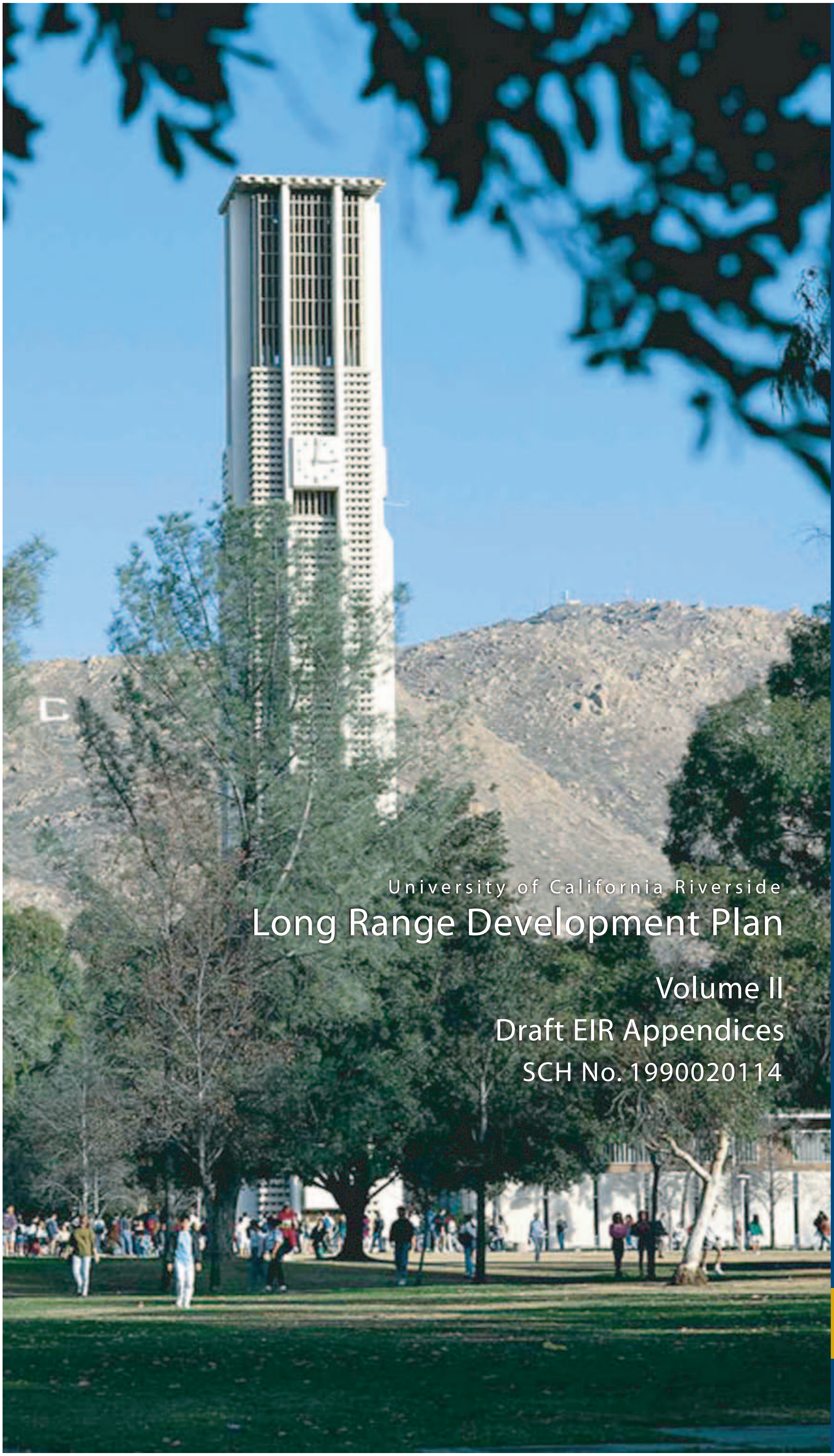

University of California Riverside

Long Range Development Plan

Volume II

Draft EIR Appendices

SCH No. 1990020114

UCR 50th ANNIVERSARY

A Tradition of Excellence
A Future of Distinction
1954 - 2004

April 2005

UNIVERSITY OF CALIFORNIA, RIVERSIDE
2005 LONG RANGE DEVELOPMENT PLAN

Volume II

Draft Environmental Impact Report
Appendices
SCH No. 1990020114

Prepared for:
University of California, Riverside
Academic Planning and Budget
Capital and Physical Planning
3637 Canyon Crest Drive, F-101
Riverside, CA 92507

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April 2005

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Volume II—Appendices

APPENDICES

Appendix A Initial Study / Notice of Preparation, NOP Responses, and Summary of Agency Consultations

UNIVERSITY OF CALIFORNIA, RIVERSIDE

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ACADEMIC PLANNING & BUDGET
RIVERSIDE, CALIFORNIA 92521-0101

NOTICE OF PREPARATION

DRAFT ENVIRONMENTAL IMPACT REPORT

Date: December 14, 2001

Project Title: 2002 Long Range Development Plan
(Update to the 1990 Long Range Development Plan)

Project Number:

Lead Agency: University of California Board of Regents

Project Location: University of California, Riverside campus

County: Riverside

Introduction:
The University of California, Riverside proposes to update the campus' Long Range Development Plan (LRDP) previously adopted by the University of California Board of Regents (The Regents) July 20, 1990. The Long Range Development Plan update will be undertaken to address anticipated growth in student enrollment.

Project Location:
The University of California, Riverside campus is located at the eastern end of the city of Riverside in western Riverside County. The 215/Highway 60 Freeway runs southeast to northwest through the campus and bisects the approximately 1,112-acre campus in half. There are two pedestrian and vehicle connections between the east side of the campus and the west side. The northernmost is at University Avenue, a city street, and provides crossing at grade while the freeway passes overhead. The second connection is to the south via Canyon Crest Drive as it passes under the freeway below grade. This portion of Canyon Crest Drive is included in the campus vehicular circulation and is not part of the city street system. The academic core, housing and student and campus services including childcare are provided on the east side of the campus. The west side is largely undeveloped and serves primarily as a location for agricultural teaching and research fields. Other existing uses on the west side include

University Extension, an office building, housing, parking, and agricultural operation facilities (primarily south of Martin Luther King Boulevard).

Project Description:

On July 19, 1990, The Regents adopted the 1990 Long Range Development Plan (LRDP) for the University of California, Riverside (UCR), to guide the physical development of the UCR campus in order to meet the campus' academic goals and objectives. The 1990 LRDP proposed approximately 10,134,000 gross square feet (gsf) of building space on campus to support a total student enrollment of 18,050 students by the year 2005/06. As of the 2000/2001 academic year, the campus enrolled 12,703 students (three-quarter average headcount) and had a total of approximately 4,554,700 gross square feet of academic building and related support facilities.

In response to projected increases in higher education enrollment demand over the next decade, the University of California has begun studying the feasibility of enrollment growth at its various campuses, including Riverside, over the next 15 years. In January 2000, the President of the University of California asked each campus to consider the feasibility of enrollment growth, and UCR has identified a planning target for the UCR campus of approximately 25,000 (headcount) students by the year 2015. Because this enrollment planning target would exceed the projection of 18,050 students in the 1990 LRDP, the campus proposes to update the current LRDP and prepare an Environmental Impact Report, as required by Section 21080.09 of the California Environmental Quality Act (CEQA), to address the long-term and cumulative implications of that growth.

The LRDP is a comprehensive land use plan, which will guide the physical development of the UCR campus to 2015 in response to the instruction, research, and public service mission of the University. The UCR 2002 LRDP will identify the program goals to be achieved during the planning period, estimate the net new building space required to achieve the goals, articulate planning principles to guide the physical development process, and suggest potential future uses of campus land.

Although the 2002 LRDP update is in progress, it is anticipated that the LRDP will generally preserve existing patterns of campus development. The majority of future campus development will occur within the eastern portion of the campus (east of the I-215/SR-60), with most academic buildings located within or adjacent to the central academic core of the campus. Residential facilities are proposed to remain within the northeastern portion of the campus. Some academic, administrative and support facilities, including housing, would be developed on the western portion of the campus, in the area generally bounded by I-215/SR-60, Martin Luther King Boulevard, Chicago Avenue, and University Avenue. Recreational and athletic facilities would be developed in proximity to the housing facilities in the northeastern portion of the campus and on the western portion of the campus where the majority of undeveloped land is located. No development is proposed for the area south of Martin Luther King Boulevard, except for facilities directly related to agricultural research. Parking will primarily be provided in parking structures, generally located around the perimeter of campus. The 2002 LRDP will also evaluate and update as appropriate policies related to natural resources.

The proposed UCR 2002 LRDP estimates that approximately 12,500,000 gsf of academic buildings, support facilities and student housing are required to support a total future enrollment of 25,000 students by the year 2015. Compared to current conditions, implementation of the 2002 LRDP would result in an increase of approximately 12,300 students and 8 million gsf of additional building space including about half a million gross square feet of buildings and facilities which are currently under construction or in various planning stages.

In addition to the development of new buildings and support facilities, existing on-campus facilities will continue to be subject to renovation (including seismic retrofit), maintenance activities, and infrastructure improvements during the planning period from 2002 to 2015.

This Initial Study (attached to this NOP) has been prepared to identify the potential environmental issues that will be addressed in the EIR on the UCR 2002 LRDP, in accordance with the California Environmental Quality Act (CEQA) of 1970, as amended (Public Resources Code, §21000-21178), the CEQA Guidelines (California Code of Regulations, Title 4, Chapter 14, §15000-15387), and the University of California Guidelines for the Implementation of CEQA

Potential Environmental Effects:
The LRDP EIR will consider the potential environmental effects of the development of the remaining approximately 5.58 million square feet of space under the 1990 LRDP, for academic, research, housing, and other uses on campus as well as the anticipated increase of 1.2 million square feet required for 25,000 students in 2015. The LRDP EIR will serve as a program EIR for the consideration of subsequent actions consistent with the update to the LRDP. As part of the environmental analysis for the LRDP update, the University will evaluate all of the mitigation measures identified in the 1990 LRDP FEIR to determine whether new or modified mitigation measures are necessary to reduce the potential significant impacts of campus development through 2015. As appropriate, the analysis will include program-level analysis for the entire Long Range Development Plan and project-level analysis for potential effects of LRDP implementation combined with known and reasonably foreseeable future growth in the surrounding area.

Potential environmental effects anticipated from the increased enrollment growth and related development include: aesthetics; agriculture resources; air quality; biological resources; cultural resources; geology and soils; hazards and hazardous materials; hydrology and water quality; land use and planning; noise; population and housing; public services; recreation; transportation and traffic; and utilities, energy and service systems. The Initial Study has determined that there has been no mineral resources identified on the campus since the 1990 LRDP. Since the existing materials on this subject are sufficient to show that there will be no potential impacts to mineral resources on the campus due to the anticipated growth, mineral resources will not be addressed in the EIR. In addition to the above, the Draft LRDP EIR will also include analysis of project alternatives and cumulative effects.

Notice and Comments:
In compliance with the state and University of California guidelines for the implementation of CEQA, this Notice of Preparation is hereby sent to inform agencies and interested parties of the LRDP Update and EIR.

This notice is to provide agencies and the public an opportunity to comment in writing on the scope and content of the EIR. The University will also accept oral comments on the proposed scope and content of the EIR at a Scoping meeting that will be held on January 8, 2002 from 6:30 to 8:00 PM in the Highland Elementary School multipurpose room, 700 Highlander Drive, Riverside, CA 92507.

The date and location of the Scoping meeting will be noticed in the local newspaper and by direct mailing to interested individuals, organizations and associations as well as by posting on the campus LRDP web site at www.lrdp.ucr.edu.

Requests for noticing and written comments should be directed to Juanita W. Bullock, Campus Physical Planner, 3637 Canyon Crest Drive, Riverside, CA 92507 and should be received no later than 5:00 PM on Monday, January 14, 2002. Due to the time limits mandated by state law, the response must be sent at the earliest possible date, but not later than 30 days after receipt of this Notice.

After the University of California completes the draft EIR, it will be circulated for public review and comment for 45 days. At the conclusion of the public comment period, the University of California will prepare written responses to comments on the draft EIR.

Additional Information

For additional information, please contact:

Juanita W. Bullock AICP, ASLA
UCR Campus Physical Planner
Capital and Physical Planning
3637 Canyon Crest Drive, F-101
Riverside, CA 92507
Phone: (909) 787-7376
Fax: (909) 787-2402
E-mail: nita.bullock@ucr.edu

Attachments:
1. Initial Study
2. Document Transmittal Form
3. Regional Location Map
4. Campus Location Map
5. NOP Distribution List

C: See Attachment 5 above

ENVIRONMENTAL CHECKLIST FORM

(Initial Study/Notice of Preparation)

UNIVERSITY OF CALIFORNIA — DATE: December 14, 2001

CAMPUS: Riverside — PROJECT NO.:__________

I. PROJECT INFORMATION

1. *Project title:*

UC Riverside 2002 Long Range Development Plan

2. *Lead agency name and address:*

The Regents of the University of California
1111 Franklin Street, 12th Floor
Oakland, California 94607

3. *Contact person and phone number:*

Juanita W. Bullock, AICP, ASLA, Campus Physical Planner
University of California, Riverside
Capital and Physical Planning
3637 Canyon Crest Drive, F-101
Riverside, California 92507
(909) 787-7376
Nita.Bullock@ucr.edu

4. *Project location:*

University of California, Riverside
Riverside, California 92507

5. *Project sponsor's name and address:*

University of California, Riverside (UCR)
APB—Capital and Physical Planning
3637 Canyon Crest Drive, F-101
Riverside, CA 92507

6. *Custodian of the administrative record for this Project:*

   Refer to Section I, Item 3 (above).

7. *Identification of previous EIRs relied upon for tiering purposes (including all applicable LRDP and Project EIRs) and address where a copy is available for inspection:*

   The Final Environmental Impact Report on the 1990 Long Range Development Plan (LRDP Final EIR, State Clearinghouse Number 90020114) will be used as a primary source for the environmental analysis of the proposed UCR 2002 LRDP. The LRDP Final EIR and all materials referenced herein are available for review during normal business hours at UCR Capital and Physical Planning, 3637 Canyon Crest Drive, Bannockburn F-101, on the UC Riverside campus.

II. PROJECT DESCRIPTION

1. *Project Description:*

   On July 19, 1990, The Board of the Regents of the University of California ("The Regents") adopted the 1990 Long Range Development Plan (LRDP) for the University of California, Riverside (UCR), to guide the physical development of the UCR campus in order to meet the campus' academic goals and objectives. The 1990 LRDP proposed a total of approximately 10,134,000 gross square feet (gsf) of building space on campus to support a total student enrollment of 18,050 students by the year 2005/06. As of the 2000/2001 academic year, the campus enrolled approximately 12,700 students (based on the average headcount for the three academic quarters) and had a total of approximately 4,554,700 gross square feet of academic building and related support facilities.

   In response to projected increases in higher education enrollment demand over the next decade, the University of California has begun studying the feasibility of enrollment growth at its various campuses, including Riverside, over the next 15 years. In January 2000, the President of the University of California asked each campus to consider the feasibility of enrollment growth. The UCR campus has developed a preliminary enrollment target of approximately 25,000 (headcount) students by the year 2015. Because this enrollment planning target would exceed the projection of 18,050 students in the 1990 LRDP, the campus proposes to update the current LRDP and prepare an Environmental Impact Report, as required by Section 21080.09 of the California Environmental Quality Act (CEQA), to address the long-term and cumulative implications of that growth.

   The LRDP is a comprehensive land use plan which will guide the physical development of the UCR campus to 2015 in response to the instruction, research, and public service mission of the University. The UCR 2002 LRDP will identify the program goals to be achieved during the planning period, estimate the net new building space required to achieve the goals, articulate planning principles to guide the physical development process, and suggest potential future uses of campus land.

Although the 2002 LRDP update is in progress, it is anticipated that the LRDP will generally preserve existing patterns of campus development. The majority of future campus development will occur within the eastern portion of the campus (east of the I-215/SR-60), with most academic buildings located within or adjacent to the central academic core of the campus. Residential facilities are proposed to remain within the northeastern portion of the campus. Some academic, administrative and support facilities (including housing) would be developed on the western portion of the campus, in the area generally bounded by I-215/SR-60, Martin Luther King Boulevard, Chicago Avenue, and University Avenue. Recreational and athletic facilities would be developed in proximity to the housing facilities (in the northeastern portion of the campus) and on the western portion of the campus (where the majority of undeveloped land is located). No development is proposed for the area south of Martin Luther King Boulevard, except for facilities directly related to agricultural research. Parking will primarily be provided in parking structures, generally located around the perimeter of campus. The 2002 LRDP will also evaluate and update as appropriate policies related to natural resources.

The proposed UCR 2002 LRDP estimates that a total of approximately 12,500,000 gsf of academic buildings, support facilities and student housing are required to support a total future enrollment of approximately 25,000 students by the year 2015. Implementation of the 2002 LRDP would result in a student enrollment of approximately 12,300 students (over current enrollment) and approximately 8 million gross square feet of building space (including approximately half a million gross square feet of buildings and facilities which are currently under construction or have already been approved).

In addition to the development of new buildings and support facilities, existing on-campus facilities may be subject to expansion, renovation (including seismic retrofit), maintenance activities, and infrastructure improvements during the planning period from 2002 to 2015.

This Initial Study has been prepared to identify the potential environmental issues that will be addressed in the EIR on the UCR 2002 LRDP, in accordance with the California Environmental Quality Act (CEQA) of 1970, as amended (Public Resources Code, §21000-21178), the CEQA Guidelines (California Code of Regulations, Title 4, Chapter 14, §15000-15387), and the University of California Guidelines for the Implementation of CEQA.

2. *Surrounding land uses and environmental setting:*

UCR is located in the City of Riverside in western Riverside County. The 1,112-acre UCR campus is located three miles east of downtown Riverside and is bisected by the I-215/SR 60 freeway. The 576 acres east of the freeway include the academic core and most of the existing campus facilities. The western portion of the campus includes parking, office buildings, the University Extension (UNEX) facility, International Student Housing, and agricultural teaching and research fields and related facilities.

The land uses surrounding the campus in the City of Riverside are primarily residential, with some commercial uses along the major streets. To the north of the campus, the area is comprised of residential uses and a series of community parks. To the east, the adjacent land uses are primarily residential. The southern border of the campus is partially defined by the I-215/SR-60 freeway and a line roughly following Le Conte Drive. To the south and west, residential uses are immediately adjacent to the campus. North of the research fields is a commercial area along University Avenue and multi-family apartment complexes. North of this area is mixture of other uses, including residential, public, and industrial uses generally abutting the freeway.

3. *Discretionary approvals:*

The University will prepare an EIR to address all State, regional, and local government approvals needed for construction and/or implementation of the project, whether or not such actions are known at this time or are explicitly listed in this Initial Study. UCR seeks the approvals and regulatory permits for implementation of the proposed revisions to the UC Riverside LRDP, including, but not limited to, the following:

UC Board of Regents

- Certification of the Environmental Impact Report.
- Approval of the proposed 2002 LRDP.

