River Blvd, between Center Pkwy and Bruceville Road. The shallow skew angle of RT's at-grade crossing near sta 538+00 will make for a long reach where the water main is under the South Line tracks. Consider and coordinate with DOU placement of a casing pipe for the future 24" pipe.

We appreciate your consideration of these comments. Attached is a copy of a letter from SAFCA in support of these comments and suggestions. If you have any questions regarding this letter, please contact Stu Williams, Senior Engineer with DOU at 808-1410, or me at 808-1423.

Sincerely,

Dave Schamber
Supervising Engineer

Cc: DOU -- Dave Brent, Jeff Heard, Mike Nolan, Jim Peifer, Stu Williams, Inthira Southiyanon
SAFCA – Grant Kreinberg

Please see responses on previous page

The pump house is owned and operated by CSD-1. The proposed LRT alignment requires relocation of this sanitary sewer facility, which runs north and south along Center Parkway. It is proposed to relocate the pump station to the corner of the Cosumnes River College which has the only available right of way in the local area

The flyover at Cosumnes River Boulevard is now proposed as part of the project. There is very limited available space to move the alignment between Center Parkway and Bruceville (including the flyover bridge) to the south due to conflicts with the existing SRCSD sewer interceptors and the future widening of Cosumnes River Boulevard by the City.

RT has coordinated extensively with SAFCA and the Corps of Engineers during preliminary engineering. RT is aware of the 78 foot width as published in the South Streams Final EIS/EIR. The right-of-way in this area is highly constrained due to the existing sewer interceptors and future widening of Cosumnes River Blvd. This new request for an additional 12 feet appears to be infeasible. However RT is willing to consider this request for accommodation as design of the RT project progresses.

RT will continue to coordinate with the Department of Utilities during final design regarding the water main placement and protection in relation to the light rail extension.

The SAFCA letter is provided on page II-78 of this Volume II of the SFEIS/SFEIR.

DEPARTMENT OF TRANSPORTATION

CITY OF SACRAMENTO
CALIFORNIA

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ROOM 250
SACRAMENTO, CA
95814-2413

OFFICE OF THE DIRECTOR

PH 916-808-7100
FAX 916-808-5573

April 3, 2007

Diane Nakano, P.E.
Assistant General Manager for
Engineering & Construction
Sacramento Regional Transit District
P.O. Box 2110
Sacramento, CA 95812-2110

HAND DELIVERED

RE: South Sacramento Corridor Phase 2

Dear Ms. Nakano:

Thank you for the opportunity to review the Supplemental Draft Environmental Impact Statement/Subsequent Draft Environmental Impact report/Draft Section 4(f). The City of Sacramento Department of Transportation provides the following comments:

1) Chapter 3 – throughout this chapter, year 2000 traffic data are used to represent existing traffic conditions and forecast future traffic conditions. The City does not accept year 2000 data as an accurate representation of the current conditions and believes that this information skews future projections. We recommend that 2007 data be used as the basis of your traffic analysis and future forecasts. In addition, traffic forecasts should portray conditions at the project inception date as well as 20 years out passed the opening day of service.

2) Chapter 3 – All references to the City's Cosumnes River Blvd. environmental document should state that this document is currently in draft form and has not been approved by the City Council.

3) Chapter 4 – Noise Section: Reference is made to sharing the cost of construction of sound wall(s) with the City of Sacramento. Currently, the City of Sacramento does not have a formal agreement with Regional Transit (RT) for sharing the cost of these proposed sound walls. Prior to any agreement with RT, the City of Sacramento will need to finalize its Cosumnes River Blvd. environmental document and determine its design elements along this corridor. In addition, the City has developed an unapproved plan for the long-term widening of the Cosumnes River Boulevard, east of Franklin

New traffic counts were collected and the analysis was updated. Chapter 3 now incorporates new 2007 counts and updated existing geometry. The new 2007 data were used to evaluate existing conditions. Future conditions were updated and revised and now represent year 2030. Traffic forecasts for opening year (2011) were added. Year 2011 conditions were forecasted by interpolating between year 2007 and 2030.

The CRB Extension Project environmental document has been approved so the references are now appropriate.

Given that the timing of the CRB widening is still uncertain, the Noise/Vibration Section of Volume I reviews impacts and mitigation for the LPAP2 project without the widening as well as the cumulative impacts of the two projects. For the LPAP2, RT is mitigating the LRT portion of the cumulative noise impacts along CRB and will await the City's environmental review to determine if different noise mitigation should be pursued. Mitigation measures included in the LPAP2 would mitigate impacts of the light rail to below FTA and RT's more stringent criteria levels.

Should the CRB project move forward into the environmental assessment and preliminary design stages before the LRT project is finalized, it may be feasible to coordinate the noise mitigation measures.

For example, it is likely that mitigating noise impact from the CRB extension would require increasing the wall height to at least 9 ft for the entire extent between Franklin Boulevard and Center Parkway. This would reduce the need for a sound wall along the south boundary of the LRT right of way.

South Sacramento Corridor Phase 2 2 April 3, 2007

Boulevard. Absent of a formal approval, the City will not be able to negotiate cost-sharing for the proposed sound walls.

4) Chapter 3 – No-Action Alternative Long Term Traffic Impacts: Please verify the lane geometrics at the intersection of CRB with Franklin Boulevard and include a description.

5) Chapter 3 –Mitigation Measures: Please confirm that Sacramento Regional Transit is the responsible party for implementing mitigation measures.

6) Chapter 3 – Mitigation Measures: Verify that the mitigation measure to add a second southbound left turn lane at the intersection of Center Parkway and CRB is coordinated to accommodate existing conditions and future improvements.

We appreciate your consideration of these comments. If you have any questions please contact Azadeh Doherty, Principal Planner at 808-3137.

Sincerely,

Jerry Way
Director of Transportation

C: Hector Barron, Traffic Engineer, DOT
Azadeh Doherty, Principal Planner, DOT
Saed Hassan, Senior Engineer, DOT

The year 2030 no-action alternative long-term traffic impacts assume CRB is extended to I-5. The lane geometry assumed at the intersection of CRB and Franklin Boulevard in this study was verified and is consistent with the City's CRB extension EIR.

In all cases, Regional Transit is the responsible party for implementing mitigation measures to mitigate project impact.

The north leg of this intersection has been designed to easily accommodate the future addition of a second southbound left-turn lane. The project will construct the "hard" improvements (sidewalks, curbs, gutter, median, crossing warning systems) in locations that will accommodate future addition of the second left turn lane. Lane widths to be constructed with the LRT project will be generous (11', 14', 16', plus a wide shoulder). With the future addition of the second southbound lane, the lane widths will be (11', 11', 11', 11', plus normal shoulder).

DEVELOPMENT SERVICES DEPARTMENT

DEVELOPMENT ENGINEERING

CITY OF SACRAMENTO
CALIFORNIA

915 I STREET, 3rd Floor
SACRAMENTO, CA
95814

PH. (916) 808-7995
FAX (916) 808-7480

April 4, 2007

Diane Nakano, P.E. Assistant General Manager
Sacramento Regional Transit District
P.O. Box 2110
Sacramento, CA 95812-2110

RE: South Sacramento Corridor Phase 2

Dear Ms. Nakano:

Thank you for the opportunity to review the Supplemental Draft Environmental Impact Statement/Subsequent Draft Environmental Impact report. The City of Sacramento Department of Development Services, Development Engineering Division provides the following comments:

1) Chapter 3 – throughout this chapter, year 2000 traffic data is used to represent existing traffic conditions and forecast future traffic conditions. Year 2000 data is not considered as an accurate representation of the current conditions and will skew the project impacts defined in the document. We recommend that 2007 data be used as the basis of your traffic analysis and future forecasts.

2) Chapter 3- Several development projects in the study area has been approved after year 2002 which are anticipated to cause a big impact on the transportation system in the study area. Such development project such as College Square, The Strawberry Creek shopping Center and others had its own EIR and traffic studies that show several mitigation measures that would be implemented with these projects. These development projects will have a substantial impact on the traffic conditions in the study area and have to be considered in the traffic study prepared for this DEIR. Therefore, a revised traffic impact study will be required for the proposed project.

3) Chapter 3- A major roadway improvements was implemented recently which include widening Bruceville Road between Cosumnes River Blvd and Sheldon Road. Bruceville Rd was widened to six to four lanes within the limits mentioned before and several traffic signals were installed at several major intersections. This roadway improvement has to be considered in the traffic study.

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New traffic counts were collected and the analysis was updated. Chapter 3 now incorporates new 2007 traffic counts and updates existing geometry. New year 2007 data were used to evaluate existing conditions. Future conditions were updated and revised and now represent year 2030. Traffic forecasts for opening year (2011) were added. Year 2011 conditions were forecasted to be interpolating between year 2007 and 2030.

Year 2011 and Year 2030 traffic forecasts considered the land use and traffic forecasts from the College Square and CRB extension projects. New counts collected in early 2007 capture traffic from development projects approved and constructed after 2002 noted in the comment to include the Strawberry Creek Shopping Center.

The new 2007 counts and updated existing geometry in the revised Chapter 3 includes the recent widening of Bruceville Road south of Cosumnes River Blvd.

4) As the proposed project includes a 2000 parking spaces lot/garage in the Cosumnes River Collage vicinity, it is expected that traffic entering the collage from Cosumnes River Boulevard will cause a big impact specifically on the westbound left turn movement at Cosumens/ Bruceville Rd intersection in the a.m. peak hour. Several traffic studies prepared by the City of Sacramento in the study area shows that there will be a need to widen Cosumnes River Boulevard and add a third left turn lane in the westbound direction due to the high volume of traffic turning left into the southbound Bruceville Rd. The City of Sacramento has reserved the required right of way for this future widening, which is anticipated to be required with the RT south line extension. Please revise the traffic study to accurately present the traffic condition and consider adding this improvement to the project funding.