III. PURPOSE OF THE INITIAL STUDY

CEQA Section 21080.09 requires that the approval of a campus Long Range Development Plan be supported by an environmental impact report. Accordingly, the University will be preparing an EIR in compliance with this requirement. Since a decision has already been made to prepare an EIR, the purpose of this initial study checklist is to help focus the EIR and to provide information allowing a meaningful response on the anticipated scope of the EIR. Specifically, this initial study is intended to: (1) inform responsible agencies and the public of the nature of the proposed project and its location, (2) generally describe the probable environmental impacts of the project, (3) identify impacts that will clearly be less than significant and therefore will not be discussed in the EIR, and (4) provide a general description of the topics intended to be addressed in the EIR.

This initial study utilizes the checklist set forth in Appendix G of the CEQA guidelines, and indicates for each of the environmental topic areas addressed in that checklist whether the topic will be, or will not be, analyzed in the EIR. Impacts for which no additional analysis is required include impacts that clearly will not be presented by the project, as well as impacts that will clearly be less than significant under CEQA criteria. The impacts to be analyzed include impacts that may be significant and unavoidable, impacts that are potentially significant but which may be reduced to less than significant levels through the adoption of mitigation measures, impacts for which further analysis is necessary or desirable before a determination of significance can be made, and less than significant impacts that the University intends to include in the document to provide a more comprehensive analysis. As appropriate, the analysis will include program-level analysis for the entire Long Range Development Plan, project-level analysis for those issues relevant for tiering of future project-specific analysis, and cumulative-level analysis for potential effects of LRDP implementation combined with known and reasonably foreseeable future growth in the surrounding area.

The environmental factors checked below are proposed to be addressed in the EIR, as described in greater detail in the discussions below:

☒ Aesthetics
☒ Biological Resources
☒ Hazards & Hazardous Materials
☐ Mineral Resources
☒ Public Services
☒ Utilities Service Systems/Energy

☒ Agriculture Resources
☒ Cultural Resources
☒ Hydrology/Water Quality
☒ Noise
☒ Recreation
☒ Mandatory Findings of Significance

☒ Air Quality
☒ Geology/Soils
☒ Land Use/Planning
☒ Population/Housing
☒ Transportation/Traffic

IV. DETERMINATION: (To be completed by the Lead Agency)

On the basis of the initial evaluation that follows:

______ I find that the proposed project COULD NOT have a significant effect on the environment, and a NEGATIVE DECLARATION will be prepared.

______ I find that although the proposed project could have a significant effect on the environment, there will not be a significant effect in this case because revisions in the project have been made by or agreed to by the project proponent. A MITIGATED NEGATIVE DECLARATION will be prepared.

X I find that the proposed project MAY have a significant effect on the environment, and an ENVIRONMENTAL IMPACT REPORT is required.

______ I find that the proposed project MAY have a "potentially significant impact" or "potentially significant unless mitigated" impact on the environment, but at least one effect 1) has been adequately analyzed in an earlier document pursuant to applicable legal standards, and 2) has been addressed by mitigation measures based on the earlier analysis as described on attached sheets. A TIERED ENVIRONMENTAL IMPACT REPORT is required, but it must analyze only the effects that remain to be addressed.

______ I find that although the proposed project could have a significant effect on the environment, because all potentially significant effects (a) have been analyzed adequately in an earlier EIR or NEGATIVE DECLARATION pursuant to applicable standards, and (b) have been avoided or mitigated pursuant to that earlier EIR or NEGATIVE DECLARATION, including revisions or mitigation measures that are imposed upon the proposed project, no further environmental document is required. FINDINGS consistent with this determination will be prepared.

	12/14/01
Signature	*Date*
Juanita W. Bullock, AICP, ASLA	Campus Physical Planner
Printed Name	*Title*

V. EVALUATION OF ENVIRONMENTAL IMPACTS:

General Instructions

A. All answers must take account of the whole action involved, including off-site as well as on-site, cumulative as well as project-level, indirect as well as direct, and construction as well as operational impacts.

B. Supporting Information Sources: A source list should be attached, and other sources used or individuals contacted should be cited in the discussion.

C. This is only a suggested form, and lead agencies are free to use different formats; however, lead agencies should normally address the questions from this checklist that are relevant to a project's environmental effects in whatever format is selected.

D. Lead agencies are encouraged to incorporate into the checklist references to information sources for potential impacts (e.g. general plans, zoning ordinances). Reference to a previously prepared or outside document should, where appropriate, include a reference to the page or pages where the statement is substantiated.

Response Column Heading Definitions

As stated in the general instructions above, lead agencies are free to use different formats in the evaluation of environmental impacts. This Initial Study serves to identify the potential environmental impacts that will be addressed in an EIR on the proposed project. Thus, this document has been modified from the standard format to a two-column format as follows:

A. *Impact to be Analyzed* applies to those environmental issues, which may or may not be significant, that will be addressed in the Environmental Impact Report. As appropriate, the analysis will include program level analysis, for the entire Long Range Development Plan, project-level analysis, for those issues relevant for tiering of future project-specific analysis; and cumulative-level analysis for potential effects of LRDP implementation combined with known and reasonably foreseeable future growth in the surrounding area.

B. *No Additional Analysis Required* applies where the proposed LRDP implementation would have no effect on the particular environmental issue, and no additional analysis, beyond that provided in this Initial Study, is warranted or required.

IMPACT QUESTIONS

	Impact to be Analyzed in EIR	No Additional Analysis Required
1. AESTHETICS — Would the project:		
a) Have a substantial adverse effect on a scenic vista?	☒	☐

The UCR Campus is located in the eastern portion of the City of Riverside, adjacent to the Box Springs Mountains. The surrounding area is predominantly urban in character, with the exception of the mountains to the south and east of the campus. The EIR will analyze the potential for LRDP implementation to affect scenic vistas including those within the City of Riverside as well as the campus.

b) Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?	☐	☒

The campus is bisected by State Route (SR) 60/I-215, and generally bounded by University Avenue, Canyon Crest Drive, Blaine Street, Watkins Drive, Valencia Hill Drive, Le Conte Drive and Chicago Avenue, none of which are officially designated, or identified as eligible for designation, as a state scenic highway (California Department of Transportation, Office of State Landscape Architecture, list of California Scenic Routes). Development associated with implementation of the 2002 LRDP would, therefore, not have a significant impact on any State Scenic Highways.

c) Substantially degrade the existing visual character or quality of the site and its surroundings?	☒	☐

The proposed UCR 2002 LRDP would designate areas of the campus for future development, including both additional development within the eastern portion of the campus, where most development is concentrated, and the western portion of the campus, which is currently occupied primarily with agricultural fields. Because new development could occur in previously undeveloped areas and in areas characterized by low development densities, the EIR will analyze whether the visual quality of those settings could be adversely impacted by future development.

d) Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?	☒	☐

Development of new buildings, including at locations around the perimeter of the campus, and in areas that are currently undeveloped could create new sources of light, from exterior building

	Impact to be Analyzed in EIR	No Additional Analysis Required

illumination, lighted recreation/athletic facilities, and parking lots or structures, or glare, from reflective building surfaces or headlights from additional vehicular traffic. The EIR will address whether these new sources of light or glare could affect day or nighttime views, or adjacent land uses.

e) Result in Other Impacts?	☒	☐

Implementation of the 2002 LRDP, in conjunction with other reasonably foreseeable development in the vicinity or region, could result in cumulatively considerable aesthetics effects related to light and glare, scenic vistas, and development of previously undeveloped areas. The EIR will, therefore, address the potential for cumulative aesthetic impacts.

2. AGRICULTURE RESOURCES — In determining whether impacts to agricultural resources are significant environmental effects, lead agencies may refer to the California Agricultural Land Evaluation and Site Assessment Model (1997) prepared by the California Dept. of Conservation as an optional model to use in assessing impacts on agriculture and farmland. Would the project:

a) Convert 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, to non-agricultural use?	☒	☐

	Impact to be Analyzed in EIR	No Additional Analysis Required

The 1990 LRDP Final EIR (page 4.1-7) indicated that due to physical and chemical characteristics of the soil, the growing season and moisture supply, portions of the western campus area had been designated by the State of California as Prime Farmland, and Farmland of Statewide Importance. The EIR will assess whether those prior designations are still applicable to the agricultural research fields, which may include utilization of the California Agricultural Land Evaluation and Site Assessment Model. The 1990 LRDP proposed future development on the agricultural research fields north of Martin Luther King Boulevard, which would result in the conversion of those areas to non-agricultural use. The 2002 LRDP will propose future campus development within that same area (north of MLK Blvd.) which would result the conversion of agricultural research fields to non-agricultural uses. The agricultural research fields south of Martin Luther King Boulevard would remain designated for agricultural research. Agricultural research that could be displaced from the western portion of the campus would either be relocated to the fields south of MLK Boulevard, or to the 540-acre Coachella Valley Agricultural Field Station owned by the University of California and managed by the UCR College of Natural and Agricultural Sciences. The EIR will analyze potential impacts that would result from the reduction of the agricultural research fields on the UCR campus.

b) **Conflict with existing zoning for agricultural use, or a Williamson Act contract?**	☒	☐

The University of California is constitutionally exempt from local zoning and land use plan/element requirements, and no portion of the campus is under a Williamson Act contract. Portions of the west campus (north of MLK Blvd.) were designated in the 1990 LRDP for future development. As discussed in Item 2.a) above, the 2002 LRDP will designate the agricultural research fields located north of Martin Luther King Jr. Boulevard for future development of academic building and related support facilities, which may include student housing. The EIR will evaluate whether development under the 2002 LRDP would result in conflicts with any applicable land use designations for the agricultural research fields on the western portion of the campus.

c) **Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland, to non-agricultural use?**	☒	☐

	Impact to be Analyzed in EIR	No Additional Analysis Required

Implementation of the proposed 2002 LRDP would convert a portion of the on-campus agricultural research fields to non-agricultural uses, as discussed in Item 2.a) above. The portion of the western campus south of Martin Luther King Jr. Boulevard would remain designated for agricultural research. Because of the urbanized setting of the UCR campus, there is very little farmland remaining in the vicinity of the campus. The EIR will address the potential for on-campus development to result in environmental changes which could result in the conversion of off-campus farmland to non-agricultural use.

d) **Result in Other Impacts**	☒	☐

The conversion of a portion of the on-campus agricultural research fields to non-agricultural uses, as discussed in Item 2.a) above, in conjunction with other reasonably foreseeable development that involves the conversion of farmland in the region to urban uses, could result in a cumulatively considerable loss of agricultural land. The EIR will, therefore, address the potential for cumulative impacts to agricultural resources from implementation of the 2002 LRDP in conjunction with known and reasonably-foreseeable growth in the surrounding area.

3. AIR QUALITY — Where available, the significance criteria established by the applicable air quality management or air pollution control district may be relied upon to make the following determinations. Would the project:

a) **Conflict with or obstruct implementation of the applicable air quality plan?**	☒	☐

Additional on campus development would result in short-term and long-term emission of criteria air pollutants from both mobile and stationary sources, and those emissions would contribute to the non-attainment status of the South Coast Air Basin (SCAB). The EIR will analyze whether implementation of the 2002 LRDP would conflict with or obstruct implementation of the 1997 Air Quality Management Plan for the SCAB, which outlines emission control strategies and programs designed to bring the basin into attainment or maintain existing attainment with the state and federal ozone, carbon monoxide, nitrogen dioxide, and particulate matter standards.

b) **Violate any air quality standard or contribute substantially to an existing or projected air quality violation?**	☒	☐

The UCR campus is located in the South Coast Air Basin, a non-attainment zone for ozone, carbon monoxide, nitrogen dioxide, and particulate matter. Implementation of the 2002 LRDP would result in additional on-campus development, which would result in the emission of criteria pollutants from stationary and mobile sources, which would contribute to existing exceedances of federal and state standards for criteria pollutants. The EIR will characterize existing air quality in the vicinity of the campus, quantify potential short-term and long-term impacts that would result from the implementation of the 2002 LRDP, and identify potential mitigation measures to reduce impacts to a less-than-significant level, to the extent feasible.

	Impact to be Analyzed in EIR	No Additional Analysis Required
c) **Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors)?**	☒	☐

Additional development on the UCR campus, combined with known and reasonably foreseeable growth in the region, would result in cumulatively considerable emissions for those pollutants for which the SCAB is non-attainment (ozone, carbon monoxide, nitrogen dioxide, and particulate matter). The EIR will, therefore, analyze whether cumulatively considerable air quality impacts would occur as a result of implementation of the 2002 LRDP.

	Impact to be Analyzed in EIR	No Additional Analysis Required
d) **Expose sensitive receptors to substantial pollutant concentrations?**	☒	☐

Refer to Section Items 3a) and 3b). The EIR will evaluate whether the proposed project would expose sensitive receptors, including nearby schools, to substantial pollutant concentrations.

	Impact to be Analyzed in EIR	No Additional Analysis Required
e) **Create objectionable odors affecting a substantial number of people?**	☒	☐

Although specific facilities are not proposed under the 2002 LRDP, some facilities associated with campus uses could produce odors that could affect campus or neighboring uses. The EIR will analyze whether the implementation of the 2002 LRDP would create objectionable odors affecting a substantial number of people and determine impacts, if any.

	Impact to be Analyzed in EIR	No Additional Analysis Required
f) **Result in Other Impacts?**	☒	☐

	Impact to be Analyzed in EIR	No Additional Analysis Required

Implementation of the 2002 LRDP would result in development of additional academic buildings and related support facilities, and the EIR will evaluate the potential impacts that would result from short-term emission of criteria pollutants from construction and site clearance activities. Additionally, the 1990 LRDP EIR concluded, on page 4.10-21, that implementation of the LRDP, combined with regional growth and development, would contribute to continuing exceedances of air quality standards. Therefore, the EIR will also address the potential for cumulative impacts to air quality from implementation of the 2002 LRDP in conjunction with known and reasonably-foreseeable growth in the surrounding area.

4. BIOLOGICAL RESOURCES — Would the project:

	Impact to be Analyzed in EIR	No Additional Analysis Required
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 or U.S. Fish and Wildlife Service?**	☒	☐

According to the 1990 LRDP (Figure 4.3.1, page 4.3-3) most "semi-natural" areas on-site correspond with areas with a low development potential, such as those identified in 1990 LRDP Final EIR (Figure 4.1-1, page 4.1-2) as a slope of 15% or greater, or to areas that are adjacent to drainage courses. The southeastern portion of the campus, was specifically noted as containing coastal sage scrub, a sensitive habitat. In 2000, the US Fish and Wildlife Service designated critical habitat boundaries for the California Gnatcatcher in central Riverside County, and this areas includes the hills located in the southeastern portion of the campus. Most of the western portion of the campus was not identified (in the 1990 LRDP) as providing any wildlife habitat, because of the presence of agricultural research fields, which generally removed native habitat, except for some areas along the Box Springs Arroyo (located south of Martin Luther King Boulevard).

As implementation of the LRDP could result in additional infill development in the eastern portion of the campus, if development was proposed in the area designated as critical habitat for the California Gnatcatcher, or if development would affect riparian areas or seasonal wetlands (which may provide habitat for sensitive animal species), development could result in adverse impacts to sensitive species or habitats. The EIR will evaluate the potential for development to affect sensitive plant and animal species and habitat on the campus.

	Impact to be Analyzed in EIR	No Additional Analysis Required
b) **Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations or by the California Department of Fish and Game or US Fish and Wildlife Service?**	☒	☐

Refer to Section 4a), above.

c) **Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?**	☒	☐

The riparian habitat in on-campus drainage courses may constitute "Waters of the United States" as defined by Section 404 of the Clean Water Act, and may also be protected by the Fish and Game Code of California. The EIR will identify and map potential wetlands on campus, evaluate potential impacts to these areas that could result if the future development occurred within or adjacent to those areas, and identify potential mitigation measures to reduce potential impacts, to the extent feasible.

d) **Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?**	☒	☐

The 1990 LRDP EIR described the majority of open space on campus as providing limited habitat value due to landscaping and extensive maintenance activities. These areas tend to include species tolerant of human activities. Some species could enter the campus via the Box Springs Mountains and the hills located at the southeastern corner of the campus. However, because the remainder of the campus is generally surrounded by urbanized areas in the City of Riverside, the campus does not serve as a wildlife connection between natural areas. The EIR will analyze the potential for additional on-campus development to interfere with wildlife movement, disturb wildlife corridors or impede wildlife nursery sites.

e) **Conflict with any local applicable policies protecting biological resources?**	☒	☐

The University of California is constitutionally exempt from local zoning and land use plan/element requirements. The EIR will analyze whether the proposed project would result in impacts that could constitute conflicts with applicable policies or ordinances protecting biological resources.

	Impact to be Analyzed in EIR	No Additional Analysis Required
f) **Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other applicable habitat conservation plan?**	☒	☐

The UCR Campus is not located within the area designated for any adopted HCP, NCCP, or other approved habitat conservation plan. However, a Western Riverside County Multi-Species Habitat Conservation Plan (MSHCP) is currently in development, in conjunction with an update of the Riverside County General Plan, and this plan will include portions of the Box Springs Mountains, and may include hills located in the southeastern portion of the campus. To the extent that information is available, the EIR will evaluate whether implementation of the 2002 LRDP would conflict with the provisions of the Draft MSHCP.

g) **Result in Other Impacts?**	☒	☐

Impact 4.3.13 on page 4.3-24 of the 1990 LRDP EIR determined that development under the 1990 LRDP, in conjunction with surrounding development in the region, could affect the amount of habitat in the region. Because implementation of the 2002 LRDP, in conjunction with known and reasonably-foreseeable growth in the surrounding area, could also result in cumulative impacts to biological resources, the EIR will address this potential.