5) Chapter 3- Impacts of the at grade crossing at Cosumnes Blvd is not appropriately discussed in the DEIR. For example, vehicles queuing on the westbound of Cosumnes Road when the train is crossing Cosumnes River Blvd will impact traffic operation of the Cosumnes/ Bruceville intersection. According to Table 3.3-13, an estimate of 35 vehicles will be queuing at the westbound Cosumnes River Blvd at the mid block crossing between Center Parkway and Bruceville Rd. What is the available storage at this location and what is the effect of this queuing on the signal at Bruceville Rd/ Cosumnes River Blvd if the LRT would operate on a 10 minutes headways during the peak periods?

6) Chapter 3 of the SDEIR did not look at the impact of the project at the traffic signal existing at Bruceville Rd/ east Collage Drive. Please include analysis for this signalized intersection.

7) Collage Square PUD includes an alternative of a park n ride lot in the area west of Bruceville Rd. Is this park n ride lot part of this project, if yes, there should be a need to include traffic analysis showing the impact of this project and the need for additional pedestrian crossing treatment in this area.

8) Page 3-50 stated that "In the City of Sacramento mitigation is proposed at Bruceville Road and Cosumnes River Collage east entrance". It is not clear who will be implementing this mitigation measure. This intersection was recently improved and a traffic signal was installed at this intersection. If this mitigation measure is required, then this improvement should be included in the project cost or any other funding resources.

9) Page 3-50, under 3.3.9.2: Several mitigation measures were presented without any information of who will be responsible to implement them. For example: The signal at Calvine Rd/ CRC south access should be the responsibility of this project, unless other funding resources could be defined and take responsibility of this improvement.

10) Page 3-50: The mitigation measure presented in the DEIR for Bruceville Rd and Cosumnes River Collage: "Build Dual eastbound left turn lanes" need to be rechecked and may be revised. Since this impact is defined for the AM peak hour and this movement is not the critical movement. We believe that other mitigation measures need to be looked at. In the AM peak hour the westbound left turn

RT-south line DEIR
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The traffic analysis assumed CRB was extended from Franklin Boulevard to I-5 by the Year 2030. Year 2030 no-action alternative long term analyses assumed lane geometry contained in the City's EIR for the CRB Extension. This geometry included two left turn lanes, two through lanes, and one right turn lane on each approach to the Franklin Boulevard and CRB intersection. The assumed lane geometry at the intersection of CRB and Franklin Boulevard in this study was verified and was found to be consistent with the City's CRB Extension EIR. Without the project, traffic levels would be slightly higher, but there would be no impacts, and the lane configuration would remain unchanged. Therefore, the project proposes no mitigation for 2030 no action alternative.

The Cosumnes River Boulevard at-grade crossing has been removed from the project and has been replaced with a flyover bridge. The flyover bridge previously was a design option.

The comment asks for analysis of an existing signalized intersection at Bruceville Road / East College Drive. The transportation analysis evaluated impacts resulting from the LRT project at several intersections on Bruceville Road. Study intersections along Bruceville Road included Sheldon Road, Old Calvine Road, the east entrance to Cosumnes River College, West Stockton Boulevard and Cosumnes River Boulevard-Calvine Road. Please note the east entrance to Cosumnes River College (CRC) was included as a study intersection and was analyzed in the transportation report. The intersection appears as "Bruceville Rd/CRC-Cotton PNR" in the Intersection Levels of Service tables.

Please see responses on following page.

4) As the proposed project includes a 2000 parking spaces lot/garage in the Cosumnes River Collage vicinity, it is expected that traffic entering the collage from Cosumnes River Boulevard will cause a big impact specifically on the westbound left turn movement at Cosumens/ Bruceville Rd intersection in the a.m. peak hour. Several traffic studies prepared by the City of Sacramento in the study area shows that there will be a need to widen Cosumnes River Boulevard and add a third left turn lane in the westbound direction due to the high volume of traffic turning left into the southbound Bruceville Rd. The City of Sacramento has reserved the required right of way for this future widening, which is anticipated to be required with the RT south line extension. Please revise the traffic study to accurately present the traffic condition and consider adding this improvement to the project funding.

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Page 2 of 3

Please see responses on previous page.

A park-and-ride lot is no longer planned for the College Square site. All parking will be on the Cosumnes River College campus.

The referred to statement is in regards to the TSM Alternative. Should this alternative be progressed instead of the light rail proposed project, RT would pay for the mitigation measure.

The project would pay for and implement the mitigation measures noted in this section.

At the Bruceville Road and CRB intersection, a triple left turn lane from westbound to southbound was assumed with and without LRT project conditions. The triple left turn lane was indicated in the College Square EIR and the College Square conditions of approval as a mitigation measure to a significant impact triggered by the College Square project. Several traffic studies prepared by the City of Sacramento also indicated the need to add a third left turn lane, as mentioned in the fourth comment in the April 4, 20007 letter. Please note the reference in Comment 10 to the need for dual eastbound left turn lanes applies to another intersection along Bruceville Road south of CRB, the Bruceville Road and East College Entrance Road (not Bruceville/CRB.)

movement at this intersection is anticipated to be the critical movement with very high volume heading to the Cosumnes River Station. Therefore, the triple left turn will be more appropriate for such peak hour traffic. Please revise and investigate other feasible mitigation measures.

We appreciate your consideration of these comments. If you have any questions please contact Azadeh Doherty, Principal Planner at 808-3137.

Sincerely,

Samar Hajeer

Samar Hajeer
Supervising Engineer

C: ED William, Dev. Engineering Manager
Azadeh Doherty, DOT
Hector Barron, DOT

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Please see response on previous page.

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DEVELOPMENT SERVICES
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SOLID WASTE (916) 478-3634
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March 8, 2007

Ms. Diane Nakano P.E.
Assistant General Manager for Engineering & Construction
Sacramento Regional Transit District
PO BOX 2110
Sacramento, CA 95812-2110

Dear Diane:

SUBJECT: South Sacramento Corridor Phase 2 Supplemental Draft Environmental Impact Statement/Subsequent Draft Environmental Impact Report Section 4(f)

The City of Elk Grove has reviewed the South Sacramento Corridor Phase 2 Supplemental Draft Environmental Impact Statement/Subsequent Draft Environmental Impact Report Section 4(f) and respectfully submits the following comments for consideration in the document mentioned above:

- Throughout the document: Change Old Calvine Road to Geneva Point Drive and change Lent Ranch Mall to Elk Grove Promenade.
- Page S-7: Mention that direct express bus service from Laguna West and high frequency bus service to Elk Grove from Meadowview Light Rail Station will be provided by ***e-tran***.
- Page S-21 – Section 4.14 and 4.15: Mention that Enhanced bus service from the Calvine/SR 99 Park and Ride Lot to Meadowview LRT Station and express bus service from Elk Grove to the CRC transit center will be provided by ***e-tran***.
- Page 1-10 – Section 1.2.3.2 Public Transit Services: Mention that ***e-tran*** operates express bus routes 52, 59, 60 and that these routes were formerly operated by RT.
- Page 1-11: Add a paragraph about ***e-tran*** bus service.
  - ***e-tran*** is the City of Elk Grove's transit service that began on January 2, 2005. The City assumed operation of five commuter routes and two local routes from RT. The City now operates 8 commuter routes between Elk Grove and Downtown Sacramento, 6 local routes, 4 neighborhood shuttle type routes, 6 local supplemental routes and ADA paratransit service within the City of Elk Grove with connections to RT's Light Rail system at Meadowview.
- Page 2-5: Mention on the last paragraph that ***e-tran*** (Elk Grove local and commuter service) did not begin service until January 2, 2005.

RT appreciates the extensive information provided by the City of Elk Grove regarding is current transit services. This comment letter is now referred to as a reference regarding current ELK Grove transit services in the body of the Summary, Chapter 2, and Chapter 3 of Volume I of the SFEIS/SFEIR.

RT notes that the information currently provided in Volume I of this SEIS/SEIR regarding transit services reflects the services and service providers at the time of the Notice of Intent to Prepare an EIS and the Notice of Preparation for the EIR in 2002. The no-project, TSM, and LPAP2 were also defined following the NEPA/CEQA scoping process in 2002, and the Federal Transit Administration formally approved the TSM Alternative described in this SEIS/SEIR in 2004. This formal approval was a prerequisite to FTA formally authorizing RT to enter into preliminary engineering for this project.

The transportation model runs for the South Sacramento Phase 2 applied the current services at that point in time. This model applies all regional transit services, regardless of the provider.

- Page 2-7: Add another figure to show ***e-tran*** conceptual year 2025 No Action Alternative. Remove Routes 52, 56 (south of CRC), 57, 59, 60, 65 (south of Calvine Road), 66, community shuttles and I from Figure 2.2-1 since RT no longer operates these routes.

- Page 2-8: Add a separate table to show ***e-tran*** routes and remove Routes 52, 56 (south of CRC), 57, 59, 60, 65 (south of Calvine Road), 66 and I from Table 2.2-1 since these routes are no longer operated by RT.

- Page 2-9: Update Table 2.2-2 to update the completion year from the following projects:

  - REG17350 – 2010
  - REG17340 – 2006
  - SAC20520 – 2008
  - SAC19380 – 2010
  - SAC23650 – 2006
  - SAC19040 – 2006
  - SAC15920 – 2010
  - SAC15930 – 2010
  - SAC 18380 – 2010

- Page 2-10: Mention that the high frequency bus service between Meadowview LRT Station and Elk Grove and Direct Express Bus Service via Interstate 5 will be operated by ***e-tran***.

- Page 2-11: Add another figure to show ***e-tran*** TSM Alternative. Remove Routes 52, 52X, 56 (south of CRC), 57, 59, 60, 65 (south of Calvine Road), 66, 66X, community shuttles, G and I from Figure 2.3-1 since these routes are no longer operated by RT.

- Page 2-12: Add a separate table to show ***e-tran*** routes and remove Routes 52, 52X, 56 (south of CRC), 57, 59, 60, 65 (south of Calvine Road), 66, 66X, G and I from Table 2.3-1 since these routes are no longer operated by RT.

- Page 2-14 – Section 2.4.2 LPAP2 Transit Service: Mention that ***e-tran*** will continue to maintain express bus service from areas in Elk Grove to Downtown Sacramento that is away from the Light Rail sphere of influence. ***e-tran*** will also continue to feed its local routes to the CRC Light Rail Station/Transit Center. ***e-tran*** will discontinue transit service to the Meadowview Light Rail Station.

- Page 2-15: Add another figure to show ***e-tran*** LRT Alternative. Remove Routes 52, 56 (south of CRC), 57, 59, 60, 65 (south of Calvine Road), 66, G, community shuttles and I from Figure 2.4-1 since these routes are no longer operated by RT.

- Page 2-17: Add a separate table to show ***e-tran*** routes and remove Routes 52, 52X, 56 (south of CRC), 57, 59, 60, 65 (south of Calvine Road), 66, 66X, G and I from Table 2.4-1 since these routes are no longer operated by RT.

Please see response on page II-125.

- Pages 2-31, 2-32, 2-33, 2-34: Add more bus bays into the CRC station design for at least 10 ***e-tran*** routes, 8 RT routes and 2 extra bus bays for other services (i.e. SCT/LINK, Paratransit, ***e-van***)
- Page 2-35: Incorporate at least 6 bus bays into the optional RT Shuttle lot to accommodate RT and ***e-tran*** bus routes that would serve this lot.
- Page 2-48 Section 2.5 Fleet and Maintenance Facility Requirements: The number of buses may need to be reduced, since ***e-tran*** operates the routes within the City of Elk Grove and from Elk Grove to Downtown Sacramento.
- Page 2-50: Update Table 2.6-1 to only include RT routes, which may reduce the number of buses needed for the TSM Alternative.
- Page 3-3: Update the existing Transit Network map. Remove Routes 52, 53, 56 (south of CRC), 57, 58, 59, and 60 from Figure 3.2-2 since these routes are no longer operated by RT. Include new RT routes operating in the south area (as of January 1, 2007) on this map. Add a new figure to show ***e-tran*** routes (as of February 25, 2007).
- Page 3-5 Third Paragraph: Mention that Amtrak bus connection stops in Elk Grove.
- Page 3-5 – Existing Fares: Update fares to RT's new fare structure as of September 1, 2006. Mention that ***e-tran*** and RT have a revenue sharing transfer agreement in place that allows RT riders to use their passes, tickets and transfers on ***e-tran*** routes.
- Page 3-8 – Table 3.2-3: Update this table and remove Routes 57, 58, 59, 60, 52 and 53, since these routes are no longer operated by RT. Add a new table to show ***e-tran*** routes.
- Page 3-9 – Table 3.2-4: Update this table and remove Routes 57, 58, 59, 60, 52 and 53, since these routes are no longer operated by RT. Add a new table to show ***e-tran*** routes.
- Page 3-10 – Section 3.2.2.3 Other Fixed Route Transit Operators: Elk Grove as other bus operators serving Downtown Sacramento. Add ***e-tran*** as a connecting operator. Add paragraph about ***e-tran***.
  - ***e-tran*** is the City of Elk Grove's transit service that began on January 2nd, 2005. The City assumed operation of five commuter routes and two local routes from RT. The City now operates 8 commuter routes between Elk Grove and Downtown Sacramento, 6 local routes, 4 neighborhood shuttle type routes, 6 local supplemental routes and ADA paratransit service within the City of Elk Grove with connections to RT's Light Rail system at Meadowview.
- Page 3-10 – Section 3.2.2.4 Paratransit Service: Include ***e-tran*** also provides a similar service within the City of Elk Grove.

Please see response on page II-125.

- Page 3-11 – Section 3.2.3.4 LPAP2 Transit Services: Remove reconfiguration of existing express bus routes from Elk Grove to Downtown Sacramento. Mention that ***e-tran*** will continue to maintain express bus service from areas in Elk Grove to Downtown Sacramento that is away from the Light Rail sphere of influence. ***e-tran*** will also continue to feed its local routes to the CRC Light Rail Station/Transit Center. ***e-tran*** will discontinue transit service to the Meadowview Light Rail Station. ***e-tran*** will also add commuter bus service to the new Laguna Ridge development.

- Page 3-12: Rewrite the first paragraph to reflect what is shown below.
  - The LPAP2 does not include the proposed South Sacramento Corridor Phase 3 project, which is included in the MTP project list. The Phase 3 project would extend the South Sacramento Corridor to Elk Grove. The mode, alignment, terminus and other key project parameters of the Phase 3 extension have not been determined and will be subject to a future alternative analysis and environmental evaluation. In lieu of representing the Phase 3 project in the LPAP2, the alternative transit network provided by ***e-tran*** (the City of Elk Grove's transit service) includes enhanced fixed route, local fixed route and neighborhood shuttle bus service from the LPAP2 terminus to Elk Grove. Outside of the South Sacramento Corridor, the LPAP2 transit network provided by RT and ***e-tran*** (in Elk Grove) contains all of the 2025 MTP transit investments and projects described in the No Action Alternative.

- Page 3-12 Second Paragraph – Cutline 3: Modify to include Cutline 3 –North of Laguna Blvd and Bond Road. No alternative LRT carrying capacity across this cutline. ***e-tran*** bus carrying capacity is highest for TSM alternative (1,560 passengers).

- Page 7-6 Number 5. Transportation Development Act Revenues: Mention that RT will continue to receive TDA revenues from all cities except Elk Grove, Citrus Heights, Galt, Isleton and Folsom. These cities are not RT member agencies and they do not directly contribute their TDA to support RT operations. Elk Grove, Folsom and Citrus Heights contract with RT for limited transit services, which are paid to RT after being claimed by the cities.

- Page 7-14 – Section 7.7.2.1 Expand Transit Service in South Sacramento: Remove Routes 52X, 66X and G. Mention that ***e-tran*** will be adding more frequency to its routes that serve Cosumnes River College and the RT optional Shuttle Lot on Calvine Road @ Auberry Drive.

- Page D-12 Add Carlos Tobar, Transit System Manager, City of Elk Grove, 10250 Iron Rock Way, Suite 200, Elk Grove, CA 95624 and John Andoh, Assistant Transit Manager, City of Elk Grove, 10250 Iron Rock Way, Suite 200, Elk Grove, CA 95624. Change Elk Grove Community Services District to Cosumnes Community Services District.

Please see response on page II-125.

Attached to this letter are maps of the ***e-tran*** existing transit network, no action alternative, TSM alternative and LRT alternative. Also attached is a frequency table for each alternative.

Thank you for providing the City the opportunity to provide comment about the South Sacramento Corridor Phase 2 Supplemental Draft Environmental Impact Statement/ Subsequent Draft Environmental Impact Report Section 4(f). If you require further information or have any questions regarding our comments, please contact John Andoh, Assistant Transit Manager at (916) 687-3031 or email jandoh@elkgrovecity.org.

Please see response on page II-125.

Sincerely,

CARLOS TOBAR
Transit System Manager

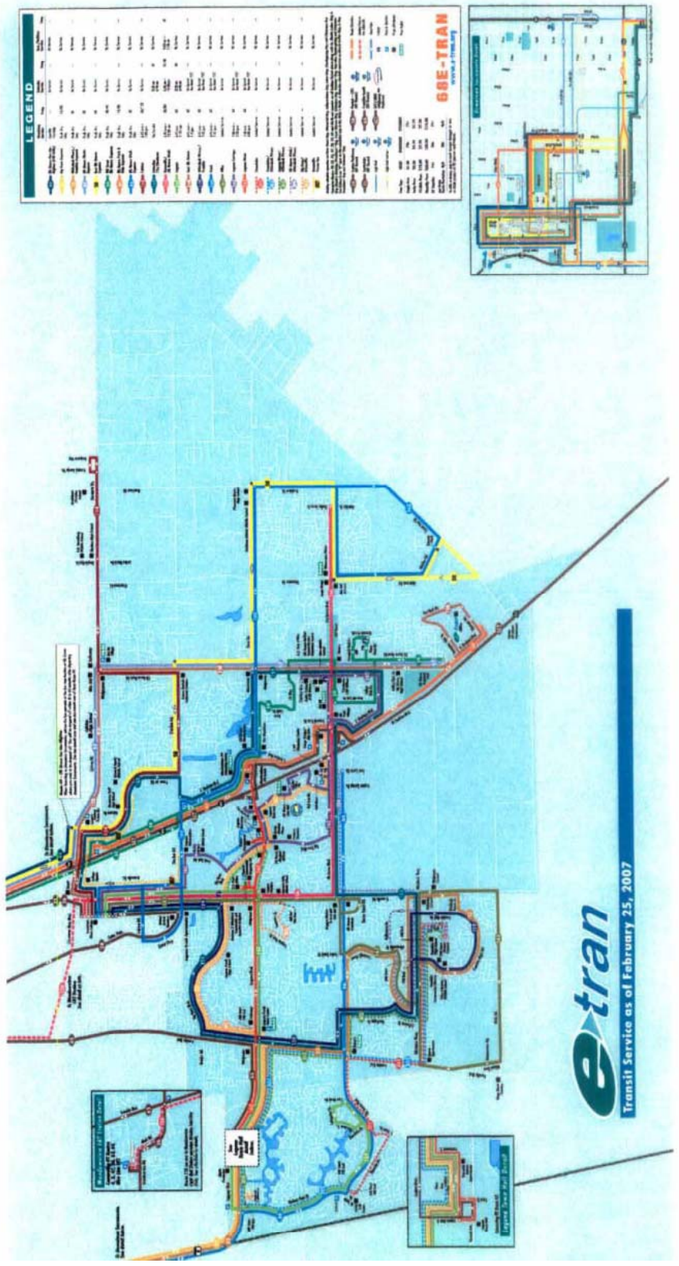
cc: Jerome Wiggins, Program Specialist, Federal Transit Administration
John Andoh, Assistant Transit Manager, City of Elk Grove