5. CULTURAL RESOURCES — Would the project:

a) **Cause a substantial adverse change in the significance of a historical resource as defined in Section 15064.5?**	☒	☐

Impact 4.4.2 on page 4.4-9 of the 1990 LRDP EIR determined that historic structures could be affected by the placement of new structures nearby. Although the 2002 LRDP proposes no specific structures, intensification of development in the east campus may result in similar impacts to historic structures. The EIR will, therefore, analyze whether the proposed project would cause a substantial adverse change in the significance of historical resources on campus, including campus buildings which are, or will be, older than 50 years during the period of 2002 to 2015.

b) **Cause a substantial adverse change in the significance of an archaeological resource pursuant to Section 15064.5?**	☒	☐

	Impact to be Analyzed in EIR	No Additional Analysis Required

The 1990 LRDP EIR concluded (Impact 4.4.1, on page 4.4-9) that unknown archaeological sites could be adversely impacted by LRDP development. Because development under the 2002 LRDP could also potentially affect currently unknown archaeological resources, the EIR will analyze whether the additional development in the eastern portion of the campus and the introduction of new structures in the western portion of the campus would result in damage to defined archaeological resources, and will recommend appropriate mitigation measures to reduce potential impacts.

c) **Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?** ☒ ☐

Because paleontological resources are generally not apparent until revealed by excavation, development under the 2002 LRDP has the potential to affect such resources. The EIR will, therefore, analyze whether the implementation of the 2002 LRDP would destroy defined unique paleontological resources or unique geologic features, and will recommend appropriate measures, as necessary.

d) **Disturb any human remains, including those interred outside of formal cemeteries?** ☒ ☐

Refer to response b), above. Because human remains are a type of archaeological resource, the EIR will analyze whether the implementation of the 2002 LRDP would disturb any human remains, and will recommend appropriate measures, as necessary, to avoid or reduce such impacts.

e) **Result in Other Impacts?** ☒ ☐

As described above, development under the 2002 LRDP could potentially affect a variety of cultural resources and could, in conjunction with other reasonably foreseeable growth in the surrounding area, result in cumulative impacts upon cultural resources. The EIR will, therefore, address the potential for cumulative impacts to cultural resources from implementation of the 2002 LRDP.

6. GEOLOGY AND SOILS — Would the project:

a) **Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving:**

	Impact to be Analyzed in EIR	No Additional Analysis Required
i) Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? Refer to Division of Mines and Geology Special Publication 42.	☒	☐

Branches of the San Andreas, San Jacinto and Whittier-Elsinore faults are located in proximity to the UCR campus. The EIR will evaluate seismic hazard maps to determine the proximity and level of potential hazard from these earthquake faults and other known faults.

ii) Strong seismic ground shaking?	☒	☐

As stated above in a)ii), branches of the San Andreas, San Jacinto and Whittier-Elsinore faults are located in proximity to the UCR campus. The EIR will provide an analysis, based on current maps delineating faults, and determine soil characteristics and groundshaking susceptibility.

iii) Seismic-related ground failure, including liquefaction?	☒	☐

The1990 LRDP EIR concluded that a limited potential for liquefaction exists, based on existing soil types (generally, consolidated materials and bedrock) and depth of groundwater (60 to 200 ft below ground). This conclusion will be verified by review of current seismic hazard maps prepared by the Resources Agency. The EIR will also include a general characterization of soil types and drainage characteristics in areas where development is likely to occur.

iv) Landslides?	☒	☐

The 1990 LRDP EIR did not address landslides. However, because some slopes surround areas of the campus in which development could occur under the 2002 LRDP, the EIR analysis will include a study of available seismic hazard maps, as well as a discussion of potential landslide hazards.

b) Result in substantial soil erosion or the loss of topsoil?	☒	☐

	Impact to be Analyzed in EIR	No Additional Analysis Required

The 1990 LRDP EIR identified the soils in the northeastern portion of the campus as having a slight to moderate erosion hazard, but no loss of substantial topsoil was anticipated to occur. Erosion hazards have been identified as moderate to high in the east-central and southeastern portions of the campus, but no loss of substantial topsoil is anticipated. A slight to moderate erosion hazard was identified for the west campus. The EIR will examine the potential loss of topsoil associated with development of the west campus, as well as the potential for erosion hazards in the east-central and southeastern portions of the campus, where development is proposed to occur.

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?**	☒	☐

Refer to discussion regarding liquefaction in sections 6a)iii), above, and in 6d), below.

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?**	☒	☐

The 1990 LRDP EIR states that expansive characteristics of soils in the west, east-central, and southeastern portions of campus are low; however, shrink-swell characteristics of the northeastern part of the campus have been identified as moderate, and potential development in that area may result in a significant impact. The geology discussion in the EIR will verify expansive areas of the campus, if any, and recommend mitigation measures, as appropriate.

e) **Have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems where sewers are not available for the disposal of waste water?**	☐	☒

The UCR campus is provided sanitary sewer service by the City of Riverside and no septic tanks or alternative wastewater systems are proposed.

f) **Result in Other Impacts?**	☒	☐

	Impact to be Analyzed in EIR	No Additional Analysis Required

The 1990 LRDP EIP concluded, on page 4.1-13, that development under the 1990 LRDP would not result in a significant cumulative impact in terms of geological hazards. However, the EIR will freshly address the potential for cumulative impacts to geology and soils from implementation of the 2002 LRDP in conjunction with known and reasonably-foreseeable growth in the surrounding area.

7. HAZARDS AND HAZARDOUS MATERIALS — Would the project:

a) Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?	☒	☐

Implementation of the 2002 LRDP would result in development of additional laboratories and other research facilities that would use, store, and require the transportation and disposal of hazardous materials. The EIR will evaluate potential hazards impacts resulting from these activities and recommend mitigation measures as appropriate.

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?	☒	☐

Refer to Discussion 7a), above.

c) Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?	☒	☐

Implementation of the 2002 LRDP would result in development of additional laboratories and other research facilities that may use or store hazardous materials. The EIR will analyze whether the proposed project will emit hazardous emissions or handle hazardous or acutely hazardous material within one-quarter mile of an existing or proposed school and determine potential impacts, if any.

d) Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?	☒	☐

The campus is listed, pursuant to Government Code Section 65962.5, on a list of hazardous materials sites, due to pesticide disposal pits located in the agricultural teaching and research fields. These fields are currently undergoing remediation according to an approved plan. The EIR will evaluate whether development under the 2002 LRDP would create a significant hazard to the public or the environment with respect to these disposal pits.

	Impact to be Analyzed in EIR	No Additional Analysis Required
e) **For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard for people residing or working in the project area?**	☐	☒

The campus is not located within two miles of a public airport or public use airport, and has not been included in an airport land use plan.

f) **For a project within the vicinity of a private airstrip, would the project result in a safety hazard for people residing or working in the project area?**	☐	☒

The campus is not located in the vicinity of a private airstrip.

g) **Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?**	☒	☐

Development associated with the 2002 LRDP, as well as the construction activities associated with such development, could potentially affect emergency response or evacuation plans. The EIR will, therefore, evaluate whether the proposed project would impair implementation of, or physically interfere with, an adopted emergency response plan or emergency evacuation plan for the campus or community.

h) **Expose people or structures to a significant risk of loss, injury or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands?**	☒	☐

The hills located at the southeastern portion of the campus are subject to wildland fires, because of the natural vegetation and proximity to the Box Springs Mountains. Additional development in the southeast portion of the campus could expose people or structures to increased risks associated with wildland fires. The EIR will evaluate this potential risk.

	Impact to be Analyzed in EIR	No Additional Analysis Required
i) **Result in Other Impacts?**	☒	☐

The 1990 LRDP EIR concluded, on page 4.14-12, that cumulative hazardous materials impacts are were considered less than significant. Because conditions have changed since preparation of the 1990 LRDP EIR, the 2002 LRDP EIR will address the potential for cumulative impacts to hazards and hazardous materials from implementation of the 2002 LRDP in conjunction with known and reasonably-foreseeable growth in the surrounding area.

8. HYDROLOGY AND WATER QUALITY — Would the project:

a) **Violate any water quality standards or waste discharge requirements?**	☒	☐

Development under the 2002 LRDP could result in increases of in permeable surface area, which could produce polluted runoff. Additionally, increased water usage that could result from implementation of the 2002 LRDP could in turn result in wastewater discharges that exceed requirements. The EIR will characterize current waste discharge volumes (of the campus) and wastewater treatment capacity (of the municipal plant operated by the City of Riverside), and evaluate whether the implementation of the 2002 LRDP would result in a violation of applicable standards or waste discharge requirements.

b) **Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted)?**	☒	☐

According to the 1990 LRDP EIR, the campus is not considered a significant regional groundwater recharge area. In general, the soils underlying east campus are Class D, or the least-permeable soil type. The west campus is primarily underlain by Class C soils (intermediate permeability). However, to the extent that the campus draws additional water from the City, which relies on water from wells, additional on-campus development could result in additional demand on groundwater supplies. The EIR will quantify anticipated water consumption and system capacity to determine potential impact on groundwater supplies.

	Impact to be Analyzed in EIR	No Additional Analysis Required
c) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation on- or off-site?	☒	☐

The UCR campus is located at the western edge of the Box Springs Mountains, which are primarily drained via intermittent streams that emerge from canyons. Four main drainage courses traverse the campus: 1) the main "University Arroyo" which generally runs east-west along a line that extends north of University Avenue to Box Springs Road: 2) the "Botanical Gardens Arroyo" which traverses the Botanical Garden at the southeastern corner of the campus;3) an unnamed arroyo, which enters the campus near the intersection of Watkins and Valencia Hills Drives (in the vicinity of the Pentland Phase II housing project currently under construction); and 4) the Box Springs Arroyo, which traverses the southwestern portion of the campus south of Martin Luther King Boulevard. The proposed UCR 2002 LRDP would result in additional development within the eastern portion of the campus, where most development is concentrated, and new development within the western portion of the campus, which is currently occupied primarily with agricultural fields. The infill of new building and facilities (or the replacement of existing facilities) in the eastern portion of the campus is not anticipated to substantially alter existing drainage patterns in that portion of the campus. Construction of new academic buildings and related support facilities on the western portion of the campus (in the area north of Martin Luther King Boulevard) would alter existing drainage patterns, as runoff currently occurs primarily as sheet flow across the agricultural research fields. Future development would include drainage improvements at the site of new buildings, which would direct runoff into existing or future storm drains. The EIR will evaluate the potential for these development activities and modification of drainage patterns to result in substantial erosion or siltation, or a substantial increase in runoff.

d) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner, which would result in flooding on- or off-site?	☒	☐

Refer to discussion 8c), above.

e) Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff?	☒	☐

Implementation of the 2002 LRDP would result in the development of additional academic buildings and related support facilities, including parking and student housing. This would increase the extent

	Impact to be Analyzed in EIR	No Additional Analysis Required

of impervious surfaces on campus, which could result in increased runoff, as discussed in item 8c), above. The City of Riverside and UCR jointly propose to undertake the University Arroyo Flood Control and Enhancement Plan, a comprehensive storm drainage improvement project that includes portions of the UCR campus generally located south and east of Linden Drive and the I-215/SR-60. The proposed improvements would correct existing drainage problems in the Islander Park area east of the campus and reduce flooding potential on campus and thereby reducing the extent of the 100-year floodplain on the UCR campus. The EIR will evaluate whether the planned flood control improvements will accommodate future development proposed under the 2002 LRDP.

Increased development on the campus would result in the introduction of typical urban contaminants into stormwater runoff, including oil, grease, metals, pesticides/herbicides, and entrained dust. The EIR will evaluate potential impacts of urban stormwater pollution.

f) **Otherwise substantially degrade water quality?**	☒	☐

Refer to discussion 8a) and 8e), above.

g) **Place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map?**	☒	☐

According to the 1990 LRDP EIR, portions of the campus are within a 100-year flood hazard area, including the area along the Box Springs Arroyo, in the agricultural research fields south of Martin Luther King Boulevard, and the area along the University Arroyo, that extends north of University Avenue, North Campus Drive and Box Springs Road. No development is proposed for the portion of the campus south of Martin Luther King Boulevard. Additional development could occur in the eastern portion of the campus, which may include areas adjacent to the University Arroyo. The City of Riverside and UCR jointly propose to undertake University Arroyo Flood Control and Enhancement Plan [described in item 8)e above] which would correct existing drainage problems on and east of the campus and reduce the extent of the 100-year flood hazard area on the UCR campus. The EIR will evaluate whether the 2002 LRDP would result in the placement of housing within the current or proposed future 100-year flood hazard area.

h) **Place within a 100-year flood hazard area structures, which would impede or redirect flood flows?**	☒	☐

	Impact to be Analyzed in EIR	No Additional Analysis Required

No development is proposed for the portion of the campus south of Martin Luther King Boulevard, therefore no structures would be placed within that portion of the campus within the 100-year flood hazard area associated with the Box Springs Arroyo. As discussed above in item 8h) above, the University Arroyo Flood Control and Enhancement Plan would reduce the extent of the 100-year flood hazard area on the UCR campus associated with the University Arroyo. The EIR will evaluate whether the 2002 LRDP would result in the placement of structures within the current or proposed future 100-year flood hazard area.

i) **Expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam?**	☒	☐

No dams are located upstream from campus; and the nearest dam to campus is the Prado Dam, located on the Santa Ana River downstream from the UCR campus. A 10' diameter water distribution line (from Lake Silverwood to Lake Perris) of the California State Water Project is located east of the campus along Watkins Drive. A catastrophic failure of this line could result in flooding on the UCR campus. The EIR will evaluate the potential for people or structures to be subject to flooding.

j) **Inundation by seiche, tsunami, or mudflow?**	☒	☐

The UCR campus is located in an inland area, and would therefore not be subject to tsunamis. The Prado Dam on the Santa Ana River is approximately eighteen miles downstream from the UCR campus. Several small reservoirs, however, are located on the west campus, including one on the east campus above parking lot 9, and may represent seiche hazards. In addition, the EIR will analyze the potential for mudflows, particularly related to potential development near the hills located at the southeastern portion of the campus.

k) **Result in Other Impacts?**	☒	☐

Implementation of the 2002 LRDP, in conjunction with known and reasonably-foreseeable growth in the surrounding area, could result in cumulative impacts to hydrology and water quality The EIR will address this potential.

9. **LAND USE AND PLANNING** — Would the project:

a) **Physically divide an established community?**	☐	☒

	Impact to be Analyzed in EIR	No Additional Analysis Required

The Riverside City community has developed around and in response to the campus. It is not currently anticipated that implementation of the 2002 LRDP would include any development outside of established campus boundaries, and no incursion into, or division of, the surrounding residential communities would occur.

b) **Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including, but not limited to the LRDP, general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect?**	☒	☐

The University of California is constitutionally exempt from local zoning and land use plan/element requirements. The EIR will evaluate consistency of current and proposed future land uses, including open space, building intensity, identify potential conflicts between on-campus land uses and any potential conflicts with uses in the City, as identified in the existing General Plan for the City of Riverside and the University Community Plan. The EIR will also evaluate the consistency of the 2002 LRDP with the pending University Community Plan update, to the extent such information is available.

c) **Conflict with any applicable habitat conservation plan or natural community conservation plan?**	☒	☐

Refer to the discussion under item 4f) above.

d) **Result in Other Impacts?**	☒	☐

Implementation of the 2002 LRDP could result in land use incompatibilities with adjacent land uses, and in conjunction with other known and reasonably foreseeable growth in the surrounding area, could result in cumulative land use impacts. EIR will analyze this potential.

10. MINERAL RESOURCES — Would the project:

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?**	☐	☒

No mineral resources of regional or state-wide importance are known to exist on the UC Riverside campus, and no such activities have been associated with development of the campus. The majority of the east campus is already developed; therefore, intensification of land uses in that area would not constitute a new constraint on access to minerals, even if any mineral resources are present. Development of existing agricultural research fields on the western portion of the campus would not result in the loss of the potential availability of known mineral resources.

b) **Result in the loss of availability of a locally-important mineral resource recovery site delineated on a local general plan, specific plan or other land use plan?** ☐ ☒

No mineral resource recovery activities occur on the UCR campus, and no such sites are delineated in the General Plan for County and City of Riverside, or the University Community Plan, which covers the area around the campus. Refer also to discussion 10a), above.

c) **Result in Other Impacts?** ☐ ☒

Implementation of the 2002 LRDP would not result in any impacts to mineral resource recovery activities, nor result in the loss of availability of any locally-important mineral recovery sites, therefore the 2002 LRDP would not contribute to any potential cumulative mineral resource impacts.

11. NOISE — Would the project result in:

a) **Exposure of persons to or generation of noise levels in excess of standards established in any applicable plan or noise ordinance, or applicable standards of other agencies?** ☒ ☐

Increases in traffic, as well as mechanical equipment associated with new structures, could result in substantial long-term increases in noise levels. Additionally, construction equipment could result in substantial short-term noise increases. The EIR will use current noise modeling methods to predict the magnitude of these noise increases, and will evaluate whether the increased noise levels would exceed applicable standards or ordinances.

b) **Exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels?** ☒ ☐

Construction activities, particularly if pile-driving is required, could result in generation of excessive groundborne vibration or groundborne noise levels. The EIR will evaluate the potential impacts of these construction activities.

	Impact to be Analyzed in EIR	No Additional Analysis Required
c) **A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project?**	☒	☐

Refer to discussion 11a).

	Impact to be Analyzed in EIR	No Additional Analysis Required
d) **A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project?**	☒	☐

Refer to discussion 11a).

	Impact to be Analyzed in EIR	No Additional Analysis Required
e) **For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?**	☐	☒

The UCR campus is not located within an airport land use plan, nor within two miles of a public airport or public use airport.

	Impact to be Analyzed in EIR	No Additional Analysis Required
f) **For a project within the vicinity of a private airstrip, would the project expose people residing or working in the project area to excessive noise levels?**	☐	☒

The UCR campus is not located within the vicinity of a private airstrip.

	Impact to be Analyzed in EIR	No Additional Analysis Required
g) **Result in Other Impacts?**	☒	☐

The EIR will address the potential for cumulative noise and vibration impacts from implementation of the 2002 LRDP in conjunction with known and reasonably-foreseeable growth in the surrounding area.

12. **POPULATION AND HOUSING** — Would the project:

	Impact to be Analyzed in EIR	No Additional Analysis Required
a) **Induce substantial population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)?**	☒	☐

The proposed 2002 LRDP would accommodate an increase in enrollment from the current approximately 12,700 students (three-quarter average headcount) to 25,000 students by the year 2015. The EIR will use utilize projected student growth to estimate increases in faculty and staff

Impact to be Analyzed in EIR | No Additional Analysis Required

growth, and estimate the combined demand for short-term and long-term housing within the City of Riverside and adjacent areas. The EIR will evaluate the potential for this demand to exceed the projected housing supply in the City and adjacent areas, and whether such growth could result in demand for additional housing, goods and services, which could induce additional population growth.

b) **Displace substantial numbers of existing housing, necessitating the construction of replacement housing elsewhere?** ☒ ☐

The proposed 2002 LRDP may include redevelopment of the existing Family Student Housing area, located along the northern edge of the campus. The EIR will evaluate the potential for relocation of existing residents to an alternative location. No other housing is proposed to be displaced as a result of LRDP implementation.

c) **Displace substantial numbers of people, necessitating the construction of replacement housing elsewhere?** ☒ ☐

If displacement is proposed as part of the LRDP Update, the EIR will address the availability of housing alternatives for displaced students and their families. Also, refer to the discussion for item 11b), above.

d) Result in Other Impacts? ☒ ☐

The 1990 LRDP EIR concluded, on page 4.7-7 (Impact 4.7.3), that development under the previously proposed LRDP build-out was generally consistent with population and employment projections for the area. However, the 2002 LRDP proposes substantial growth of the campus population, and the EIR will address the potential for cumulative population and housing impacts to result from implementation of the 2002 LRDP, in conjunction with known and reasonably-foreseeable growth in the surrounding area.