South Sacramento Corridor Phase 2 SFEIS/SFEIR

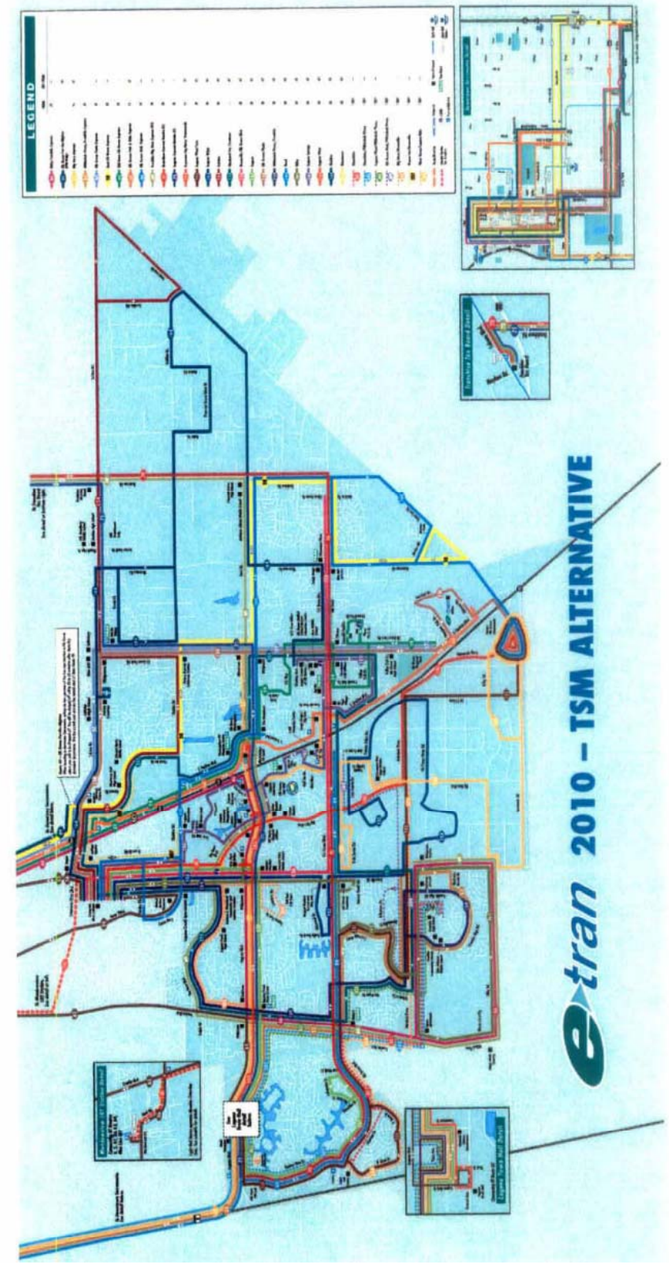
	TSM Alternative			LPAP2			No Action			2006 Weekday
Route	Description	Peak	Off Peak	Peak	Off Peak	Change from TSM	Peak	Off Peak	Change from TSM and LPAP2	Boardings
46	Bilby/Franklin Express	20	-	20	-		30	-		-
49	Elk Grove For-The-Nighter	-	60	-	-	Route Eliminated	-	60		18
52	Big Horn Express	15	60	20	-	No Midday Service	20	60		575
53	Whitelock Pkwy/Franklin Express	20	-	20	-		20	-		122
57	Elk Grove Florin Express	20	-	20	-		20	-		150
58	East Elk Grove Express	20	-	20	-		30	-		80
59	Old Town Elk Grove Express	20	-	20	-		30	-		275
60	Elk Grove Park and Ride Express	15	60	15	-	No Midday Service	15	60		485
66	Elk Grove Blvd Express	20	-	20	-		30	-		80
69	Franklin/Big Horn Express (RC)	30	-	30	-		30	-		-
70	Bradshaw Express (Rancho C)	30	-	30	-		30	-		-
71	Laguna Express (Rancho C)	30	-	30	-		30	-		-
150	Expresso Big Horn/Promenade	15	30	15	30		15	30	Extend to Meadowview LRT Station	-
151	Laguna West/Lotz	30	60	30	60		30	60		-
153	Laguna Ridge	30	60	30	60		60	60		-
154	Calvine	30	60	15	60	Improved Frequency	30	60		176
155	Weekend City Circulator	-	60	-	60		-	60		46
156	Bruceville/Elk Grove Bl	30	60	15	60	Improved Frequency	30	60	Terminate Route at CRC	860
157	Laguna	30	60	15	60	Improved Frequency	30	60		325
158	Elk Grove Florin	30	60	15	60	Improved Frequency	30	60		205
159	Whitelock Pkwy/Franklin	30	60	15	60	Improved Frequency	30	60		298
160	Bond	60	60	30	60	Improved Frequency	60	60		75
161	Bilby	60	60	30	60	Improved Frequency	60	60		75
162	Laguna Springs	60	60	30	60	Improved Frequency	60	60		42
163	Laguna West	60	60	30	60	Improved Frequency	60	60		25
164	Sheldon	60	90	60	90		60	90		-
165	Kammerer	60	60	30	60	Improved Frequency	60	60		-
301	Stonelake	1 Trip	-	1 Trip	-		1 Trip	-		160
302	Stonelake/Whitelock Pkwy	1 Trip	-	1 Trip	-		1 Trip	-		145
303	Laguna West/Whitelock Pkwy	1 Trip	-	1 Trip	-		1 Trip	-		58
304	Elk Grove Bl/Whitelock Pkwy	1 Trip	-	1 Trip	-		1 Trip	-		45
305	Big Horn/Bruceville	1 Trip	-	1 Trip	-		1 Trip	-		44
307	Power Inn/Bruceville	1 Trip	-	1 Trip	-		1 Trip	-		137
308	West Taron/Laguna Ridge	1 Trip	-	1 Trip	-		1 Trip	-		-
										4,501 e-tran system

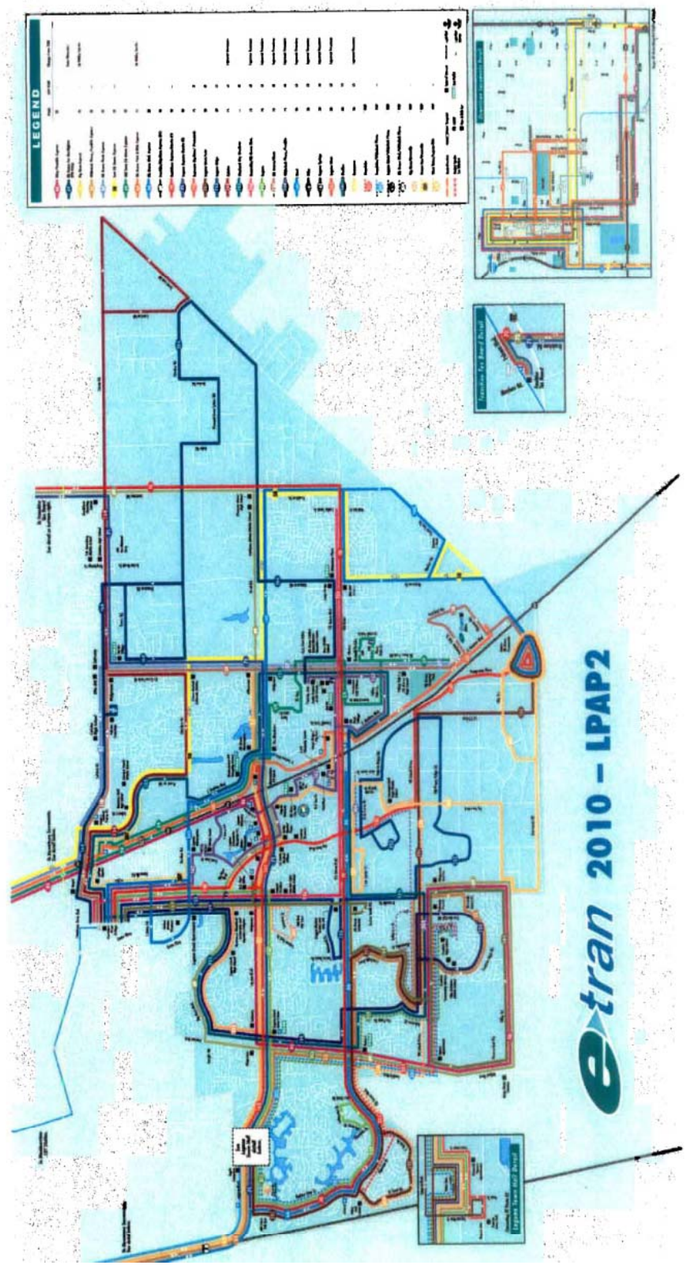
		e-tran Overall Service Span									
		LPAP2 Frequency		Light Rail Alternative Service Span			2006 Frequency		2006 Service Span		
Route	Description	Peak	Off Peak	Weekday Service Span	Saturday Service Span	Sunday Service Span	Peak	Off Peak	Weekday Service Span	Saturday Service Span	Sunday Service Span
46	Bilby/Franklin Express	20	-	4 AM & 4 PM Trips	-	-	-	-	-	-	-
49	Elk Grove For-The-Nighter	-	60	6 pm to 9 pm	-	-	-	1 Trip	-	-	-
52	Big Horn Express	15-20	-	7 AM & 7 PM Trips	-	-	15-20	-	6 AM & 6 PM Trips	-	-
53	Whitelock Pkwy/Franklin Express	20	-	4 AM & 4 PM Trips	-	-	20	-	3 AM & 3 PM Trips	-	-
57	Elk Grove Florin Express	20	-	4 AM & 4 PM Trips	-	-	20	-	3 AM & 3 PM Trips	-	-
58	East Elk Grove Express	20	-	4 AM & 4 PM Trips	-	-	20	-	3 AM & 3 PM Trips	-	-
59	Old Town Elk Grove Express	20	-	5 AM & 5 PM Trips	-	-	20	-	4 AM & 4 PM Trips	-	-
60	Elk Grove Park and Ride Express	15	-	5 am to 9 am & 3 pm to 7 pm	-	-	15-20	-	5 AM & 5 PM Trips	-	-
66	Elk Grove Blvd Express	20	-	4 AM & 4 PM Trips	-	-	30	-	2 AM & 2 PM Trips	-	-
69	Franklin/Big Horn Express (RC)	30	-	4 AM & 4 PM Trips	-	-	-	-	-	-	-
70	Bradshaw Express (Rancho C)	30	-	4 AM & 4 PM Trips	-	-	30	-	-	-	-
71	Laguna Express (Rancho C)	30	-	4 AM & 4 PM Trips	-	-	30	-	-	-	-
150	Expresso Big Horn/Promenade	15	30	5 am to 11 pm	7 am to 10 pm	7 am to 8 pm	-	-	-	-	-
151	Laguna West/Lotz	30	60	6:30 am to 7:30 pm	8:30 am to 6 pm	8:30 am to 6 pm	-	-	-	-	-
153	Laguna Ridge	30	60	6:30 am to 7:30 pm	-	-	-	-	-	-	-
154	Calvine	15	60	6:30 am to 7:30 pm	8:30 am to 6 pm	8:30 am to 6 pm	60	120	6:30 am to 7:30 pm	-	-
155	Weekend City Circulator	-	60	-	8:30 am to 6 pm	8:30 am to 6 pm	-	60	-	8:30 am to 6 pm	-
156	Bruceville/Elk Grove Bl	15	60	6:30 am to 9:30 pm	6:30 am to 9:30 pm	8:30 am to 6 pm	30	45-60	5:30 am to 10:30 pm	6:30 am to 10 pm	9 am to 7 pm
157	Laguna	15	60	6:30 am to 7:30 pm	8:30 am to 6 pm	8:30 am to 6 pm	30-60	60	6:30 am to 7:30 pm	8:30 am to 6 pm	-
158	Elk Grove Florin	15	60	6:30 am to 7:30 pm	-	-	30-45	60	6:30 am to 7:30 pm	-	-
159	Whitelock Pkwy/Franklin	15	60	6:30 am to 7:30 pm	-	-	30-45	60	6:30 am to 7:30 pm	-	-
160	Bond	30	60	6:30 am to 7:30 pm	-	-	60	60	6:30 am to 7:30 pm	-	-
161	Bilby	30	60	6:30 am to 7:30 pm	-	-	4 Trips	-	6:30 am to 7:30 pm	-	-
162	Laguna Springs	30	60	7 am to 6 pm	-	-	60	-	7 am to 6 pm	-	-
163	Laguna West	30	60	6:30 am to 7:30 pm	8:30 am to 6 pm	8:30 am to 6 pm	60	-	7:30 am to 5 pm	-	-
164	Sheldon	60	90	7 am to 6 pm	-	-	-	-	-	-	-
165	Kammerer	30	60	7 am to 6 pm	-	-	-	-	-	-	-
301	Stonelake	1 Trip	-	1 Trip	-	-	1 Trip	-	1 Trip	-	-
302	Stonelake/Whitelock Pkwy	1 Trip	-	1 Trip	-	-	1 Trip	-	1 Trip	-	-
303	Laguna West/Whitelock Pkwy	1 Trip	-	1 Trip	-	-	1 Trip	-	1 Trip	-	-
304	Elk Grove Bl/Whitelock Pkwy	1 Trip	-	1 Trip	-	-	1 Trip	-	1 Trip	-	-
305	Big Horn/Bruceville	1 Trip	-	1 Trip	-	-	1 Trip	-	1 Trip	-	-
307	Power Inn/Bruceville	1 Trip	-	1 Trip	-	-	1 Trip	-	1 Trip	-	-
308	West Taron/Laguna Ridge	1 Trip	-	1 Trip	-	-	-	-	1 Trip	-	-

Enhanced Bus Service

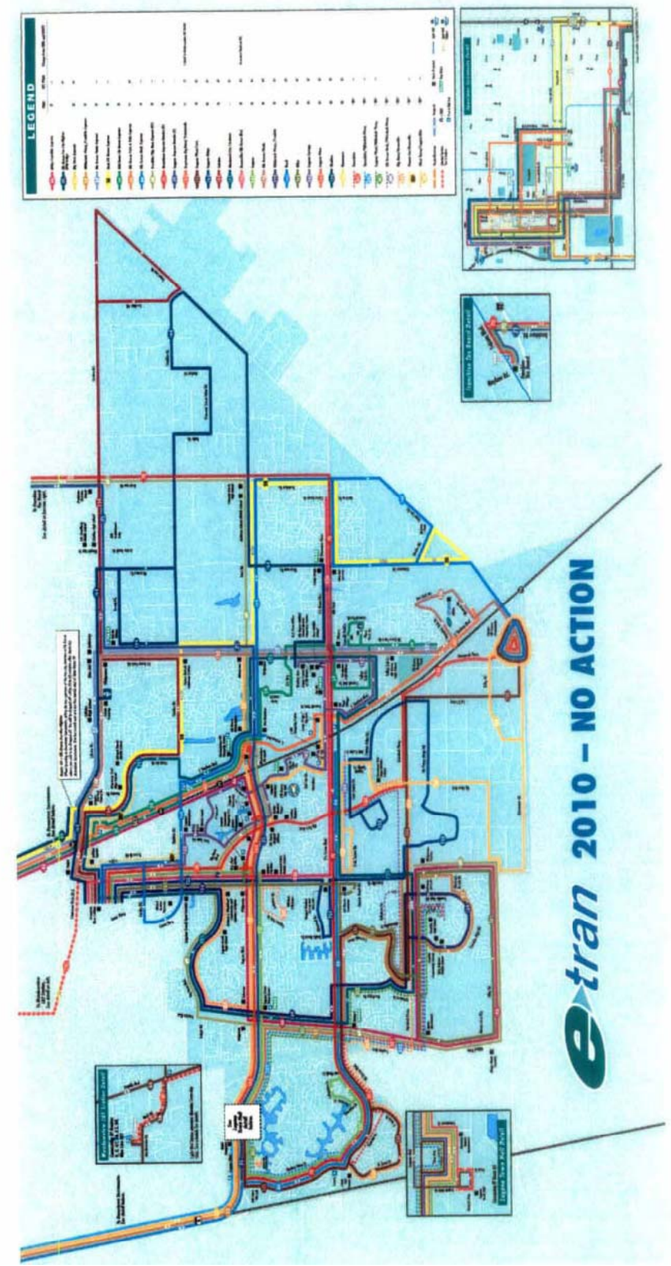


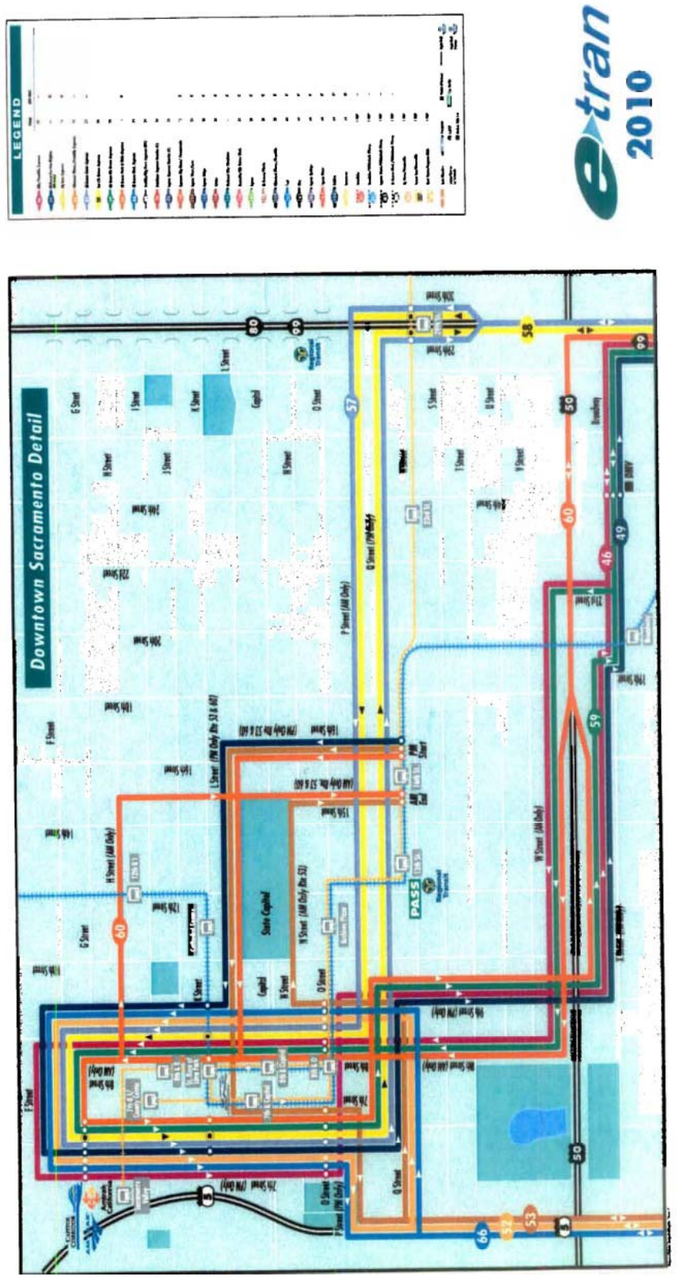
South Sacramento Corridor Phase 2 SFEIS/SFEIR





South Sacramento Corridor Phase 2 SFEIS/SFEIR





South Sacramento Corridor Phase 2 SFEIS/SFEIR

Regional Organizations

WALKSACRAMENTO
Walkable Communities = Communities of Walkers

A2 : A - 00102

RECEIVED
APR 03 2007
ESD

April 3, 2007

Ms. Diane Nakano
Assistant General Manager for Engineering and Construction
Sacramento Regional Transit
1400 29th St, PO Box 2110
Sacramento, CA 95812

Re: South Sacramento Corridor Phase 2 Project Supplemental Draft Environmental Impact Statement/Subsequent Draft Environmental Impact Report (SDEIS/SDEIR)

Dear Ms. Nakano:

WALKSacramento is pleased to comment on the proposed extension of the light rail system from the end point of South Line Phase 1 at Meadowview Road, approximately four miles to Cosumnes River College. Good access to the stations for pedestrians and bicyclist is essential to meet the goal of serving the region's growing population by providing reliable transit service, reducing automobile congestion, and decreasing air polluting emissions. The collaboration between Sacramento Regional Transit and the Los Rios Community College District in placing a light rail station on the Cosumnes River College grounds is especially noteworthy. This station will serve a dual role, both as a destination for those going to the college, and as a departure point for local residents.