13. PUBLIC SERVICES

a) **Would the project 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:**

	Impact to be Analyzed in EIR	No Additional Analysis Required
i) Fire protection?	☒	☐

The EIR will evaluate whether implementation of the 2002 LRDP would increase demand for fire protection services, compare the increased demand with existing and planned equipment and staffing levels, and recommend mitigation measures, as appropriate. The environmental impacts of new, expanded or altered facilities to respond to any such demand will also be evaluated in the EIR.

ii) Police protection?	☒	☐

Police protection services for the UCR campus are provided by the University of California Police Department. The EIR will evaluate whether implementation of the 2002 LRDP would increase demand for police protection, compare the increase in demand to existing and planned equipment and staffing levels, and recommend mitigation measures, as appropriate. The environmental impacts of new, expanded or altered facilities to respond to any such demand will also be evaluated in the EIR.

iii) Schools?	☒	☐

Increased student enrollment, combined with associated increases in faculty and staff may increase the number of school-age children that would enroll in local schools. The EIR will evaluate potential effects of increased enrollment on the capacity of local schools. The environmental impacts of new, expanded or altered facilities to respond to any such demand will also be evaluated in the EIR.

iv) Parks?	☒	☐

The proposed increase in student enrollment and the campus population would result in additional demand for recreational space, which may impact the recreational capacity of nearby parks. The EIR will, therefore, evaluate the environmental impacts of new, expanded, or altered facilities to respond to any such demand will also be evaluated in the EIR.

	Impact to be Analyzed in EIR	No Additional Analysis Required
v) **Other public facilities?**	☒	☐

Expansion of the campus population and construction associated with implementation of the 2002 LRDP could increase demand for library services or result in impacts to the campus telecommunications infrastructure. The EIR will, therefore, evaluate the whether implementation of the 2002 LRDP would require new, expanded or altered facilities to respond to any such demand.

b) **Result in Other Impacts?**	☒	☐

Implementation of the LRDP, in conjunction with other known or reasonably foreseeable growth in the area, could result in a cumulatively considerable contribution to impacts on public services. The EIR will, therefore, address the potential for cumulative impacts to public services.

14. RECREATION —

a) **Would the project 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?**	☒	☐

The proposed 2002 LRDP will include the provision of additional athletic and recreational facilities for use by students, faculty and staff. The EIR will evaluate whether the increase in campus population would exceed the capacity of existing or planned neighborhood, community, and regional parks. The environmental impacts of new, expanded or altered facilities to respond to any such demand will also be evaluated in the EIR.

b) **Does the project include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment?**	☒	☐

The campus has an existing shortage of recreational facilities, and the proposed 2002 LRDP will include additional recreational playing fields and other facilities. The EIR's evaluation of the environmental effects of the project would consider these facilities, and their effect on the capacity of recreational facilities.

	Impact to be Analyzed in EIR	No Additional Analysis Required
c) **Does the project affect existing recreational opportunities?**	☒	☐

Implementation of the 2002 LRDP may result in proposals to displace existing recreational facilities to provide sites for academic and support facilities that require proximity to other existing academic or support uses. However, the LRDP Update will also designate areas of the campus to provide new recreational playing field and facilities, which would replace and augment any existing facilities or opportunities that may be displaced. Refer also to discussions 14a) and 14b).

d) **Result in Other Impacts?**	☒	☐

Implementation of the LRDP, in conjunction with other known or reasonably foreseeable growth in the area, could result in a cumulatively considerable contribution to the demand for recreational facilities. The EIR will, therefore, address the potential for cumulative impacts to public services. The environmental impacts of new, expanded or altered facilities to respond to any such demand will also be evaluated in the EIR.

15. TRANSPORTATION/ TRAFFIC — Would the project:

a) **Cause an increase in traffic which is substantial in relation to the existing traffic load and capacity of the street system (i.e., result in a substantial increase in either the number of vehicle trips, the volume to capacity ratio on roads, or congestion at intersections)?**	☒	☐

Implementation of the proposed 2002 LRDP would increase the amount of on-campus building space, the on-campus population, and the number of parking spaces on campus, which would result in increased vehicular traffic on local streets and the adjacent regional highway system. The EIR will analyze the impact of additional project-related and cumulative traffic on the local street networks, including intersection capacity, and the regional highway network, including the impact on the capacity of Congestion Management Program designated roadways and freeway ramps and adjacent segments.

b) **Exceed, either individually or cumulatively, a level of service standard established by the county congestion management agency for designated roads or highways?**	☒	☐

Refer to discussion 15a), above.

	Impact to be Analyzed in EIR	No Additional Analysis Required
c) Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks?	☐	☒

Development associated with the 2002 LRDP is not anticipated to affect or contribute air traffic to existing patterns. The project would, therefore, have a less-than-significant impact on air traffic.

d) Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?	☒	☐

The 1990 LRDP EIR did not address intersection geometry or incompatible traffic use. Any proposed circulation system changes proposed under the 2002 LRDP will be evaluated in the EIR for their potential to increase traffic hazards.

e) Result in inadequate emergency access?	☒	☐

Construction activities and general development associated with implementation of the 2002 LRDP could result in impacts to emergency access routes. The EIR will, therefore, evaluate the potential for impacts regarding emergency access.

f) Result in inadequate parking capacity?	☒	☐

The 1990 LRDP EIR concluded, on page 4.9-32 (Impact 4.9.2) that implementation of the 1990 LRDP would result in parking impacts. Because the proposed 2002 LRDP would result in an increase in the population of the campus, the EIR will evaluate the adequacy of the proposed campus parking inventory, based upon projected parking demand, estimates of future campus population, and the components of a comprehensive transportation demand management program.

g) Conflict with applicable policies, plans, or programs supporting alternative transportation (e.g., bus turnouts, bicycle racks)?	☒	☐

The proposed 2002 LRDP is anticipated to include policies related to alternative transportation; however, the EIR will analyze whether the implementation of the 2002 LRDP would conflict with applicable policies supporting alternative transportation, including a the development of a comprehensive transportation demand management program for the campus.

	Impact to be Analyzed in EIR	No Additional Analysis Required
h) Result in Other Impacts?	☒	☐

Implementation of the 2002 LRDP, in conjunction with known and reasonably-foreseeable growth in the surrounding area, could result in cumulative traffic impacts. The EIR will, therefore, address the potential for cumulative traffic and transportation impacts.

16. UTILITIES/SERVICE SYSTEMS/ENERGY — Would the project:

a) Exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board?	☒	☐

Implementation of the proposed 2002 LRDP could result in increased wastewater generation on the campus. The EIR will, therefore, characterize current waste discharge volumes and wastewater treatment capacity, and evaluate whether the implementation of the 2002 LRDP would, in context of any planned increases in water treatment capacity increases, result in a violation of applicable standards or requirements.

b) Require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?	☒	☐

Implementation of the proposed 2002 LRDP would increase the amount of on-campus building space and the on-campus residential population, which would result in generation and discharge of additional wastewater, which would require treatment at the municipal treatment facility operated by the City of Riverside. The EIR will evaluate whether projected increases in wastewater generation would exceed available or planned conveyance and treatment capacity. The environmental impacts of new, expanded or altered facilities to respond to any such demand will also be evaluated in the EIR.

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?	☒	☐

Refer to discussion 8b), above.

	Impact to be Analyzed in EIR	No Additional Analysis Required
d) Have sufficient water supplies available to serve the project from existing entitlements and resources, or are new or expanded entitlements needed?	☒	☐

Implementation of the proposed 2002 LRDP could result in increased campus demand for water supplies. The EIR will, therefore, characterize current demand and system capacity, and evaluate whether the implementation of the 2002 LRDP would, in context of any planned increases in water supply increases, result in the need for new or expanded water entitlements. The EIR will evaluate the environmental impacts of expanded or altered facilities to respond to any such demand.

e) Result in a determination by the wastewater treatment provider which serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments?	☒	☐

Refer to discuss 16b), above.

f) Be served by a landfill with sufficient permitted capacity to accommodate the project's solid waste disposal needs?	☒	☐

Implementation of the proposed 2002 LRDP could result in an increase in campus solid waste generation. The EIR will, therefore, evaluate whether existing and planned landfill capacity would be sufficient to accommodate the potential increases in solid waste generation that would result from implementation of the 2002 LRDP. The environmental impacts of new, expanded or altered facilities to respond to any such demand will be evaluated in the EIR.

g) Comply with applicable federal, state, and local statutes and regulations related to solid waste?	☒	☐

Refer to the discussion for item 16 f), above. The EIR will also evaluate the impact of implementation of the 2002 LRDP on campus compliance with applicable statutes and regulations related to solid waste.

h) Result in wasteful, inefficient or unnecessary consumption of energy?	☒	☐

Development of additional building space would result in the consumption of additional energy, including electricity, natural gas and other fossil fuels. The EIR will quantify the potential increase in campus-related energy usage and determine whether implementation of the LRPD, in conjunction with known and reasonably-foreseeable growth in the surrounding area, would result in cumulative energy impacts.

i) **Result in Other Impacts?** ☒ ☐

Implementation of the proposed 2002 LRDP, in conjunction with known and reasonably foreseeable growth in the area, could result in cumulative impacts to utilities and service systems. The EIR will, therefore, address the potential for cumulative impacts to utility/service systems and energy from implementation of the 2002 LRDP.

17. MANDATORY FINDINGS OF SIGNIFICANCE —

a) **Does the project have 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?** ☒ ☐

As indicated in the discussions above, implementation of the proposed 2002 LRDP has the potential to result in significant impacts which could degrade the quality of the environment. Due to the limited extent of undisturbed land on the UCR campus, the potential for the 2002 LRDP to 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 is considered low. Although implementation of the 2002 LRDP could result in modification or loss of some historic resources (e.g., buildings greater than 50 years old), these potential impacts would not eliminate any important examples of the major period of California history or prehistory.

b) **Does the project have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects)?** ☒ ☐

The proposed UCR 2002 LRDP estimates that a total of 12,500,000 gsf of academic buildings, support facilities and student housing are required to support a total future enrollment of 25,000

	Impact to be Analyzed in EIR	No Additional Analysis Required

students by the year 2015. As of the 2000/2001 academic year, the campus enrolled 12,700 students (three academic quarter average headcount) and had a total of approximately 4,554,700 gross square feet of academic building and related support facilities. The EIR will evaluate whether the potential impacts of implementation of the 2002 LRDP, including an increase in enrollment of approximately 12,000 additional students, combined with other current projects and probable future projects and projected regional growth in the surrounding area, would be cumulatively considerable.

c) **Does the project have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly?**	☒	☐

As indicated in the above discussions, implementation of the proposed 2002 LRDP has the potential to result in significant impacts. The EIR will evaluate whether any of those impacts have the potential to result in substantial adverse effects on human beings.

VI. REFERENCES

Helix Environmental Planning, Inc, *University Arroyo Flood Control and Enhancement Plan, and Islander Park Improvements Initial Study*, August 17, 2001

____________, *Riverside Islander Park/University Arroyo Restoration/Storm Drain Project, Biological Technical Report*, August 17, 2001

Riverside City Planning Department, *University Community Plan*, December 23, 1986

University of California, Riverside, Office of Campus Planning, 1990, *Long Range Development Plan*, July

____________,1990b. *Long Range Development Plan Final Environmental Impact Report*, State Clearinghouse No. 90020114, July

University of California, Riverside, Office of Design and Construction, 2000a, *Campus Modular Building Initial Study*, September

____________, 2000b, *Final Initial Study and Mitigated Negative Declaration for Physical Sciences No.1*, SCH No. 2000111053, December

____________, 2001, *Undergraduate Student Housing Expansion 2 Initial Study*, SCH No. 200011163, January

United State Fish and Wildlife Service, *Coastal California Gnatcatcher Final Critical Habitat Boundary, Unit 10 – Riverside County Central*, October 18, 2000

~~Curt Taucher~~
~~California Dept. of Fish & Game~~
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UCR

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Oakland, CA 94607

Notice of Completion & Environmental Document Transmittal

Mail to: State Clearinghouse, PO Box 3044, Sacramento, CA 95812-3044 916/445-0613

SCH# ____________

Project Title: University of California, Riverside 2002 Long Range Development Plan (LRDP) draft EIR

Lead Agency: University of California Board of Regents
Contact Person: Juanita W. Bullock
Street Address: 1111 Franklin Street, 12 Floor
Phone: (909) 787-7376
City: Oakland
Zip: 94607
County: Alameda

Project Location:

County: Riverside
City/Nearest Community: Riverside
Cross Streets: University Avenue/Canyon Crest Drive
Zip Code: 92507
Total Acres: 1,112
Assessor's Parcel No. Multiple
Section: ______ Twp. ______ Range: ______ Base: ______
Within 2 Miles: State Hwy #: 215/60/91
Waterways: None
Airports: None
Railways: BNSF
Schools: Multiple Elementary, Middle, Secondary and Private

Document Type:

CEQA:
- X NOP
- ☐ Early Cons
- ☐ Neg Dec
- ☐ Draft EIR
- ☐ Supplement/Subsequent EIR (Prior SCH No.) 90020114
- ☐ Other ____________

NEPA:
- ☐ NOI
- ☐ EA
- ☐ Draft EIS
- ☐ FONSI

Other:
- ☐ Joint Document
- ☐ Final Document
- ☐ Other ____________

Local Action Type:

- ☐ General Plan Update
- ☐ General Plan Amendment
- ☐ General Plan Element
- ☐ Community Plan
- ☐ Specific Plan
- ☐ Master Plan
- ☐ Planned Unit Development
- ☐ Site Plan
- ☐ Rezone
- ☐ Prezone
- ☐ Use Permit
- ☐ Land Division (Subdivision, etc.)
- ☐ Annexation
- ☐ Redevelopment
- ☐ Coastal Permit
- X Other - LRDP

Development Type:

☐ Residential: *Units*______ *Acres*______
☐ Office: *Sq.ft.*______ *Acres*______ *Employees*______
☐ Commercial: *Sq.ft.*______ *Acres*______ *Employees*______
☐ Industrial: *Sq.ft.*______ *Acres*______ *Employees*______
X Educational Campus Long Range Development Plan
☐ Recreational ____________
☐ Water Facilities: *Type*______ *MGD*______
☐ Transportation: *Type*______
☐ Mining: *Mineral*______
☐ Power: *Type*______ *Watts*______
☐ Waste Treatment: *Type*______
☐ Hazardous Waste: *Type*______
☐ Other: ____________

Funding (approx.): Federal $ ______ State $ ______ Total $ ______

Project Issues Discussed in Document:

- X Aesthetic/Visual
- X Agricultural Land
- X Air Quality
- X Archeological/Historical
- ☐ Coastal Zone
- X Drainage/Absorption
- ☐ Economic/Jobs
- ☐ Fiscal
- X Flood Plain/Flooding
- X Forest Land/Fire Hazard
- X Geologic/Seismic
- X Minerals
- X Noise
- X Population/Housing Balance
- X Public Services/Facilities
- X Recreation/Parks
- X Schools/Universities
- ☐ Septic Systems
- X Sewer Capacity
- X Soil Erosion/Compaction/Grading
- X Solid Waste
- X Toxic/Hazardous
- X Traffic/Circulation
- X Vegetation
- X Water Quality
- X Water Supply/Groundwater
- X Wetland/Riparian
- X Wildlife
- X Growth Inducing
- X Land Use
- X Cumulative Effects
- ☐ Other ____________

Present Land Use/Zoning/General Plan Designation: Institution

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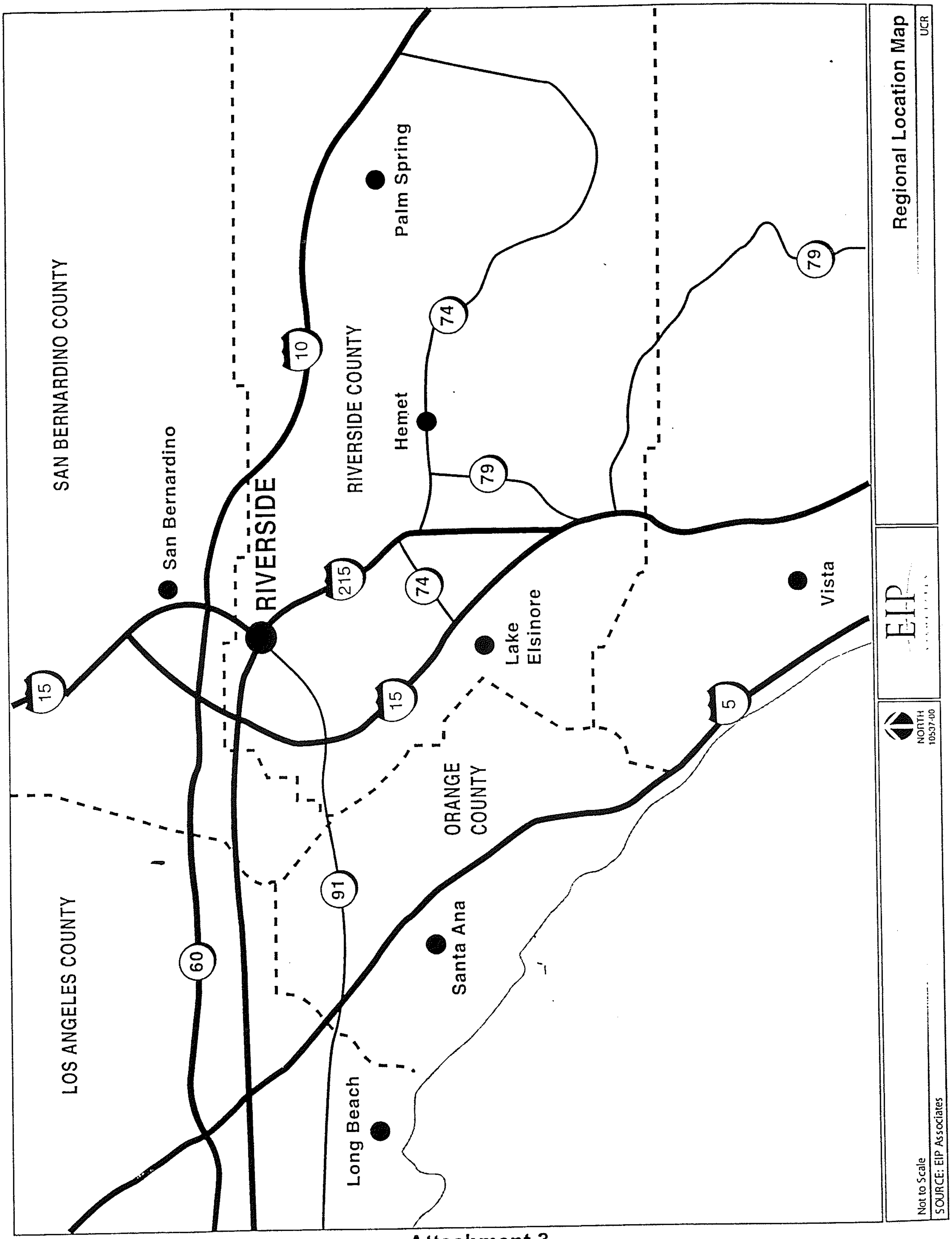
Project Description: The University of California, Riverside proposes to update the 1990 LRDP previously adopted by The Regents that anticipated 18,090 students by 2005-06 and a need for 10.1 million gross square feet of facilities. The update will address anticipated growth in enrollment by approximately 12,300 students in 2015 over the current enrollment of 12,700 (2000-01). The LRDP EIR will address the environmental impacts this growth will have as the campus moves from 4.5 million existing gross square feet of development to 12.5 million gross square feet to accommodate the increase in students. The LRDP EIR will incorporate existing LRDP mitigation measures as appropriate as well as develop new measures to mitigate the increase in enrollment.

Attachment 2



Regional Location Map

UCR

EIP

NORTH

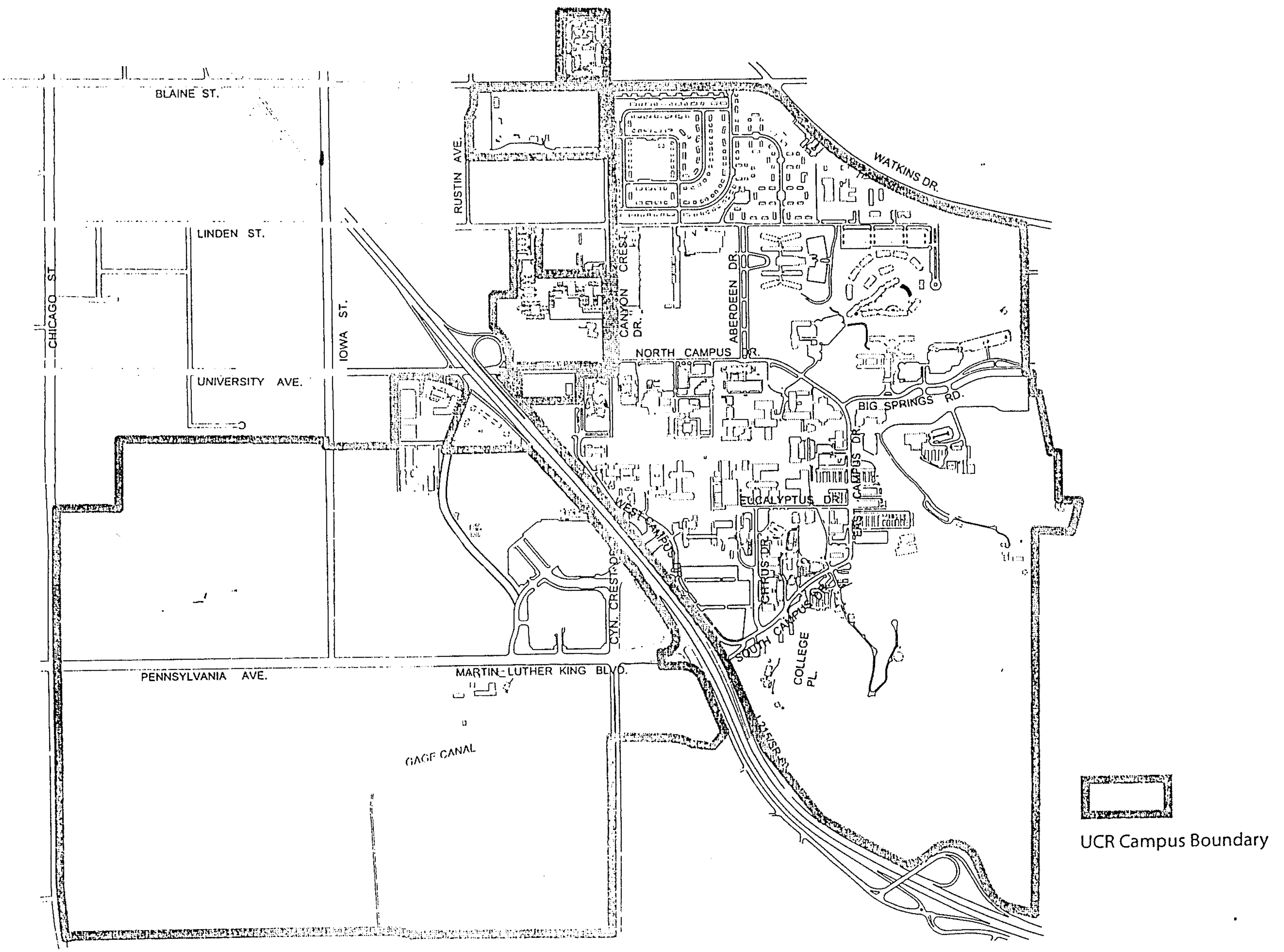
10537-00

Not to Scale

SOURCE: EIP Associates

Attachment 3

Attachment 4



Not to Scale
SOURCE: EIP Associates

NORTH
10537-00

EIP

UCR Campus Location Map

UCR

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Attachment 5

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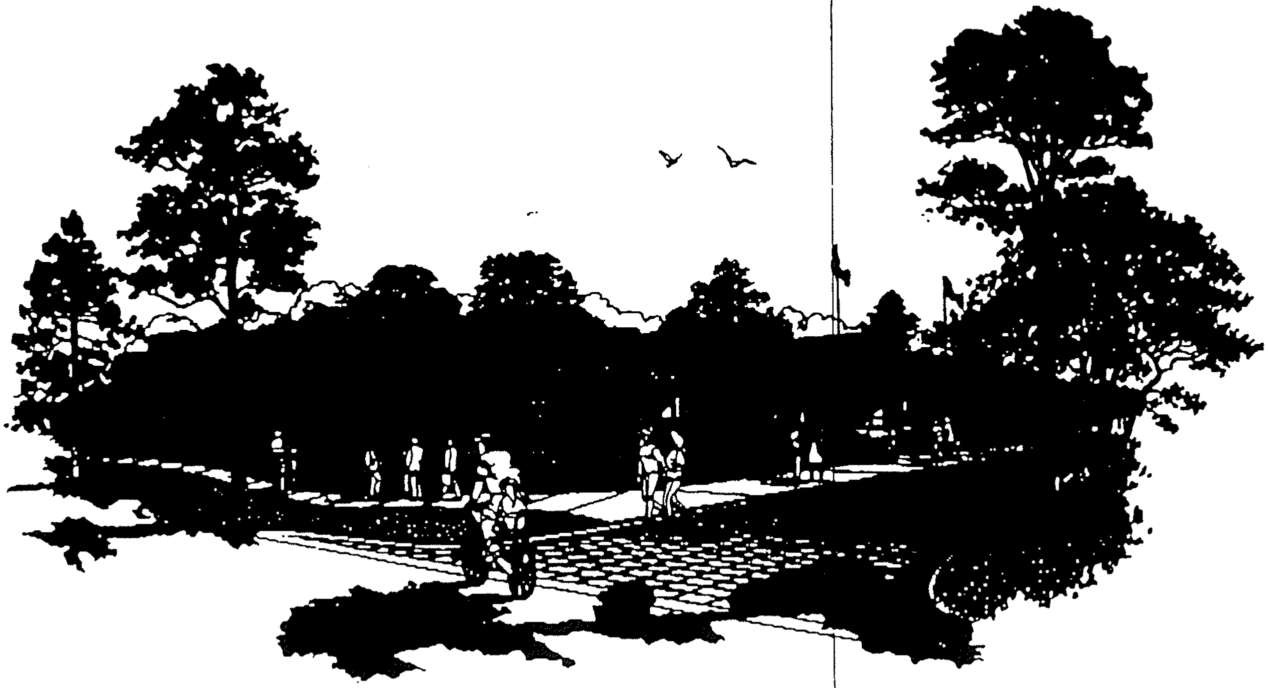
City of Grand Terrace
Facsimile Transmittal Sheet



CIVIC CENTER OF GRAND TERRACE

To: UCR Campus Physical Planner

Date: 1-15-02

Attn: Juanita W. Bullock

From: Jeff Golder

This FAX Includes 2 *pages, including this transmittal sheet.*

NOTES:

22795 BARTON ROAD
GRAND TERRACE, CA 92313
FAX 909-783-2600 PH. 909-824-6621

C 5168

Community Development
Department

Ms. Juanita W. Bullock
Capital and Physical Planning
University of California
3637 Canyon Crest Dr. F-101
Riverside, CA. 92507

Re: Notice of Preparation

January 15, 2002

Dear Ms. Bullock,

We would like to thank you for the opportunity to review the Notice of Preparation and its possible impact on the community of Grand Terrace. We believe that the study thoroughly examines the possible impact for the surrounding areas and we concur with its preliminary findings. There are two concerns that arise from this study that could potentially affect the City of Grand Terrace. The first concern is the air quality item **3b** which addresses the increase in student population and physical structures that will inevitably cause an increase in emission from vehicles and stationary facilities impacting short and long term air quality. The second concern is the Transportation/Traffic item **15a** which addresses the increased traffic in the area. The area of concern, for the City of Grand Terrace, is a section of the 215 freeway between the 10 and 60 freeways. This area has become increasing congested over the last several years and with the projected student population growth this will increase the number of cars on the local freeways increasing congestion on the north and south bound traffic and potentially blocking the on and off ramps that lead to the City of Grand Terrace, namely Barton Road and La Cadena/Iowa. We anticipate the possible economic growth that this will also bring to the outlying areas but have concerns regarding regional traffic impacts. We trust that these impacts will be adequately addressed in the EIR and a full discussion of mitigation measures for potential regional traffic impacts including any needed rail-grade separations. Again we thank you for allowing us the opportunity to participate in this important project.

John Lampe

for Patrizia Materassi
Director of Community and
Economic Development

PM:JL:JG:jg
\\FS1\VOL3\USERS\COMDEV\JGOLLIHAR\letters 02\UCRgrowth.wpd

22795 Barton Road • Grand Terrace, California 92313-5295 • (909) 824-6621

CITY OF RIVERSIDE

"People Serving People"

January 15, 2002

Juanita W. Bullock, AICP, ASLA
Capital and Physical Planning
University of California
3637 Canyon Crest Drive, R-101
Riverside, CA 92507

RE: Notice of Preparation of a Draft Environmental Impact Report (EIR) for the University of California Riverside (UCR) 2002 Long Range Development Plan (LRDP)

Dear Ms. Bullock:

Thank you for meeting last week with staff of various City of Riverside departments to discuss issues of concern to the City of Riverside relative to the above-referenced EIR. We concur in the comprehensive list of issues to be addressed in the EIR, and request that you consider the specific issues discussed at our meeting. These would include those concerns and questions listed in the attached e-mail correspondence from the Police Department.

Should you have any questions regarding this matter, please call me at 826-5989 or e-mail me at caaron@ci.riverside.ca.us.

Sincerely,

Craig Aaron

Craig Aaron
Principal Planner

c: Lieutenant Robert Meier, Police Department
Thomas Boyd, Public Works Director
Andrew Emery, Senior Parks Planner
Perry Halterman, Fire Marshall

PLANNING DEPARTMENT

3900 MAIN STREET • RIVERSIDE, CALIFORNIA 92522 • (909) 826-5371
FAX: (909) 826-5622 • www.riverside-ca.org

787 4357

ATTN:
NITA
Bullcock

From: Robert Meier
To: Aaron, Craig
Date: 1/10/02 4:17PM
Subject: UCR Long Range Development Plan

As a result of our meeting this morning regarding the Long Range Development Plan (LRDP) for UCR, the following are the Police Department's concerns:

1. Student parking in areas around the campus such as residential areas and business complexes.

2. Increased vehicle traffic in and out of the campus.

3. As the enrollment grows, does UCR PD plan to add officers consistent with that growth?

4. As the enrollment grows, we can anticipate the need to provide additional officers for the University Neighborhood Enhancement Team (UNET), which is a joint community policing partnership program between UCR PD and Riverside PD.

5. Will it be necessary to relocate the UNET office from University Village, or open a second office elsewhere near the campus?

6. Off-campus housing- will there be more multi-housing units off-campus to accommodate the increase in enrollment?

7. Will the off-campus housing be located in the area currently patrolled by UCR PD and UNET or will it be located in areas requiring Riverside PD services?

8. Anticipated increases in the number of businesses near the campus such as restaurants, fast food, movie theaters, bars, and other types of entertainment centers will certainly increase the number of calls for police services.

CC: Wilson, Audrey

University of California, Riverside
(909) 787-2433 FAX: (909) 787-2402

Academic Planning and Budget – Capital and Physical Planning

Fax

To:	Mark Horne Charlotte Strem Michelle Ouellette	From:	Nita Bullock
Company:	EIP OP BB&K	cc:	
Fax:	310.268.8175 510.987.9757 909.686.3083	# Pages:	2 (including cover)
Phone:		Date:	1/28/02

RE: Attachment that was missing from the City of Riverside LRDP EIR NOP letter

☐ Urgent ☒ For Review ☐ Please Comment ☐ Please Reply

Comments: Finally got a copy of the missing attachment.

Department of Toxic Substances Control

Edwin F. Lowry, Director
5796 Corporate Avenue
Cypress, California 90630

Winston H. Hickox
Agency Secretary
California Environmental
Protection Agency

Gray Davis
Governor

January 4, 2002

Ms. Juanita W. Bullock, AICP, ASLA
UCR Campus Physical Planner
Capital and Physical Planning
3637 Canyon Crest Drive, F-101
Riverside, California 92507

NOTICE OF PREPARATION OF AN ENVIRONMENTAL IMPACT REPORT FOR THE UNIVERSITY OF CALIFORNIA, RIVERSIDE 2002 LONG RANGE DEVELOPMENT PLAN (SCH #1990020114)

Dear Ms. Bullock:

The Department of Toxic Substances Control (DTSC) has received your Notice of Preparation (NOP) of a draft Environmental Impact Report (EIR) for the above-mentioned project.

Based on the review of the document, DTSC's comments are as follows:

1) The draft EIR needs to identify and determine whether current or historic uses at the Project site have resulted in any release of hazardous wastes/substances at the Project area.

2) The draft EIR needs to identify any known or potentially contaminated site within the proposed Project area. For all identified sites, the ND needs to evaluate whether conditions at the site pose a threat to human health or the environment.

3) The draft EIR should identify the mechanism to initiate any required investigation and/or remediation for any site that may require remediation, and the government agency to provide appropriate regulatory oversight.

4) The NOP indicates that the project site which is located on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 (due to pesticide disposal pits located in the agricultural teaching and research fields), and as a result, would create a significant hazard to the public or the environment. Therefore, an environmental assessment should be conducted at the project area to evaluate whether the site is contaminated with hazardous

substances from the potential past and current uses including storage, transport, generation and disposal of toxic and hazardous waste/materials.

5) Any hazardous wastes/materials encountered should be remediated in accordance with local, state, and federal regulations. Prior to initiating any construction activities, an environmental assessment should be conducted to determine if a release of hazardous wastes/substances exists at the site. If so, further studies should be carried out to delineate the nature and extent of the contamination. Also, it is necessary to estimate the potential threat to public health and/or the environment posed by the site. It may be necessary to determine if an expedited response action is required to reduce existing or potential threats to public health or the environment. If no immediate threat exists, the final remedy should be implemented in compliance with state regulations and policies rather than excavation of soil prior to any assessments.

6) All environmental investigation and/or remediation should be conducted under a Workplan which is approved by a regulatory agency who has jurisdiction to oversee hazardous waste cleanups. Complete characterization of the soil is needed prior to any excavation or removal action.

7) If vegetation or agricultural use occurred on the project site, onsite soils could contain pesticide residues. The NOP states that due to pesticide disposal pits located in the agricultural teaching and research fields, the site is on a list of hazardous materials sites, and the impacts to be analyzed in the EIR. Proper investigation and remedial actions should be conducted at the site prior to the new development. As long as the proposed project is for the development of a university campus, proper environmental studies to be conducted to evaluate the health risks associated with these chemicals. The NOP again states the impact to be analyzed and these fields are currently undergoing remediation according to an approved plan. The draft EIR should mention the government agency to provide appropriate regulatory oversight and the details of remediation.

8) The NOP indicates that the academic core, housing and student and campus services including childcare are provided on the east side of the campus. During the school property acquisition and/or construction utilizing state funding, it should be in compliance with the Assembly Bill 387 (Wildman) and Senate Bill 162 (Escutia) which requires a comprehensive environmental review process and that DTSC's approval is required. DTSC's role in the assessment, investigation, and cleanup of proposed school sites is to ensure that the selected properties are free of contamination, and if the property is contaminated, that it is

cleaned up to a level that is protective of the students and faculty who will occupy the new school. A study of the site is to be conducted to provide basic information for determining if there has been a release, or if there is a threatened release of a hazardous material including agricultural chemicals or if there maybe a naturally occurring hazardous material present at the site, that may pose a risk to human health or the environment. Though the proposed childcare facility may not be a school, but a childcare facility using state fund. The purpose of the bill is to protect the children who will be attending this childcare facility. Therefore, proper environmental studies should be conducted to ensure that a threat to childcare children's health and the environment does not exist at the site.

9) The NOP indicates that in addition to the development of new buildings and support facilities, existing on-campus facilities will continue to be subject to renovation. If the proposed project is planning to demolish any old buildings during the development, investigate the presence of lead paints and asbestos containing materials (ACMs) in the currently existing building structures. If the presence of lead or ACMs is suspected, proper precautions should be taken during any future demolition activities. Additionally, the contaminants should be remediated in compliance with the California environmental regulations.

10) The NOP has to describe the adjacent properties of the proposed project. If the proposed project is within 2,000 feet from a contaminated site, then the proposed development may fall under the "Border Zone of a Contaminated Property." Appropriate precautions should be taken prior to construction if the proposed project is on a "Border Zone Property."

11) The project construction may require soil excavation and/or soil filling in certain areas. Appropriate sampling is required prior to disposal of the excavated soil. If the soil is contaminated, properly dispose it rather than placing it in another location. Land Disposal Restrictions (LDRs) may be applicable to these soils. Also, if the project is planning to import soil to backfill the areas excavated, proper sampling should be conducted to make sure that the imported soil is free of contamination.

12) If it is determined that hazardous wastes are, or will be, generated by the proposed project, the wastes must be managed in accordance with the California Hazardous Waste Control Law (California Health and Safety Code, Division 20, Chapter 6.5) and the Hazardous Waste Control Regulations (California Code of Regulations, Title 22, Division 4.5).

13) If it is determined that hazardous wastes are or will be generated and the wastes are (a) stored in tanks or containers for more than ninety days, (b) treated onsite, or (c) disposed of onsite, then a permit from DTSC may be required. The facility should contact DTSC at (818) 551-2171 to initiate pre application discussions and determine the permitting process applicable to the facility.

14) If it is determined that hazardous wastes will be generated, the facility should obtain a United States Environmental Protection Agency Identification Number by contacting (800) 618-6942.