In order for the proposed transit stations to be truly successful, good pedestrian and bicycle access are critical. The SDEIS/SDEIR states, "Currently pedestrians in the project area are accommodated on sidewalks, with at-grade crossings of major intersections." However, many roadways lack sidewalks and safe, convenient, marked crossings. High speed traffic discourages both bicycling. Success of planned transit oriented development depends on maximizing pedestrian and bicycle access.

We are concerned about certain design features that will discourage pedestrian and bicycle usage. Examples of specific issues that we have noted in reviewing this document include:

1. Plans to build dual eastbound left turn lanes at Bruceville Road and Cosumnes River College
2. Plans to stripe dual left turn lanes on the eastbound approach at Bruceville Road and Old Calvine Road.
3. Plans to add a second southbound left turn lane at Center Parkway and CRB.
4. The drawing of the Cosumnes River College Station that shows a bicycle lane to the right of a motor vehicle right turn lane, but no bicycle lane for bicyclists proceeding straight ahead. Adding turn lanes and widening roads impacts

909 12th Street, Suite #122 • Sacramento, CA 95814 • 916.446.9255 • fax 916.443.9255
www.walksacramento.org

To improve access to the stations for this proposed light rail extension, RT added in 2004 multi-use pedestrian/bicycle trails to the project at the Franklin and Center Parkway stations. A proposed pedestrian access across Morrison Creek to the Morrison Creek light rail station was removed from the project due to safety issues with the railroad, impacts to the levee, and opposition from Ruiz Court residents.

RT will continue to work directly with the Los Rios Community College District and Cosumnes River College to assure that the access between the campus and station platforms is safe and user friendly.

As required by NEPA and CEQA, RT has included roadway improvements to mitigate traffic impacts from light rail patrons arriving at the stations via automobile. RT has endeavored to design these improvements to create a safe environment not only for the automobile but also pedestrians and bicyclists. The provision of safety enhancements will be further defined as the design of the light rail extension advances.

pedestrians and bicyclists. Mitigation for motor vehicle traffic by widening roads requires further mitigation for pedestrians and bicyclists. Measures such as slower design speeds, high visibility crosswalks, curb extensions, pedestrian refuge islands, and count down signals, need to be included if lanes are added. Other options such as roundabouts should be considered.

Please see response on previous page.

Pedestrian and bicycle access improvements to the proposed light rail stations will help pedestrians and bicyclists reach the new stations, and are essential for the walk-in Center Parkway Station. Pedestrian/bicycle bridges across Union House Creek give residents the option of walking or bicycling to transit, and the plan to accommodate a bikeway where LRT crosses Morrison Creek is important.

As noted on the previous page, RT added in 2004 multi-use pedestrian/bicycle trails to the project at the Franklin and Center Parkway stations.

WALKSacramento would like to participate in the design process for these four stations to offer our specific review and suggestions to maximize pedestrian and bicycle access. We are currently working on a plan to increase walking, bicycling, and transit use to Cosumnes River College in collaboration with the Los Rios Community College District and the Sacramento County Department of Transportation through a Caltrans Community Planning Grant and can contribute to the success of this light rail extension. WALKSacramento strongly supports the South Sacramento Corridor Phase 2 extension of light rail to Cosumnes River College. Pedestrians and transit are natural partners.

RT has in the past involved interested parties in the design of all of its light rail extension stations, and such an approach will be followed again for this extension.

If you have questions or need additional information, please contact me or Lindell Price at (916) 446-9255 or via email at ageraghty@walksacramento.org or lprice@walksacramento.org.

Sincerely,

Anne Geraghty
Executive Director

Cc: Ron Vicari, Sacramento County Department of Transportation
Ed Cox, Alternate Modes Coordinator, City of Sacramento
Teri Duarte, Sacramento County Department of Health Services
Gordon Poon, Associate Vice Chancellor, Los Rios Community College District
Bill Karns, Vice President, Cosumnes River College
Cory Wathen, Director Administrative Services, Cosumnes River College
Scott Crosier, Cosumnes River College
Andrea Roberge, Cosumnes River College
Walt Seifert, Executive Director, Sacramento Area Bicycle Advocates

South Sacramento Corridor Phase 2 SFEIS/SFEIR

Public Comments

South Sacramento Corridor Phase 2 SFEIS/SFEIR

A2 : A - 00098

THE South Line

Sacramento Regional Transit District

COMMENT CARD

Thank you for attending today's Informational Open House and Public Hearing for the Sacramento Regional Transit District, South Sacramento Corridor Phase 2 Project.
Your comments are welcome.

ALL COMMENTS ARE DUE BY: APRIL 3, 2007, 5:00 P.M.

Name (please print): Linda E. Roberts Title (if applicable):
Phone (optional): 454-9330 Fax (optional): same
Organization/Business (if applicable): Utilities Chamber, CDR Email: LRoberts520@earthlink.net
Address (optional): 3519 7th Avenue
City: Sacramento State: Ca. Zip: 95817

☑ Yes, I would like to be added to your mailing list to receive newletters, information mailings, and meeting notices.

Comments on the Supplemental Draft EIS/Subsequent Draft EIR for the South Sacramento Corridor Phase 2 Project:

Logistical issues: should be negator vegetarian food available. 2 older white men stood in front of one display talking to each other for about 20 minutes & didn't move though. I was clearly trying to look at the map around them.

LRT has door buttons that are hard to find & don't always work. Stairs are too steep. There are not ramps at every station for wheel chairs. There are no LRT stations in Oak Park & no parking at the Fruitridge, City College, 4th Ave, Broadway, 29th St, 39th St, & the 48th Street stations. There is vacant land near the Fruitridge station that should be purchased & made into a parking lot. There should be LRT to Kaiser & Methodist hospitals. There is no LRT shuttle in Oak Park as there is in Tahoe Park.

The daily & monthly passes are way too expensive for low income folks like myself. It is cheaper to park. You can't use old tickets to purchase passes. There is no longer a discount for (over)

Thank you for your participation in this important process.
Please mail to: Diane Nakano, Assistant General Manager of Engineering and Construction, Sacramento Regional Transit, South Sacramento

Regional

RT is sorry that access to the boards was obstructed.

These comments have been passed on to the facilities, operations, and planning personnel at RT

bulk ticket purchases.
Oak Park lost it's safest bus stop on 33rd St
we have to go all the way to 14th or 12th Ave
to catch the bus which is unsafe. Buses
+ LRT have ongoing problems with open containers
of ETOH. Too much smoking at stations. No access
to WIC office in Arden area.
Florin near 24th has 4 stops on Islands that
have no curb cuts.
It takes 2 hours to get to Oak Park from
midtown + RT wants you to go to 65th St.
on the way.
We need more late night service for movies.
Don't spend $55 million moving the Amtrak station.

Fold here

The Post Office will not deliver mail without postage

DIANE NAKANO
Assistant General Manager of Engineering and Construction
Sacramento Regional Transit - South Sacramento Corridor Phase 2 Project
P.O. Box 2110
Sacramento CA 95812-2110

Regional Transit

These comments have been passed on to the facilities, operations, and planning personnel at RT

South Sacramento Corridor Phase 2 SFEIS/SFEIR

THE South Line PHASE 2

Sacramento Regional Transit District

A2 : A - 00097

COMMENT CARD

Thank you for attending today's Informational Open House and Public Hearing for the Sacramento Regional Transit District, South Sacramento Corridor Phase 2 Project.
Your comments are welcome.

ALL COMMENTS ARE DUE BY: APRIL 3, 2007, 5:00 P.M.

Name (please print): Alex Kotko Title (if applicable):
Phone (optional): 916-421-1974 Fax (optional):
Organization/Business (if applicable): Email: alexkotko@ebcglobal.net
Address (optional): 7624 Detroit Blvd
City: Sacramento State: CA Zip: 95832

☒ Yes, I would like to be added to your mailing list to receive newletters, information mailings, and meeting notices.

Comments on the Supplemental Draft EIS/Subsequent Draft EIR for the South Sacramento Corridor Phase 2 Project:

1. Why does the pipeline have to be moved down Detroit Blvd?
2. What other options were discussed before deciding on Detroit Blvd?
3. Will the roads be paved when the construction is finished?
4. In the case of an emergency, because of Detroit Blvd having one entrance and one exit, how will the homeowners know their safety is still in tact during the construction?
5. Is it possible to have the pipeline go down Meadowview/Mack Road, then down Morrison Creek, and connect to the other pipeline there?
6. After the meeting I was told by the gentleman who led the presentation there were other major streets that have 24in gas pipelines going through residential areas. What are those other streets?
7. Would it be safer for the homeowners if the construction for the pipeline was postponed until another exit for Detroit Blvd is created?

Regional Transit

Thank you for your participation in this important process.
Please mail to: Diane Nakano, Assistant General Manager of Engineering and Construction, Sacramento Regional Transit, South Sacramento Corridor Phase 2 Project, PO Box 2110, Sacramento, CA 95812-2110.
ALL COMMENTS ARE DUE BY: APRIL 3, 2007, 5:00 P.M.

Detroit Boulevard was selected because it is a public street right-of-way that is the closest to the existing pipeline that is being relocated.

Placement of the relocated pipeline along or within the Morrison Creek creekbed was discussed but would involve levee design issues and introduce additional environmental impacts and permit requirements (e.g., approval of the U.S. Corps of Engineers, U.S. Fish and Wildlife Service, Sacramento Area Flood Control Agency, and the State Department of Water Resources and Board of Reclamation).

Final design of the pipeline relocation will advance following completion of this SFEIS/SFEIR. The precise location of the pipeline will be determined at that point, but it will be within the street right-of-way. Any construction in the pavement would be covered with new street surface following the pipeline relocation.

Access for emergency vehicles to the Detroit Blvd. area would be maintained throughout construction.

Please see response above.

24" Line (the same line that's being relocated for this RT project): Riverside Blvd (Vallejo to Sutterville Road); 20th Ave (Freeport to 24th Street); 24th Street (20th Ave to 50th Ave); and Indian Lane (50th Ave to Gardendale). 12" DFM (260 psig): 3rd Street (I St to Q St; and I Street (3rd to 7th).