15) Certain hazardous waste treatment processes may require authorization from the local Certified Unified Program Agency (CUPA). Information about the requirement for authorization can be obtained by contacting Ms. Martha Bahia, Riverside County Environmental Health, the CUPA designated agency at (909) 358-5055.

16) If the proposed project discharge treated waste water to the sewer, a discharge permit should be obtained from the Regional Water Quality Control Board.

17) A groundwater investigation may also be necessary based on the nature of on-site contaminants and the depth to the groundwater.

18) If during construction of the project, soil and/or groundwater contamination is suspected, construction in the area should cease and appropriate Health and Safety procedures should be implemented. If it is determined that contaminated soil and/or groundwater exist, the draft EIR should identify how any required investigation and/or remediation will be conducted, and the government agency to provide appropriate regulatory oversight.

DTSC provides guidance for the Preliminary Endangerment Assessment (PEA) preparation and cleanup oversight through the Voluntary Cleanup Program (VCP). Also, DTSC is administering the $85 million Cleanup Loans and Environmental Assistance to Neighborhoods (CLEAN) program, which provides low-interest loans to investigate and cleanup hazardous materials at properties where redevelopment is likely to have a beneficial impact to a community. The CLEAN program consists of two main components: low interest loans of up to $100,000 to conduct PEAs of underutilized properties; and loans of up to 2.5 million for the cleanup or removal of hazardous materials also at underutilized urban properties. These loans are available to developers, businesses, schools, and local governments.

For additional information on the VCP of CLEAN program, please visit DTSC's web site at www.dtsc.ca.gov. If you would like to meet/discuss this matter further, please contact Mr. Johnson P. Abraham, Project Manager at (714) 484-5476.

Sincerely,

Haissam Y. Salloum, P.E.
Unit Chief
Southern California Cleanup Operations Branch
Cypress Office

cc: Governor's Office of Planning and Research
State Clearinghouse
P.O. Box 3044
Sacramento, California 95812-3044

Mr. Guenther W. Moskat, Chief
Planning and Environmental Analysis Section
CEQA Tracking Center
Department of Toxic Substances Control
P.O. Box 806
Sacramento, California 95812-0806

M~~s~~. Juanita W. Bullock, AICP, ASLA
UCR Campus Physical Planner
University of California Board of Regents
1111 Franklin Street, 12th Floor
Oakland, California 94607

Department of Toxic Substances Control

Edwin F. Lowry, Director
5796 Corporate Avenue
Cypress, California 90630

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Agency Secretary
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January 4, 2002

Ms. Juanita W. Bullock, AICP, ASLA
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3637 Canyon Crest Drive, F-101
Riverside, California 92507

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Sincerely,

Haissam Y. Salloum, P.E.
Unit Chief
Southern California Cleanup Operations Branch
Cypress Office

cc: Governor's Office of Planning and Research
State Clearinghouse
P.O. Box 3044
Sacramento, California 95812-3044

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Planning and Environmental Analysis Section
CEQA Tracking Center
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UCR Campus Physical Planner
University of California Board of Regents
1111 Franklin Street, 12th Floor
Oakland, California 94607

C-7'O — F. 7. +.

STATE OF CALIFORNIA

GOVERNOR'S OFFICE *of* PLANNING AND RESEARCH

State Clearinghouse

Gray Davis
GOVERNOR

Steven A. Nissen
DIRECTOR

Notice of Preparation

December 18, 2001

To: Reviewing Agencies

Re: University of California, Riverside 2002 Long Range Development Plan (LRDP) Draft EIR
SCH# 1990020114

Attached for your review and comment is the Notice of Preparation (NOP) for the University of California, Riverside 2002 Long Range Development Plan (LRDP) Draft EIR draft Environmental Impact Report (EIR).

Responsible agencies must transmit their comments on the scope and content of the NOP, focusing on specific information related to their own statutory responsibility, within 30 days of receipt of the NOP from the Lead Agency. This is a courtesy notice provided by the State Clearinghouse with a reminder for you to comment in a timely manner. We encourage other agencies to also respond to this notice and express their concerns early in the environmental review process.

Please direct your comments to:

Juanita W. Bullock
University of California Board of Regents
1111 Franklin Street, 12th. Floor
Oakland, CA 94607

with a copy to the State Clearinghouse in the Office of Planning and Research. Please refer to the SCH number noted above in all correspondence concerning this project.

If you have any questions about the environmental document review process, please call the State Clearinghouse at (916) 445-0613.

Sincerely,

Karen Fowler for

Scott Morgan
Project Analyst, State Clearinghouse

Attachments
cc: Lead Agency

Post-It™ brand fax transmittal memo 7671 # of pages ▸

To Nita Bullock	From C. Strem
Co. UCR	Co. UCOP
Dept. APP	Phone # (510) 987-0113
Fax # (909) 787 4357	Fax # (510) 987-0752

1400 TENTH STREET P.O. BOX 3044 SACRAMENTO, CALIFORNIA 95812-3044
916-445-0613 FAX 916-323-3018 WWW.OPR.CA.GOV/CLEARINGHOUSE.HTML

Document Details Report
State Clearinghouse Data Base

SCH# **1990020114**
Project Title University of California, Riverside 2002 Long Range Development Plan (LRDP) Draft EIR
Lead Agency University of California, Regents of the

Type NOP Notice of Preparation

Description The University of California, Riverside proposes to update the 1990 LRDP previously adopted by The Regents that anticipated 18,090 students by 2005-06 and a need for 10.1 million gross square feet of facilities. The update will address anticipated growth in enrollment by approximately 12,300 students in 2015 over the current enrollment of 12,700 (2000-01). The LRDP EIR will address the environmental impacts this growth will have as the campus moves from 4.5 million existing gross square feet of development to 12.5 million gross sf to accommodate the increase in students. The LRDP EIR will incorporate existing LRDP mitigation measures as appropriate as well as develop new measures to mitigate the increase in enrollment.

Lead Agency Contact

Name Juanita W. Bullock
Agency University of California Board of Regents
Phone (909) 787-7376 ***Fax***
email
Address 1111 Franklin Street, 12th. Floor
City Oakland ***State*** CA ***Zip*** 94607

Project Location

County Riverside
City Riverside
Region
Cross Streets University Avenue/Canyon Crest Drive
Parcel No.
Township ***Range*** ***Section*** ***Base***

Proximity to:

Highways 215/60/91
Airports
Railways BNSF
Waterways
Schools Multiple Elementary, Middle, Secondary & Private
Land Use Institution

Project Issues Aesthetic/Visual; Agricultural Land; Air Quality; Archaeologic-Historic; Drainage/Absorption; Flood Plain/Flooding; Forest Land/Fire Hazard; Geologic/Seismic; Growth Inducing; Landuse; Wildlife; Wetland/Riparian; Water Supply; Water Quality; Vegetation; Traffic/Circulation; Toxic/Hazardous; Solid Waste; Soil Erosion/Compaction/Grading; Sewer Capacity; Schools/Universities; Recreation/Parks; Public Services; Population/Housing Balance; Noise; Minerals; Cumulative Effects

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Reviewing Agencies Resources Agency; Department of Conservation; Office of Historic Preservation; Department of Health Services; Department of Fish and Game, Region 6; Native American Heritage Commission; State Lands Commission; Office of Emergency Services; Caltrans, District 8; State Water Resources Control Board, Clean Water Program; Department of Toxic Substances Control; Regional Water Quality Control Board, Region 7; Department of Parks and Recreation

---

Date Received 12/18/2001 ***Start of Review*** 12/18/2001 ***End of Review*** 01/16/2002

Note: Blanks in data fields result from insufficient information provided by lead agency.

NOP Distribution List

County: Riverside

SCH# 1990020114

Resources Agency

■ **Resources Agency**
Nadell Gayou

☐ **Dept. of Boating & Waterways**
Bill Curry

☐ **California Coastal Commission**
Elizabeth A. Fuchs

☒ **Dept. of Conservation**
Ken Trott

☐ **Dept. of Forestry & Fire Protection**
Allen Robertson

☒ **Office of Historic Preservation**
Hans Kreutzberg

■ **Dept of Parks & Recreation**
Resource Mgmt. Division

☐ **Reclamation Board**
Pam Bruner

☐ **S.F. Bay Conservation & Dev't. Comm.**
Steve McAdam

☐ **Resources Agency**
Nadell Gayou
Dept. of Water Resources

Health & Welfare

☒ **Health & Welfare**
Wayne Hubbard
Dept. of Health/Drinking Water

Food & Agriculture

☐ **Food & Agriculture**
Tad Bell
Dept. of Food and Agriculture

Fish and Game

☐ **Dept. of Fish & Game**
Scott Flint
Environmental Services Division

☐ **Dept. of Fish & Game 1**
Donald Koch
Region 1

☐ **Dept. of Fish & Game 2**
Banky Curtis
Region 2

☐ **Dept. of Fish & Game 3**
Robert Floerke
Region 3

☐ **Dept. of Fish & Game 4**
William Laudermilk
Region 4

☐ **Dept. of Fish & Game 5**
Don Chadwick
Region 5, Habitat Conservation Program

▨ **Dept. of Fish & Game 6**
Gabrina Gatchel
Region 6, Habitat Conservation Program

☐ **Dept. of Fish & Game 6 I/M**
Tammy Allen
Region 6, Inyo/Mono, Habitat Conservation Program

☐ **Dept. of Fish & Game M**
Tom Napoli
Marine Region

Independent Commissions

☐ **California Energy Commission**
Environmental Office

■ **Native American Heritage Comm.**
Debbie Treadway

☐ **Public Utilities Commission**
Andrew Barnsdale

■ **State Lands Commission**
Betty Silva

☐ **Governor's Office of Planning & Research**
State Clearinghouse Planner

☐ **Colorado River Board**
Gerald R. Zimmerman

☐ **Tahoe Regional Planning Agency (TRPA)**
Lyn Barnett

☒ **Office of Emergency Services**
John Rowden, Manager

☐ **Delta Protection Commission**
Debby Eddy

☐ **Santa Monica Mountains Conservancy**
Paul Edelman

Dept. of Transportation

☐ **Dept. of Transportation 1**
IGR/Planning
District 1

☐ **Dept. of Transportation 2**
Vicki Roe
Local, Development Review, District 2

☐ **Dept. of Transportation 3**
Jeff Pulverman
District 3

☐ **Dept. of Transportation 4**
Jean Finney
District 4

☐ **Dept. of Transportation 5**
Lawrence Newland
District 5

☐ **Dept. of Transportation 6**
Marc Birnbaum
District 6

☐ **Dept. of Transportation 7**
Stephen J. Buswell
District 7

▨ **Dept. of Transportation 8**
Mike Sim
District 8

☐ **Dept. of Transportation 9**
Caroline Yee for Kate Walton
District 9

☐ **Dept. of Transportation 10**
Chris Sayre
District 10

☐ **Dept. of Transportation 11**
Lou Salazar
District 11

☐ **Dept. of Transportation 12**
Aileen Kennedy
District 12

Business, Trans & Housing

☐ **Housing & Community Development**
Cathy Creswell
Housing Policy Division

☐ **Caltrans - Division of Aeronautics**
Sandy Hesnard

☐ **California Highway Patrol**
Lt. Julie Page
Office of Special Projects

☐ **Dept. of Transportation**
Ron Helgeson
Caltrans - Planning

☐ **Dept. of General Services**
Robert Sleppy
Environmental Services Section

Air Resources Board

- ☐ **Airport Projects**
  Jim Lerner
- ☐ **Transportation Projects**
  Ann Geraghty
- ☐ **Industrial Projects**
  Mike Tollstrup

☐ **California Integrated Waste Management Board**
Sue O'Leary

☒ **State Water Resources Control Board**
Diane Edwards
Division of Clean Water Programs

☐ **State Water Resources Control Board**
Greg Frantz
Division of Water Quality

☐ **State Water Resouces Control Board**
Mike Falkenstein
Division of Water Rights

☒ **Dept. of Toxic Substances Control**
CEQA Tracking Center

Regional Water Quality Control Board (RWQCB)

☐ **RWQCB 1**
Cathleen Hudson
North Coast Region (1)

☐ **RWQCB 2**
Environmental Document Coordinator
San Francisco Bay Region (2)

☐ **RWQCB 3**
Central Coast Region (3)

☐ **RWQCB 4**
Jonathan Bishop
Los Angeles Region (4)

☐ **RWQCB 5S**
Central Valley Region (5)

- ☐ **RWQCB 5F**
  Central Valley Region (5)
  Fresno Branch Office
- ☐ **RWQCB 5R**
  Central Valley Region (5)
  Redding Branch Office

☐ **RWQCB 6**
Lahontan Region (6)

- ☐ **RWQCB 6V**
  Lahontan Region (6)
  Victorville Branch Office

☒ **RWQCB 7**
Colorado River Basin Region (7)

☐ **RWQCB 8**
Santa Ana Region (8)

☐ **RWQCB 9**
San Diego Region (9)

STATE OF CALIFORNIA Gray Davis, *Governor*

NATIVE AMERICAN HERITAGE COMMISSION
915 CAPITOL MALL, ROOM 364
SACRAMENTO, CA 95814
(916) 653-4082
(916) 657-5390 - Fax

January 4, 2002

Juanita W. Bullock
University of California Board of Regents
111Franklin Street, 12th Floor
Oakland, CA 94607

RE: SCH# 1990020114 - University of California, Riverside 2002 Long Range Development Plan Draft EIR

Dear Ms. Bullock:

The Native American Heritage Commission has reviewed the above mentioned NOP. To adequately assess and mitigate project-related impacts on archaeological resources, the Commission recommends the following actions be required:

- ✓ Contact the appropriate Information Center for a record search. The record search will determine:
    - If a part or all of the area of project effect (APE) has been previously surveyed for cultural resources.
    - If any known cultural resources have already been recorded on or adjacent to the APE.
    - If the probability is low, moderate, or high that cultural resources are located in the APE.
    - If a survey is required to determine whether previously unrecorded cultural resources are present.
- ✓ If an archaeological inventory survey is required, the final stage is the preparation of a professional report detailing the findings and recommendations of the records search and field survey.
    - The final report containing site forms, site significance, and mitigation measurers should be submitted immediately to the planning department. All information regarding site locations, Native American human remains, and associated funerary objects should be in a separate confidential addendum, and not be made available for pubic disclosure.
    - The final written report should be submitted within 3 months after work has been completed to the appropriate regional archaeological Information Center.
- ✓ Contact the Native American Heritage Commission for:
    - A Sacred Lands File Check.
    - A list of appropriate Native American Contacts for consultation concerning the project site and to assist in the mitigation measures.
- ✓ Lack of surface evidence of archeological resources does not preclude their subsurface existence.
    - Lead agencies should include in their mitigation plan provisions for the identification and evaluation of accidentally discovered archeological resources, per California Environmental Quality Act (CEQA) §15064.5 (f). In areas of identified archaeological sensitivity, a certified archaeologist and a culturally affiliated Native American, with knowledge in cultural resources, should monitor all ground-disturbing activities.
    - Lead agencies should include in their mitigation plan provisions for the disposition of recovered artifacts, in consultation with culturally affiliated Native Americans.
    - Lead agencies should include provisions for discovery of Native American human remains in their mitigation plan. Health and Safety Code §7050.5, CEQA §15064.5 (e), and Public Resources Code §5097.98 mandates the process to be followed in the event of an accidental discovery of any human remains in a location other than a dedicated cemetery.

Sincerely,

Rob Wood
Environmental Specialist III
(916) 653-4040

CC: State Clearinghouse

C 5164

rctc
Riverside County
Transportation Commission

3560 University Avenue Suite 100 • Riverside, California 92501
phone: (909)787-7141 • fax: (909)787-7920 • www.rctc.org

January 10, 2002

Ms. Juanita Bullock
Capital and Physical Planning
University of California
3637 Canyon Crest Drive, F-101
Riverside, CA 92507

Subject: Notice of Preparation of a Draft Environmental Impact Report- UCR Long Range Development Plan

Dear Ms. Bullock:

We received the Notice of Preparation (NOP) of a Draft Environmental Impact Report (DEIR) for the University of California Riverside (UCR) Long Range Development Plan (LRDP) on January 17, 2002 and are providing you with the following comments:

1) As you are aware RCTC is working with Caltrans to develop and fund transportation improvements in the Interstate 215 Corridor adjacent to the UCR Campus. RCTC is also responsible for the development of Metro Link Commuter Rail Service in Riverside to and from Los Angeles and Orange County. In these capacities we are concerned about the projected increase in the UCR student-body expected in the LDRP and how more students might affect I-215 main-line traffic and access to the UCR campus, as well as increased passenger demand on Metro Link. Please evaluate these potential impacts in the proposed DEIR.

2) As mentioned above RCTC is working with Caltrans on the I-215 Corridor. In addition RCTC works with other agencies such as the City of Riverside, County of Riverside, City of Moreno Valley and the Riverside Transit Agency (RTA) in the development and funding of transportation programs. These agencies may have similar concerns about the projected increase in student enrollment at UCR. Please ensure they are given the opportunity to comment on your proposed DEIR.

Thank you for giving RCTC the opportunity to comment on your proposed DEIR. We look forward to working with you in the preparation of the DEIR and LDRP.

Sincerely,

Eric Haley, Executive Director RCTC
Riverside County Transportation Commission

CEQA: California Environmental Quality Act

NOTICE OF PREPARATION

To:

Riverside County Transportation Commission
3560 University Avenue, Suite 100
Riverside, CA 92501

From: Juanita W. Bullock AICP, ASLA
Capital and Physical Planning
University of California
3637 Canyon Crest Drive, F-101
Riverside, CA 92507

Subject: Notice of Preparation of a Draft Environmental Impact Report

University of California Board of Regents will be the Lead Agency and will prepare an environmental impact report for the project identified below. We need to know the views of your agency as to the scope and content of the environmental information that is germane to your agency's statutory responsibilities in connection with the proposed project. Your agency will need to use the EIR prepared by our agency when considering your permit or other approval for the project.

The project description, location, and the potential environmental effects are contained in the attached materials. A copy of the Initial Study (☒ is ☐ is not) attached.

Due to the time limits mandated by State law, your response must be sent at the earliest possible date, but not later than 30 days after the receipt of this notice.

Please send your response to Juanita W. Bullock, Campus Physical Planner at the address shown above. We will need the name of a contact person in your agency.

Project Title: University of California, Riverside 2002 Long Range Development Plan

Project Applicant, if any: Academic Planning and Budget – Capital and Physical Planning, University of California, Riverside

Date: December 14, 2001

Signature JW Bullock
Title Campus Physical Planner
Telephone (909) 787-7378

RECEIVED
DEC 17 2001

Reference: California Code of Regulations, Title 14, (CEQA Guidelines), Section 15082(a), 15103, 15375.

South Coast
Air Quality Management District
AQMD
21865 E. Copley Drive, Diamond Bar, CA 91765-4182
(909) 396-2000 • http://www.aqmd.gov

January 2, 2002

Ms. Juanita W. Bullock, AICP, ASLA
Capital and Physical Planning
University of California
3637 Canyon Crest Drive, F-101
Riverside, CA 92507

Dear Ms. Bullock:

Notice of Preparation of a Draft Environmental Impact Report for 2002 Long Range Development Plan

The South Coast Air Quality Management District (AQMD) appreciates the opportunity to comment on the above-mentioned document. The AQMD's comments are recommendations regarding the analysis of potential air quality impacts from the proposed project that should be included in the Draft Environmental Impact Report (EIR).

Air Quality Analysis

The AQMD adopted its California Environmental Quality Act (CEQA) Air Quality Handbook in 1993 to assist other public agencies with the preparation of air quality analyses. The AQMD recommends that the Lead Agency use this Handbook as guidance when preparing its air quality analysis. Copies of the Handbook are available from the AQMD's Subscription Services Department by calling (909) 396-3720.

The Lead Agency should identify any potential adverse air quality impacts that could occur from all phases of the project and all air pollutant sources related to the project. Air quality impacts from both construction and operations should be considered. Construction-related air quality impacts typically include, but are not limited to, emissions from the use of heavy-duty equipment from grading, earth-loading/unloading, paving, architectural coatings, off-road mobile sources (e.g., heavy-duty construction equipment) and on-road mobile sources (e.g., construction worker vehicle trips, material transport trips). Operation-related air quality impacts may include, but are not limited to, emissions from stationary sources (e.g., boilers), area sources (e.g., solvents and coatings), and vehicular trips (e.g., on- and off-road tailpipe emissions and entrained dust). Air quality impacts from indirect sources, that is, sources that generate or attract vehicular trips should be included in the evaluation. An analysis of all toxic air contaminant impacts due to the decommissioning or use of equipment potentially generating such air pollutants should also be included.

Mitigation Measures

In the event that the project generates significant adverse air quality impacts, CEQA requires that all feasible mitigation measures be utilized during project construction and operation to minimize or eliminate significant adverse air quality impacts. To assist the Lead Agency with identifying possible mitigation measures for the project, please refer to Chapter 11 of the AQMD CEQA Air Quality Handbook for sample air quality mitigation measures. Additionally, AQMD's Rule 403 – Fugitive Dust, and the Implementation Handbook contain numerous measures for controlling construction-related emissions that should be considered for use as CEQA mitigation if not otherwise required. Pursuant to state CEQA Guidelines §15126.4 (a)(1)(D), any impacts resulting from mitigation measures must also be discussed.

Data Sources

AQMD rules and relevant air quality reports and data are available by calling the AQMD's Public Information Center at (909) 396-2039. Much of the information available through the Public Information Center is also available via the AQMD's World Wide Web Homepage (http://www.aqmd.gov).

The AQMD is willing to work with the Lead Agency to ensure that project-related emissions are accurately identified, categorized, and evaluated. Please call Dr. Charles Blankson, Transportation Specialist, CEQA Section, at (909) 396-3304 if you have any questions regarding this letter.

Sincerely,

Steve Smith

Steve Smith, Ph.D.
Program Supervisor, CEQA Section
Planning, Rule Development and Area Sources

SS:CB:li

RVC011220-01LI
Control Number

South Coast
Air Quality Management District
21865 E. Copley Drive, Diamond Bar, CA 91765-4182
(909) 396-2000 • http://www.aqmd.gov

December 20, 2001

Ms. Juanita W. Bullock, AICP, ASLA
Capital and Physical Planning
University of California
3637 Canyon Crest Drive, F-101
Riverside, CA 92507

Dear Ms. Bullock:

Notice of Preparation of a Draft Environmental Impact Report for 2002 Long Range Development Plan

The South Coast Air Quality Management District (AQMD) appreciates the opportunity to comment on the above-mentioned document. The AQMD's comments are recommendations regarding the analysis of potential air quality impacts from the proposed project that should be included in the Draft Environmental Impact Report (EIR).

Air Quality Analysis

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Sincerely,

Steve Smith

Steve Smith, Ph.D.
Program Supervisor, CEQA Section
Planning, Rule Development and Area Sources

SS:CB:li

LAC011218-04LI
Control Number

JTHERN CALIFORNIA

ASSOCIATION of GOVERNMENTS

Main Office
818 West Seventh Street
12th Floor
Los Angeles, California
90017-3435

t (213) 236-1800
f (213) 236-1825

www.scag.ca.gov

January 10, 2002

Ms. Juanita W. Bullock
Campus Physical Planner
Office of Capital and Physical Planning
University of California, Riverside
3637 Canyon Crest Drive, F-101
Riverside, CA 92507

RE: **Comments on the Notice of Preparation for a Draft Environmental Impact Report for UC Riverside 2002 Long Range Development Plan – SCAG No. I 20010700**

Dear Ms. Bullock:

Thank you for submitting the **Notice of Preparation for a Draft Environmental Impact Report for UC Riverside 2002 Long Range Development Plan** to SCAG for review and comment. As areawide clearinghouse for regionally significant projects, SCAG reviews the consistency of local plans, projects, and programs with regional plans. This activity is based on SCAG's responsibilities as a regional planning organization pursuant to state and federal laws and regulations. Guidance provided by these reviews is intended to assist local agencies and project sponsors to take actions that contribute to the attainment of regional goals and policies.

In addition, The California Environmental Quality Act requires that EIRs discuss any inconsistencies between the proposed project and the applicable general plans and **regional plans (Section 15125 [d])**. If there are inconsistencies, an explanation and rationalization for such inconsistencies should be provided.

Policies of SCAG's Regional Comprehensive Plan and Guide and Regional Transportation Plan, which may be applicable to your project, are outlined in the attachment. **We expect the DEIR to specifically cite the appropriate SCAG policies and address the manner in which the Project is consistent with applicable core policies or supportive of applicable ancillary policies. Please use our policy numbers to refer to them in your DEIR. Also, we would encourage you to use a side-by-side comparison of SCAG policies with a discussion of the consistency or support of the policy with the Proposed Project.**

Please provide a minimum of 45 days for SCAG to review the DEIR when this document is available. If you have any questions regarding the attached comments, please contact me at (213) 236-1867. Thank you.

Sincerely,

Jeffrey M. Smith

JEFFREY M. SMITH, AICP
Senior Planner
Intergovernmental Review

COMMENTS ON THE PROPOSAL TO DEVELOP A DRAFT ENVIRONMENTAL IMPACT REPORT FOR UNIVERSITY OF CALIFORNIA, RIVERSIDE LONG RANGE DEVELOPMENT PLAN
SCAG NO. I 20010700

PROJECT DESCRIPTION

The proposed Project considers the update of the University of California, Riverside Long Range Development Plan.

CONSISTENCY WITH REGIONAL COMPREHENSIVE PLAN AND GUIDE POLICIES

The **Growth Management Chapter (GMC)** of the Regional Comprehensive Plan and Guide (RCPG) contains the following policies that are particularly applicable and should be addressed in the Draft EIR for University of California, Riverside Long Range Development Plan.

3.01 *The population, housing, and jobs forecasts, which are adopted by SCAG's Regional Council and that reflect local plans and policies, shall be used by SCAG in all phases of implementation and review.*

Regional Growth Forecasts

The Draft EIR should reflect the most current SCAG forecasts which are the 2001 RTP (April 2001) Population, Household and Employment forecasts for the Western Riverside Council of Governments (WRCOG) subregion and the City of Riverside forecasts follow:

WRCOG Subregional Forecasts	**2000**	**2005**	**2010**	**2015**	**2020**
Population	1,199,215	1,416,994	1,590,774	1,761,652	1,993,534
Households	385,843	439,974	503,954	565,229	640,467
Employment	371,430	484,774	601,920	671,185	734,503

City of Riverside Forecasts	2000	2005	2010	2015	2020
Population	259,807	292,272	302,507	312,571	326,226
Households	82,397	88,373	93,245	97,910	103,638
Employment	125,999	154,003	182,943	200,058	215,701

3.03 *The timing, financing, and location of public facilities, utility systems, and transportation systems shall be used by SCAG to implement the region's growth policies.*

The **Regional Transportation Plan (RTP)** also has goals, objectives, policies and actions pertinent to this proposed project. This RTP links the goal of sustaining mobility with the goals of fostering economic development, enhancing the environment, reducing energy consumption, promoting transportation-friendly development patterns, and encouraging fair and equitable access to residents affected by socio-economic, geographic and commercial limitations. Among the relevant goals, objectives, policies and actions of the RTP are the following:

Core Regional Transportation Plan Policies

4.01 *Transportation investments shall be based on SCAG's adopted Regional Performance Indicators:*

Mobility - Transportation Systems should meet the public need for improved access, and for safe, comfortable, convenient, faster and economical movements of people and goods.

- *Average Work Trip Travel Time in Minutes – 25 minutes (Auto)*
- *PM Peak Freeway Travel Speed – 45 minutes (Transit)*
- *PM Peak Non-Freeway Travel Speed*
- *Percent of PM Peak Travel in Delay (Fwy)*
- *Percent of PM Peak Travel in Delay (Non-Fwy)*

Accessibility - Transportation system should ensure the ease with which opportunities are reached. Transportation and land use measures should be employed to ensure minimal time and cost.

- *Work Opportunities within 45 Minutes door to door travel time (Mode Neutral)*
- *Average transit access time*

Environment - Transportation system should sustain development and preservation of the existing system and the environment. (All Trips)

- *CO, ROG, NOx, PM10, PM2.5 – Meet the applicable SIP Emission Budget and the Transportation Conformity requirements*

Reliability – Transportation system should have reasonable and dependable levels of service by mode. (All Trips)

- *Transit – 63%*
- *Highway – 76%*

Safety - Transportation systems should provide minimal accident, death and injury. (All Trips)

- *Fatalities Per Million Passenger Miles – 0*
- *Injury Accidents – 0*

Equity/Environmental Justice - The benefits of transportation investments should be equitably distributed among all ethnic, age and income groups. (All trips)

- *By Income Groups Share of Net Benefits – Equitable Distribution of Benefits among all Income Quintiles*

Cost-Effectiveness - Maximize return on transportation investment (All Trips). Air Quality, Mobility, Accessibility and Safety

- *Return on Total Investment – Optimize return on Transportation Investments*

4.02 *Transportation investments shall mitigate environmental impacts to an acceptable level.*

4.04 *Transportation Control Measures shall be a priority.*

4.16 *Maintaining and operating the existing transportation system will be a priority over expanding capacity.*

GMC POLICIES RELATED TO THE RCPG GOAL TO IMPROVE THE REGIONAL STANDARD OF LIVING

The Growth Management goals to develop urban forms that enable individuals to spend less income on housing cost, that minimize public and private development costs, and that enable firms to be more competitive, strengthen the regional strategic goal to stimulate the regional economy. The evaluation of the proposed project in relation to the following policies would be intended to guide efforts toward achievement of such goals and does not infer regional interference with local land use powers.

3.05 *Encourage patterns of urban development and land use, which reduce costs on infrastructure construction and make better use of existing facilities.*

3.09 *Support local jurisdictions' efforts to minimize the cost of infrastructure and public service delivery, and efforts to seek new sources of funding for development and the provision of services.*

3.10 *Support local jurisdictions' actions to minimize red tape and expedite the permitting process to maintain economic vitality and competitiveness.*

GMC POLICIES RELATED TO THE RCPG GOAL TO IMPROVE THE REGIONAL QUALITY OF LIFE

The Growth Management goals to attain mobility and clean air goals and to develop urban forms that enhance quality of life, that accommodate a diversity of life styles, that preserve open space and natural resources, and that are aesthetically pleasing and preserve the character of communities, enhance the regional strategic goal of maintaining the regional quality of life. The evaluation of the proposed project in relation to the following policies would be intended to provide direction for plan implementation, and does not allude to regional mandates.

3.12 *Encourage existing or proposed local jurisdictions' programs aimed at designing land uses which encourage the use of transit and thus reduce the need for roadway expansion, reduce the number of auto trips and vehicle miles traveled, and create opportunities for residents to walk and bike.*

3.13 *Encourage local jurisdictions' plans that maximize the use of existing urbanized areas accessible to transit through infill and redevelopment.*

3.14 *Support local plans to increase density of future development located at strategic points along the regional commuter rail, transit systems, and activity centers.*

3.16 *Encourage developments in and around activity centers, transportation corridors, underutilized infrastructure systems, and areas needing recycling and redevelopment.*

3.18 *Encourage planned development in locations least likely to cause environmental impact.*

3.20 *Support the protection of vital resources such as wetlands, groundwater recharge areas, woodlands, production lands, and land containing unique and endangered plants and animals.*

3.21 *Encourage the implementation of measures aimed at the preservation and protection of recorded and unrecorded cultural resources and archaeological sites.*

3.22 *Discourage development, or encourage the use of special design requirements, in areas with steep slopes, high fire, flood, and seismic hazards.*

3.23 *Encourage mitigation measures that reduce noise in certain locations, measures aimed at preservation of biological and ecological resources, measures that would reduce exposure to seismic hazards, minimize earthquake damage, and to develop emergency response and recovery plans.*

GMC POLICIES RELATED TO THE RCPG GOAL TO PROVIDE SOCIAL, POLITICAL, AND CULTURAL EQUITY

The Growth Management Goal to develop urban forms that avoid economic and social polarization promotes the regional strategic goal of minimizing social and geographic disparities and of reaching equity among all segments of society. The evaluation of the proposed project in relation to the policy stated below is intended guide direction for the accomplishment of this goal, and does not infer regional mandates and interference with local land use powers.

3.24 *Encourage efforts of local jurisdictions in the implementation of programs that increase the supply and quality of housing and provide affordable housing as evaluated in the Regional Housing Needs Assessment.*

3.27 *Support local jurisdictions and other service providers in their efforts to develop sustainable communities and provide, equally to all members of society, accessible and effective services such as: public education, housing, health care, social services, recreational facilities, law enforcement, and fire protection.*

AIR QUALITY CHAPTER CORE ACTIONS

The **Air Quality Chapter** core actions related to the proposed project includes:

5.07 *Determine specific programs and associated actions needed (e.g., indirect source*

rules, enhanced use of telecommunications, provision of community based shuttle services, provision of demand management based programs, or vehicle-miles-traveled/emission fees) so that options to command and control regulations can be assessed.

5.11 Through the environmental document review process, ensure that plans at all levels of government (regional, air basin, county, subregional and local) consider air quality, land use, transportation and economic relationships to ensure consistency and minimize conflicts.

WATER QUALITY CHAPTER RECOMMENDATIONS AND POLICY OPTIONS

The **Water Quality Chapter** core recommendations and policy options relate to the two water quality goals: to restore and maintain the chemical, physical and biological integrity of the nation's water; and, to achieve and maintain water quality objectives that are necessary to protect all beneficial uses of all waters.

11.07 Encourage water reclamation throughout the region where it is cost-effective, feasible, and appropriate to reduce reliance on imported water and wastewater discharges. Current administrative impediments to increased use of wastewater should be addressed.

CONCLUSIONS

All feasible measures needed to mitigate any potentially negative regional impacts associated with the proposed project should be implemented and monitored, as required by CEQA.

SOUTHERN CALIFORNIA ASSOCIATION OF GOVERNMENTS

Roles and Authorities

THE SOUTHERN CALIFORNIA ASSOCIATION OF GOVERNMENTS (SCAG) is a ***Joint Powers Agency*** established under California Government Code Section 6502 et seq. Under federal and state law, SCAG is designated as a Council of Governments (COG), a Regional Transportation Planning Agency (RTPA), and a Metropolitan Planning Organization (MPO). SCAG's mandated roles and responsibilities include the following:

SCAG is designated by the federal government as the Region's ***Metropolitan Planning Organization*** and mandated to maintain a continuing, cooperative, and comprehensive transportation planning process resulting in a Regional Transportation Plan and a Regional Transportation Improvement Program pursuant to 23 U.S.C. '134, 49 U.S.C. '5301 et seq., 23 C.F.R. '450, and 49 C.F.R. '613. SCAG is also the designated ***Regional Transportation Planning Agency***, and as such is responsible for both preparation of the Regional Transportation Plan (RTP) and Regional Transportation Improvement Program (RTIP) under California Government Code Section 65080 and 65082 respectively.

SCAG is responsible for developing the demographic projections and the integrated land use, housing, employment, and transportation programs, measures, and strategies portions of the ***South Coast Air Quality Management Plan***, pursuant to California Health and Safety Code Section 40460(b)-(c). SCAG is also designated under 42 U.S.C. '7504(a) as a ***Co-Lead Agency*** for air quality planning for the Central Coast and Southeast Desert Air Basin District.

SCAG is responsible under the Federal Clean Air Act for determining ***Conformity*** of Projects, Plans and Programs to the State Implementation Plan, pursuant to 42 U.S.C. '7506.

Pursuant to California Government Code Section 65089.2, SCAG is responsible for ***reviewing all Congestion Management Plans (CMPs) for consistency with regional transportation plans*** required by Section 65080 of the Government Code. SCAG must also evaluate the consistency and compatibility of such programs within the region.

SCAG is the authorized regional agency for ***Inter-Governmental Review*** of Programs proposed for federal financial assistance and direct development activities, pursuant to Presidential Executive Order 12,372 (replacing A-95 Review).

SCAG reviews, pursuant to Public Resources Code Sections 21083 and 21087, Environmental Impacts Reports of projects of regional significance for consistency with regional plans [California Environmental Quality Act Guidelines Sections 15206 and 15125(b)].

Pursuant to 33 U.S.C. '1288(a)(2) (Section 208 of the Federal Water Pollution Control Act), SCAG is the authorized ***Areawide Waste Treatment Management Planning Agency***.

SCAG is responsible for preparation of the ***Regional Housing Needs Assessment***, pursuant to California Government Code Section 65584(a).

SCAG is responsible (with the Association of Bay Area Governments, the Sacramento Area Council of Governments, and the Association of Monterey Bay Area Governments) for preparing the ***Southern California Hazardous Waste Management Plan*** pursuant to California Health and Safety Code Section 25135.3.

Revised July 2001

The Gas Company

A Sempra Energy company

Southern California
Gas Company
1981 W. Lugonia Avenue
Redlands, CA 92374-9720

Mailing Address:
PO Box 3003
Redlands, CA 92373-0306

December 31, 2001 Gas Co. Reference No. 01-609 OK

University of California, Riverside
3637 Canyon Crest Drive, F-101
Riverside, CA 92507

Attention: Juanita W. Bullock

Re: Draft EIR – 2002 Long Range Development Plan.

Thank you for the opportunity to respond to the above-referenced project. Please note that Southern California Gas Company has facilities in the area where the above named project is proposed. Gas service to the project could be provided without any significant impact on the environment. The service would be in accordance with the Company's policies and extension rules on file with the California Public Utilities Commission at the time contractual arrangements are made.