Access to the neighborhood will not be jeopardized from the pipeline relocation, even with the current street configuration. Dunmore homes is currently developing a tract map showing an extension of Detroit Boulevard. The timing of that extension will depend on the timeframe for that development.

Public Hearing Transcript

392013.txt

REPORTER'S TRANSCRIPT OF PUBLIC HEARING
HELD BEFORE SACRAMENTO REGIONAL TRANSIT DISTRICT BOARD
IN THE MATTER OF
SUPPLEMENTAL DRAFT ENVIRONMENTAL IMPACT
STATEMENT/SUBSEQUENT DRAFT ENVIRONMENTAL IMPACT REPORT
FOR THE SOUTH SACRAMENTO CORRIDOR PHASE 2

Monday, March 12, 2007

REPORTED BY: SHERRI STARR, CRR; CSR #10245 (01-392013)

SAM PANNELL COMMUNITY CENTER
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SACRAMENTO, CALIFORNIA; MONDAY, MARCH 12, 2007
6:17 P.M.
--oOo--

THE CLERK: Public Hearing Item Number 12, Supplemental Draft Environmental Impact Statement/Subsequent Draft Environmental Impact Report for the South Sacramento Corridor Phase 2 introduced by Dave Mansen, project manager from Parsons Transportation Group.

MR. MANSEN: Chairman Tretheway, Ladies and Gentlemen of the Board, my name is Dave Mansen. I'm going to keep my comments very brief this evening because the purpose of this meeting this evening is to hear from the general public. There are a number of boards in the back of the room if you want some more detail than what I am providing, the public is welcome to view those boards.

This evening I'll talk about the project status and overview of the Environmental Impact Statement and we will then receive oral testimony from the public.

In 1995, the RT Board of Directors adopted a locally preferred alternative for the South Line that ran from downtown Sacramento to Calvine/Auberry Roads.

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And the alternatives adopted in 1994, as you all know, that particular locally preferred alternative was split into two phases. Phase 1 is in operation today. It is carrying approximately 15 to 16,000 riders daily.
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The subject of this evening's EIS -- Environmental Impact Statement -- Hearing is a 4.3-mile extension from Phase 1 from Meadowview Road leading out to Consumnes River College.

There will be four stations: Morrison Creek Station, Franklin Station, Center Parkway Station with a terminus at the college. And the RT Board a couple of years ago adopted the Phase 2 terminus at the college which is a good terminus location.

As all of you know, this is one of the fastest-growing portions of Sacramento County, so there's an increase in population and jobs. State Route 99 is projected to be twice its capacity in the year 2025. We're also a non-attainment area and congestion on the freeways is suspected to reach Level of Service F shortly.

This is a project for which we're seeking federal funding. We have submitted applications to the Federal Government over the years to obtain that funding. The most recent submittal indicates a medium rating which keeps us eligible for federal funding for

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this extension. We have circulated the Environmental Impact Statement and the preliminary engineering is ongoing and will wrap up fairly soon.

I'm not going to cover the criteria but this gives you an idea of what the Federal Transit Administration is asking us to evaluate and submit to them. We are compared with other cities around the

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United States for these federal funds. For instance, the Federal Government is very interested in land use, transit area development types of evaluations and what the city is doing and what the possibilities are for this extension and so on.

The estimated capital cost for the extension is $226 million. That's in year-of-expenditure funds so the cost would be what it would cost if we were to build it and open it by the year 2011.

Various funding sources from the state and federal government, an important number is the bottom number, Section 5309. That is a section of the Federal Act that is for the federal share, that would provide us with 50 percent of the funding for this extension, $113 million.

The larger boards are in the back showing some of the details of this 4.3-mile extension. I do want to mention that we're still coordinating with the Los Rios

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Community College District and with the college about the location and the various facilities at that station, including a proposed parking structure. So what's on that board in the back are several options and maybe some other options on how to locate that facility

MS. PANNELL: There's only one option.

MR. MANSEN: We've done a number of technical studies and each of those studies lead to a section in the Environmental Impact Statement. You can go through the Environmental Impact Statement and read about each

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of the subjects in that document.

We have circulated the EIS, and the closing comment period is at 5:00 p.m. on April 3rd. In the fall of this year, we hope to certify the EIS and then get a record of decision which is the federal action on this document leading to design and construction between the years 2007 and the end of 2010.

We sent out almost 5,000 notices of the availability of this document. We've placed 14,000 flyers on the light rail and bus vehicles. We sent out 253 computer disks of the EIS offering them a hard copy if they wanted it to elected officials and to agencies. The EIS availability was placed in -- the notice was placed in the Sacramento Bee and in the Federal Register on February 16th, and we did a press release to the

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local media.

The document is posted on the RT website. It's available in six libraries in this area and in downtown. We also hand-delivered 500 flyers along the Detroit Boulevard area because of the interest in the proposal to relocate a gas facility in that area.

We held a public meeting prior to the release of this document on January 3rd and we had over 50 people attend that meeting, had a number of comments, for instance, on the location of the parking lot at the college and we've had scoping meetings, bus tours, a number of open houses and so on throughout the course of the preparation of this EIS.

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This information is available in the back on a board, so these are the addresses that comments should be sent to. There are also comment cards available for people to fill out tonight, or on the back of those cards is an address you can just put a stamp on it and mail it to us in advance of April 3rd.

As we said earlier, if you'd like to speak, please fill out a speaker card. Your name will then be called. I'd like for you to keep your comments to a maximum of three minutes. There will be a time limit up here.

We won't be answering questions at the

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microphone but there will be staff at the back to talk to those people who have questions. And we would like for you to respect each of the speakers as they speak, and again, please make sure your cell phones and so forth are turned off.

MR. TRETHEWAY: Thank you. Let's see if there are any questions from the Board or comments.

MR. DICKINSON: I would like to ask a couple of questions. You've got 45 million, almost 46 million in the project budget for stations. That's obviously, for four stations, a considerable amount per station as in 10 million bucks plus. Is a parking garage built into that number or is there some other explanation for that figure?

MR. MANSEN: Parking garage is included.

MR. DICKINSON: That's the bulk of that then,

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I assume?

MR. MANSEN: And the other thing that happened, Mr. Dickinson, was over two years ago, three years ago, some of the things involved in the stations went up dramatically, concrete and steel.

MR. DICKINSON: Well, we're not spending $10 million a station I hope as a routine? We can see some further subdivision of that line item at some point?

MR. MANSEN: Absolutely.

7

MR. DICKINSON: Okay. And this is about a four-mile extension roughly and it's going to take us three years to complete the engineering and do the construction for four miles?

MR. MANSEN: We hope to do it faster than that, but that's the current schedule.

MR. DICKINSON: You know, we built the entire starter line in that amount of time, 18 miles. So it just seems like an awfully long time to me. Thanks.

MR. MANSEN: Thank you.

MS. PANNELL: Dave, you mentioned several locations for the parking garage. I think you and Mike Wiley and several people know there's only one true location for the parking garage and we've had a great meeting with Brice Harris, the chancellor, and John Sharp, and they both agree that the original location that was proposed for that parking garage is not sufficient. So I don't know if you still have to say there's several locations for the parking garage even

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though there aren't.

MR. MANSEN: The environmental document includes those but, yes, we've gone past that document. With discussions with the college -- to back up a bit, on January 3rd, a lot of the comments we received at that public meeting were questions about the parking

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garage on the southeast corner, saying that was too distant from the light rail platforms and that's why, as you know, we met with the college and the college has -- the staff at the college has been receptive to some alternatives to that.

MR. TRETHEWAY: Mr. Nottoli.

MR. NOTTOLI: Yeah. My question for Dave and for the RT staff, in our discussions as we progressed on this over the year, I just want to commend Ms. Pannell's leadership on this. She never misses an opportunity at least twice a conversation to push the Light Rail South Sacramento Phase 2.

MS. PANNELL: Thank you very much.

MR. NOTTOLI: I wanted to inquire about this. As we did some of the scoping of this initially, and certainly the City of Elk Grove has needed to refine their look at light rail which would be a Phase 3 approach, but part of the background of this was maintaining connectivity to the east side of Highway 99 where we have a Park-and-Ride, there's been right of way. It's been held, the understanding, that that may not be the ultimate direction it goes for future

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extension.

I guess I'm curious though what work either as a premise to this next extension and/or what is being

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looked at relative to either connectivity via walking, bicycling, maybe a shuttle service with the east side there because recognizing a lot of the congestion particularly in the morning hour in the northbound direction but also all the development that's occurring certainly to the east that would have to cross the Calvine overcrossing and make its way into the Park-and-Ride area on the west side of the freeway, certainly could be accommodated adequately with a number of parking spaces that are being contemplated. So where is that left in this overall look?

MR. WILEY: Dave, I'll take that. Basically the Board adopted as the end-of-the-line station for this Phase 2, Consumnes River College. We have in fact maintained as an option the ability to cross east over 99. We have basically a design that we've worked with the City of Sacramento that allows for a light rail if that's the direction that the Board chooses, to run east and cross over 99 if in fact that's the direction. If the direction is to ultimately extend this line south along Bruceville into Elk Grove, that alignment is still preserved to cross over 99 for bike/ped uses and other uses.

The specific use and the specific direction will in fact be determined by this Board through the

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update of our master plan. We're in the process right now of beginning the update of the master plan. We expect to bring it ultimately back to the Board for approval in 18 months and that master plan will basically provide the next 20- to 30-year direction of how the overall system will develop and including, you know, answering those specific issues.

Now, we've also preserved right of way on the east side of 99. That was originally set aside for a light rail extension as well as the property that we own at the vicinity of Calvine and Auberry Road. If you recall, we have I think it's about four to five acres of right of way that we currently own and preserve for future potential use, again, depending on the direction approved by the Board.

MR. NOTTOLI: So if it's going to come forward in an 18-month time frame, again, irrespective of whether the light rail crosses that location, I think the connectivity for folks at the east side wouldn't necessarily have to take the car across, you know, try to occupy one of those many hundreds of spaces there, but there is Park-and-Ride and the modest type that's already there, it's the park of CalTrans, but there's also another area there where we can shuttle across and maybe stay out of the mix as it relates to the

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Calvine/99 interchange there.

So I trust that that's going to be taken into account from discussion with Elk Grove as they plan for the future alignment on any Phase 3 extension. And also, if nothing else, to get some other additional crossing even if it's dedicated to particular uses if not the vehicle use, at least general vehicle use, I think we need to make sure that we keep that in mind because we preserved that right of way and I think we can certainly keep some of the folks out of that mix if we do it properly there.

MR. WILEY: Absolutely.

MR. MANSEN: We do have in the EIS the option of still using those four acres as an optional parking lot.

MR. TRETHEWAY: Ms. Hammond.

MS. HAMMOND: My hope especially with a new majority at Elk Grove City Council is that before we spend a lot of staff time and Board time talking about connecting to Elk Grove, Elk Grove should first become a full-fledged partner with Regional Transit. And I don't mean that necessarily you have to give up your buses but the reality is our light rail system is where we have full-fledged partners, and so my hope is that some day we will become full-fledged partners as a council member

12

from the City of Sacramento.

We already have a lot of Elk Grove people, so

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might as well just come on and join the whole way, you've got three points instead of two and Folsom is a full partner, so come on board.

I have one other question about the EIS though. How much more would it cost to go to Auberry and to build a full station, if that's -- you know, that location already had its own controversies as a cancer cluster. So the question becomes with that as a known issue, how much does it cost just to put something there?

MR. MANSEN: That cost was estimated at $45 million.

MS. HAMMOND: To cross over 99?

MR. MANSEN: To cross over into the station at Calvine/Auberry. Interestingly, there was not a substantial change in the ridership by doing that additional station, and the other thing that has changed since then is the area that we were looking at for a parking facility over there is now developed as housing.

MS. HAMMOND: Is now developed as housing? So it's no longer available?

MR. MANSEN: Well, for parking, no. We have to put a structure up or something but it was fairly

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expensive to cross 99 and did not produce substantial increase.

MS. HAMMOND: And Calvine and Auberry are not in the City of Elk Grove records, in the unincorporated county, right? It's in Mr. Nottoli's district?

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MR. NOTTOLI: Right on the line.

MS. HAMMOND: Right on the line. So we just put parking there with a bunch of houses and there's no retail to kind of help draw people?

MR. MANSEN: At this point, there is a high school right next to it where the station is going to be.

MS. HAMMOND: Two high schools.

MR. MANSEN: We would need about 1100 spaces of parking at that station. The Board decided to shorten this phase to stop at the college and revisit that question.

MS. HAMMOND: Now, refresh my memory. When we did the South Line Phase 1 that was $222 million, we completed it on time and on budget; am I correct?

MR. WILEY: Yes, you are.

MS. HAMMOND: How long did that take?

MR. WILEY: Four years.

MS. HAMMOND: That took four years and how many miles was that?

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MR. WILEY: 6.3 if I recall.

MS. HAMMOND: Six miles? So things just cost more now than the original one that was 18 miles?

MR. WILEY: Costs certainly have gone up in the last several years, yes.

MS. HAMMOND: In the last 30 years?

MR. WILEY: Definitely in the last 30 years.

MS. PANNELL: I'd just like to thank Dave for

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his presentation, and even though the room is not filled, we're all very excited about Phase 2 to the college.

MR. MANSEN: Thank you.

MR. TRETHEWAY: We'll now open the public hearing for the South Line Phase 2. As we mentioned earlier, if you have questions on the EIR, it's really best to take advantage of our staff in the back of the room as well as the consultants. If you have comments to the EIR, please sign up on speaker cards and hand them to our clerk over here. At this point, we just have two speakers. The first one is J.W. Reede who is on the advisory committee for the South Line. Thank you for your service.

MR. REEDE: Good evening, ladies and gentlemen. My name is Dr. James Reede and I was the chairman of the Community Advisory Committee for the

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South Sacramento Transit Alternatives Project. During the final public hearing, I made a comment that being the chair caused me to have two children. Well, those two children are now old enough to ride light rail by themselves. I might also add that I'm a professor of environmental science part time at Sac State teaching CEQA and NEQA and I have a couple of my students here tonight because we're actually using this Draft Subsequent and Draft Supplemental EIR and EIS as part of the class because it is an excellent document.

However, there is a shortcoming in this

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document that was caused by our Global Warming Solutions Act AB32, which went into effect January 1st which this particular document does not address. Even though we have beneficial impacts on carbon dioxide and PM2.5s and PM10s, it is not addressed in the environmental document in the air quality section specifically starting at page 4-11. The document needs to state in the affirmative that this will reduce carbon dioxide by taking vehicles off the road. It's a beneficial impact but it needs to be addressed.

The Orange County Transportation Authority in their long-range transportation plan failed to address AB32. And because they did, the California Attorney General slammed them for it. There's been a number of

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Environmental Impact Reports that have gone out since this has crossed the Water District, their alternate intake project that addressed on a cursory level -- and I'm talking real technical right now so some people may not have a clue, but your air quality engineers need to address the beneficial impacts that would be caused by this light rail segment being put in, because it's taking vehicles off the road and it's taking buses off the road. It's missing in this document.

Other than that, it's an excellent document but it needs to be addressed or you will have -- you will not have a litigation-proof document, and all of you are aware that the way CEQA gets enforced in California is through litigation. We don't need that.

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A discussion of climate change and greenhouse gases has been added to the SFEIS/SFEIR, Volume I, Section 4.3.3.5 – Global Climate Change.

South Sacramento Corridor Phase 2 SFEIS/SFEIR

15 We've been waiting on this for 12 years in the south
16 area. It was supposed to go to Grant Line in '99, our
17 previous Board chose to give the money to Folsom. We
18 want our segment now and we need to have it
19 litigation-proof. So please have your air quality
20 engineers address global and climate warming. Thank
21 you.
22 MR. TRETHEWAY: Thank you for your long
23 service and your very important point. I understand,
24 like you said, the AG's office is all over these kind of
25 plans. Very critical point. Our next speaker is Mike

Please see response on previous page.

1 Somers.
2 MR. SOMERS: Hi. My name is Mike Somers, I'm
3 a representative with CALPIRG. CALPIRG is the
4 California Public Interest Research Group. We're a
5 state-wide, citizen-based organization and we have
6 members all across the state including here in
7 Sacramento. So right now one of our top priorities is
8 preventing the Governor's 1.1 billion-dollar cuts in
9 public transportation funding. So obviously, we care
10 about public transportation because, like you, we know
11 that traffic congestion costs commuters time and money.
12 It also is only going to get worse.
13 So we also know that 40 percent of global
14 warming pollution comes from transportation, so
15 fortunately, public transit uses 1/3 of the energy of
16 single passenger cars. So I care, obviously, because I
17 don't own a car, as well as I run an office that is

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staffed with approximately 20 people which most of them as well use the Regional Transit here in Sacramento.

So in terms of what we're doing, CALPIRG is -- our advocates are meeting with legislators regularly to advocate against these budget cuts, and so finally, we're here today to say that we really would love to work with the Transit Board to prevent the budget cuts proposed by the Governor. So thanks so much.

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MR. TRETHEWAY: Thank you very much. Are there any other speakers? Do we need a motion to close the hearing?

MR. SHELBY: The hearing is automatically closed by moving to the next item.

MR. TRETHEWAY: Thank you very much. The next item, please.

THE CLERK: Reports, ideas and questions from directors and communications.

MR. TRETHEWAY: Seeing none, next item, please.

THE CLERK: The public addresses the Board and I do not have any cards for that item.

MR. TRETHEWAY: Would anybody like to address the Board?

THE CLERK: Hold on just a moment here.

MR. BITTNER: Rather than hold you up, I'll fill this out after I make my comment.

My name is Moss Bittner and I live in Midtown. I'd like to address the issue of the K Street

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beautification project that also entails a transit station move. I understand you had some people come and speak on that issue at your last meeting. I was on K Street today speaking to people about -- transit users in particular, about -- their feelings about station

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move and whatnot. Overwhelmingly, I'd have to say people like the station where it is because it's close to the destinations that they want to get to, and I hope that that really becomes incorporated in the City of Sacramento's development of a station move.

I was informed just a few minutes ago by Mr. Tretheway that the City has actually put off its vote on the K Street Beautification Project to three weeks from now in order to examine an alternative which keeps the station on the 700 block, I think that's a great idea. I also think that from the City's perspective, they could actually dissociate beautification from transit alteration.

Now, you may be wondering why an issue that's being handled by the City is of such concern to Regional Transit. Well, it's because the City's project is essentially a transit project and that creates some confusion. So with that, I'd have to say that I'm pleasantly surprised to learn that Regional Transit has participated in the development of a sort of compromised alternative that will allow the station to remain on the 700 block, I think that's really important.

And the more this Board and RT can participate

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in dealing with transit mobility and accessibility issues downtown, the more transit users can be folded

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into the project and their preferences and their opinions can be drawn on the decisions that the City and RT collectively make, the better the project can be for transit and the better ultimately it will be for downtown revitalization.

MR. TRETHEWAY: Thank you. I can assure you that RT has been in nearly -- if not every -- meeting of this subject, both public meetings and otherwise. They did come up with perhaps an option that we'll be looking at in two or three weeks. So no other items before us?

MS. PANNELL: You know what? This is the shortest meeting we've had.

MR. TRETHEWAY: It will be if you'll allow me to adjourn it. Meeting adjourned.

(Public Hearing was adjourned at 6:46 p.m.)

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CERTIFICATE OF REPORTER

I, SHERRI STARR, a Certified Shorthand Reporter, hereby certify that said proceeding was taken in shorthand by me, a disinterested person, at the time and place therein stated, and that the testimony was thereafter reduced to typewriting, by computer, under my direction and supervision;

I further certify that I am not of counsel or attorney for either or any of the parties to the said proceeding, nor in any way interested in the event of this cause, and that I am not related to any of the parties thereto.

SHERRI STARR, CRR; CSR No. 10245