You should be aware that this letter is not to be interpreted as a contractual commitment to serve the proposed project, but only as an informational service. The availability of natural gas service, as set forth in this letter, is based upon present conditions of gas supply and regulatory policies. As a public utility, The Southern California Gas Company is under the jurisdiction of the California Public Utilities Commission. We can also be affected by actions of federal regulatory agencies. Should these agencies take any action, which affects gas supply, or the conditions under which service is available, gas service will be provided in accordance with revised conditions.

Typical demand use for:

a.	Residential	(System Area Average/Use Per Meter) <u>Yearly</u>
	Single Family	799 therms/year dwelling unit
	Multi-Family 4 or less units	482 therms/year dwelling unit
	Multi-Family 5 or more units	483 therms/year dwelling unit

These averages are based on total gas consumption in residential units served by Southern California Gas Company, and it should not be implied that any particular home, apartment or tract of homes will use these amounts of energy.

C5161

b. Commercial

Due to the fact that construction varies so widely (a glass building vs. a heavily insulated building) and there is such a wide variation in types of materials and equipment used, a typical demand figure is not available for this type of construction. Calculations would need to be made after the building has been designed.

We have Demand Side Management programs available to commercial/industrial customers to provide assistance in selecting the most effective applications of energy conservation techniques for a particular project. If you desire further information on any of our energy conservation programs, please contact our Commercial/Industrial Support Center at 1-800-GAS-2000.

Sincerely,

Steve Dunivin
Technical Supervisor

STATE OF CALIFORNIA - THE RESOURCES AGENCY GRAY DAVIS, *Governor*

DEPARTMENT OF FISH AND GAME
Eastern Sierra - Inland Deserts Region
4775 Bird Farm Road
Chino Hills, California 91709[1]
(909) 597-5043

January 14, 2002

Ms. Juanita W. Bullock, AICP, ASLA, Campus Physical Planner
University of California, Riverside
Capital and Physical Planning
3637 Canyon Crest Drive, F-101
Riverside, California 92507
Phone (909) 787-7376
Fax (909) 787-2402

Re: **Notice of Preparation (NOP) of a Draft Environmental Impact Report (DEIR) for the UC Riverside 2002 Long Range Development Plan**

Dear Ms. Bullock:

The Department of Fish and Game (Department) appreciates this opportunity to comment on the above-referenced project with regards to impacts to biological resources. The proposed project is to update the campus' Long Range Development Plan (LRDP) previously adopted by the University of California Board of Regents July 20, 1990. The Long Range Development Plan will be undertaken to address anticipated growth in student enrollment. The proposed project is located at the eastern end of the City of Riverside, in western Riverside County, California.

The Department is responding as a Trustee Agency pursuant to the California Environmental Quality Act (CEQA) Guidelines Section 15386, and as a Responsible Agency regarding any discretionary actions pursuant to CEQA Guidelines Section 15381. The Department, as a Trustee Agency, has jurisdiction by law over natural resources affected by a project which are held in trust for the people of the State of California. The Department, as a Responsible Agency, is required to actively participate in the CEQA process and review and use the Lead Agency's CEQA documents when making a decision on the project (CEQA Guidelines Sec. 15096).

A review of records from the California Natural Diversity Database (CNDDB) and other area resources indicate that many sensitive species and sensitive habitat types occur in the project vicinity and may be affected by the proposed project. These species include; coastal California gnatcatcher (*Polioptila californica californica*; FT, CSC[1]), tricolored blackbird (*Agelaius tricolor*; CSC), Stephen's kangaroo rat (*Dipodomys stephensi*; FE, ST), Los Angeles pocket mouse

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[1] CSC=California Special Concern Species; SE=State listed as Endangered; ST=State listed as Threatened;FE=Federally listed as Endangered; FT=Federally listed as Threatened; List X =California Native Plant Society (CNPS) inventory list

(*Perognathus longimembris brevinasus*; CSC), northwestern San Diego pocket mouse (*Chaetodipus (=perognathus) fallax fallax*; CSC), San Diego horned lizard (*Phrynosoma coronatum blainvillei*; CSC), orange-throated whiptail (*Cnemidophorus hyperythrus*; CSC), coastal western whiptail (*Cnemidophorus tigris multiscutatus*; CSC), northern red-diamond rattlesnake (*Crotalus ruber ruber*; CSC), western spadefoot (*Scaphiopus hammondii*; CSC), Robinson's pepper-grass (*Lepidium virginicum var robinsonii*; List 1B), marsh sandwort (*Arenaria paludicola*; FE, SE, List 1B), Parry's spineflower (*Chorizanthe parryi var parryi*; List 3), slender-horned spineflower (*Dodecahema leptoceras*; FE, SE, List 1B), Parish's desert-thorn (*Lycium Parishii*; List 3), smooth tarplant (*Centromadia pungens ssp laevis*; List 1B), and Southern Sycamore Alder Riparian Woodland. Although many of the above-mentioned species are not listed as threatened or endangered, they are considered sensitive and may become listed in the future. Impacts to sensitive species, regardless of listing status, may be considered significant under CEQA and require appropriate avoidance, minimization, and compensation measures. The Department requests that the potential direct and indirect impacts to sensitive species (including those listed above) be analyzed in the DEIR. The identification of sensitive species potentially occurring in the area and may be impacted by the proposed project should not be limited to a search of the CNDDB.

This particular project has the potential to have significant environmental impacts on sensitive fauna resources, including State and Federally listed threatened and endangered species. Therefore, critical aspects of the DEIR should include an alternatives analysis which focuses on environmental resources and mitigation measures for impacts identified as significant. To enable Department staff to adequately review and comment on the proposed project, we suggest that updated biological studies be conducted prior to any environmental or discretionary approvals. The following information should be included in any focused biological report or supplemental environmental report:

1. A complete assessment of the flora and fauna within and adjacent to the project area, with particular emphasis upon identifying endangered, threatened, and sensitive species and sensitive habitats.

    a. Conduct an updated (within the last 2 years) general biological study of the site to determine if any sensitive species or habitat (including those mentioned above) may be potentially impacted by the proposed project. A complete assessment of sensitive fish, wildlife, reptile, and amphibian species should be included in the DEIR. Seasonal variations in use of the project area should also be addressed;

    b. If appropriate habitat for any listed species occurs on the site, including waters potentially containing any fish, have a qualified biologist conduct focused surveys according to U.S. Fish and Wildlife Service (USFWS) and/or Department protocol;

    c. Have a qualified botanist conduct a focused rare plant survey during the appropriate time of year following USFWS and/or Department protocols;

    d. The Department's California Natural Diversity Data Base in Sacramento should be contacted at (916) 327-5960 to obtain current information on any previously

reported sensitive species and habitat, including Significant Natural Areas identified under Chapter 12 of the Fish and Game Code.

e. If any listed species will potentially be impacted by the proposed project, consultation with the Department and/or the USFWS will be required to establish appropriate avoidance, minimization, and mitigation measures. An incidental take permit may be required pursuant to Fish and Game Code Section 2080 *et seq* and/or Section 7 or 10 of the Federal Endangered Species Act (ESA). Early

f. consultation with the Department is recommended, since modification of the proposed project may be required to avoid or reduce impacts to listed species. Please refer to Item 4 below for more detailed information regarding compliance with the California Endangered Species Act (CESA).

g. The Department requests that impacts to State and Federal listed species and potential avoidance, alternative and mitigation measures be addressed in the CEQA document and not solely in subsequent negotiations between the applicant and the agencies.

2. A thorough discussion of direct, indirect, and cumulative impacts expected to adversely affect biological resources, with specific measures to offset such impacts.

a. CEQA Guidelines, 15125(a), direct that knowledge of the regional setting is critical to an assessment of environmental impacts and that special emphasis should be placed on resources that are rare or unique to the region.

b. Project impacts should be analyzed relative to their effects on off-site habitats. Specifically, this should include nearby river, streams, or lakes located downstream of the project, public lands, open space, adjacent natural habitats, and riparian ecosystems. Impacts to and maintenance of wildlife corridor/movement areas, including access to undisturbed habitat in adjacent areas, should be fully evaluated and provided.

c. The zoning of areas for development projects or other uses that are nearby or adjacent to natural areas may inadvertently contribute to wildlife-human interactions. A discussion of possible conflicts and mitigation measures to reduce these conflicts should be included in the environmental document.

d. A cumulative effects analysis should be developed as described under CEQA Guidelines, 15130. General and specific plans, as well as past, present, and anticipated future projects, should be analyzed relative to their impacts on similar plant communities and wildlife habitats.

e. The DEIR should include an analysis of the effect that the project may have on completion and implementation of regional and/or subregional conservation programs. Under 2800-2840 of the Fish and Game Code, the Department, through the Natural Communities Conservation Planning (NCCP) program is coordinating

with local jurisdictions, landowners, and the Federal Government to preserve local and regional biological diversity. Coastal sage scrub is the first natural community to be planned for under the NCCP program. The Department recommends that the lead agency ensure that the development of this and other proposed projects does not preclude long-term preserve planning options and that projects conform with other requirements of the NCCP program. Jurisdictions participating in the NCCP should assess specific projects for consistency with the NCCP Conservation Guidelines.

3. A range of alternatives should be analyzed to ensure that alternatives to the proposed project are fully considered and evaluated. A range of alternatives which avoid or otherwise minimize impacts to sensitive biological resources should be included. Specific alternative locations should also be evaluated in areas with lower resource sensitivity where appropriate.

    a. Mitigation measures for project impacts to sensitive plants, animals, and habitats should emphasize evaluation and selection of alternatives which avoid or otherwise minimize project impacts. Off-site compensation for unavoidable impacts through acquisition and protection of high-quality habitat elsewhere should be addressed.

    b. The Department considers Rare Natural Communities as threatened habitats having both regional and local significance. Thus, these communities should be fully avoided and otherwise protected from project-related impacts.

    c. The Department generally does not support the use of relocation, salvage, and/or transplantation as mitigation for impacts to rare, threatened, or endangered species. Department studies have shown that these efforts are experimental in nature and largely unsuccessful.

4. A California Endangered Species Act (CESA) Incidental Take Permit must be obtained, if the project has the potential to result in "take" of species of plants or animals listed under CESA, either during construction or over the life of the project. CESA Permits are issued to conserve, protect, enhance, and restore State-listed threatened or endangered species and their habitats. Early consultation is encouraged, as significant modification to the proposed project and mitigation measures may be required in order to obtain a CESA Permit. Revisions to the Fish and Game Code, effective January 1998, require that the Department issue a separate CEQA document for the issuance of a CESA permit unless the project CEQA document addresses all project impacts to listed species and specifies a mitigation monitoring and reporting program that will meet the requirements of a CESA permit. For these reasons, the Department recommends including the following information:

    a. Biological mitigation monitoring and reporting proposals should be of sufficient detail and resolution to satisfy the requirements for a CESA Permit.

    b. A Department-approved Mitigation Agreement and Mitigation Plan are required for plants listed as rare under the Native Plant Protection Act.

5. The Department opposes the elimination of watercourses and/or their channelization or conversion to subsurface drains. All wetlands and watercourses, whether intermittent or perennial, should be retained and provided with substantial setbacks which preserve the riparian and aquatic values and maintain their value to on-site and off-site wildlife populations.

   a. Under Section 1600 *et seq* of the Fish and Game Code, the Department requires the project applicant to notify the Department of any activity that will divert, obstruct or change the natural flow or the bed, channel, or bank (which includes associated riparian resources) of a river, stream or lake, or use material from a streambed prior to the applicant's commencement of the activity. Streams include, but are not limited to, intermittent and ephemeral streams, rivers, creeks, dry washes, sloughs, blue-line streams, and watercourses with subsurface flow. The Department's issuance of a Lake and Streambed Alteration Agreement for a project that is subject to CEQA will require CEQA compliance actions by the Department as a responsible agency. The Department, as a responsible agency under CEQA, may consider the local jurisdiction's (lead agency) Negative Declaration or EIR for the project. However, if the CEQA document does not fully identify potential impacts to lakes, streams, and associated habitat (e.g. riparian and alluvial fan sage scrub habitat) and provide adequate avoidance, mitigation, monitoring and reporting commitments, additional CEQA documentation will be required prior to execution (signing) of the Streambed Alteration Agreement. In order to avoid delays or repetition of the CEQA process, potential impacts to a lake or stream, as well as avoidance and mitigation measures need to be discussed within this CEQA document. The Department recommends the following measures to avoid subsequent CEQA documentation and project delays:

      (1) Incorporate all information regarding impacts to lakes, streams and associated habitat within the DEIR. Information that needs to be included within this document includes: (a) a delineation of lakes, streams, and associated habitat that will be directly or indirectly impacted by the proposed project; (b) details on the biological resources (flora and fauna) associated with the lakes and/or streams; (c) identification of the presence or absence of sensitive plants, animals, or natural communities; (d) a discussion of environmental alternatives; (e) a discussion of avoidance measures to reduce project impacts; and (f) a discussion of potential mitigation measures required to reduce the project impacts to a level of insignificance. The applicant and lead agency should keep in mind that the State also has a policy of no net loss of wetlands.

      (2) Include in the DEIR a discussion of potential adverse impacts from any increased runoff, sedimentation, soil erosion, and/or urban pollutants on streams and watercourses on or near the project site, with mitigation measures proposed to alleviate such impacts must be included.

      (3) The Department recommends that the project applicant and/or lead agency consult with the Department to discuss potential project impacts and avoidance and mitigation measures. Early consultation with the Department

is recommended, since modification of the proposed project may be required to avoid or reduce impacts to fish and wildlife resources. Pre-project meetings are held every week at the Department's Chino Hills office. To schedule a pre-project meeting or to obtain a Streambed Alteration Agreement Notification package, please call (562) 590-5880.

Thank you for this opportunity to comment. Questions regarding this letter and further coordination on these issues should be directed to Ms. Leslie MacNair, Staff Environmental Scientist at (949) 458-1754.

Sincerely,

J Drongese

Jeff Drongesen
Senior Environmental Scientist - Supervisor
Habitat Conservation - Southwest
Region 6

cc: Jeff Newman, USFWS, Carlsbad
State Clearinghouse, Sacramento

ATTACHMENT 1

State of California
THE RESOURCES AGENCY
Department of Fish and Game
May 4, 1984

GUIDELINES FOR ASSESSING THE EFFECTS OF PROPOSED DEVELOPMENTS ON RARE AND ENDANGERED PLANTS AND PLANT COMMUNITIES

The following recommendations are intended to help those who prepare and review environmental documents determine <u>when</u> a botanical survey is needed, <u>who</u> should be considered qualified to conduct such surveys, <u>how</u> field surveys should be conducted and <u>what</u> information should be contained in the survey report.

1. Botanical surveys that are conducted to determine the environmental effects of a proposed development should be directed to all rare and endangered plants and plant communities. Rare and endangered plants are not necessarily limited to those species which have been "listed" by state and federal agencies but should include any species that, based on all available data, can be shown to be rare and/or endangered under the following definitions.

   A species, subspecies or variety of plant is "endangered" when the prospects of its survival and reproduction are in immediate jeopardy form one or more causes, including loss of habitat, change in habitat, over-exploitation, predation, competition or disease. A plant is "rare" when, although not presently threatened with extinction, the species, subspecies or variety is found in such small numbers throughout its range that it may be endangered if its environment worsens.

   Rare plant communities are those communities that are of highly limited distribution. These communities may or may not contain rare or endangered species. The most current version of the California Natural Diversity Data Base's Outline of Terrestrial Communities in California may be used as a guide to the names of communities.

2. It is appropriate to conduct a botanical field survey to determine if, or the extent that, rare plants will be affected by a proposed project when:

   a. Based on an initial biological assessment, it appears that the project may damage potential rare plant habitat;

   b. Rare plants have historically been identified on the project site, but adequate information of impact assessment is lacking; or

   c. No initial biological assessment has been conducted and it is unknown whether or not rare plants or their habitat exist on the site.

3. Botanical consultants should be selected on the basis of possession of the following qualifications (in order of importance):

   a. Experience as a botanical field investigator with experience in field sampling design and field methods;

   b. Taxonomic experience and a knowledge of plant ecology;

   c. Familiarity with the plants of the area, including rare species; and

   d. Familiarity with the appropriate state and federal statutes related to rare plants and plant collecting.

4. Field surveys should be conducted in a manner that will locate any rare or endangered species that may be present. Specifically, rare or endangered plant surveys should be:

   a. Conducted at the proper time of year when rare or endangered species are both "evident" and identifiable. Field surveys should be scheduled (1) to coincide with known flowering periods, and/or (2) during periods of

phenological development that are necessary to identify the plant species of concern.

b. Floristic in nature. "Predictive surveys" (which predict the occurrence of rare species based on the occurrence of habitat or other physical features rather than actual field inspection) should be reserved for ecological studies, not for impact assessment. Every species noted in the field should be identified to the extent necessary to determine whether it is rare or endangered.

c. Conducted in a manner that is consistent with conservation ethics. Collection of rare or suspected rare species (voucher specimens) should be made only when such actions would not jeopardize the continued existence of the population and in accordance with applicable state and federal permit regulations. Voucher specimens should be deposited at recognized public herbaria for future reference. Photography should be used to document plant identification and habitat whenever possible, but especially when the population cannot withstand collection of voucher specimens.

d. Conducted using systematic field techniques in all habitats of the site to ensure a reasonably thorough coverage of potential impact areas.

e. Well documented. When a rare or endangered plant (or rare plant community) is located, a California Native Species (or Community) Field Survey Form or equivalent written form should be completed and submitted to the Natural Diversity Data Base.

5. Reports of botanical field surveys should be included in or with environmental assessments, negative declarations, EIR's and EIS's, should contain the following information:

a. Project description, including a detailed map of the project location and study area.

b. A written description of biological setting referencing the community nomenclature used and a vegetation map.

c. Detailed description of survey methodology.

d. Dates of field surveys.

e. Results of survey (including detailed maps).

f. An assessment of potential impacts.

g. Discussion of the importance of rare plant populations with consideration of nearby populations and total species distribution.

h. Recommended mitigation measures to reduce or avoid impacts.

i. List of all species identified.

j. Copies of all California Native Species Field Survey Forms or Natural Community Field Survey Forms.

k. Name of field investigator(s).

l. References cited, persons contacted, herbaria visited, and disposition of voucher specimens.

ATTACHMENT 2

SENSITIVITY OF TOP PRIORITY RARE NATURAL COMMUNITIES IN SOUTHERN CALIFORNIA*

Sensitivity rankings are determined by the Department of Fish and Game, California Natural Diversity Data Base and based on either number of known occurrences (locations) and/or amount of habitat remaining (acreage). The three rankings used for these top priority rare natural communities are as follows:

S1. - Less than 6 known locations and/or on less than 2,000 acres of habitat remaining.

S2. - Occurs in 6-20 known locations and/or 2,000-10,000 acres of habitat remaining.

S3. - Occurs in 21-100 known locations and/or 10,000-50,000 acres of habitat remaining.

The number to the right of the decimal point after the ranking refers to the degree of threat posed to the natural community regardless of the ranking. For example:

S1.1 = very threatened
S2.2 = threatened
S3.3 = no current threats known

Sensitivity Rankings (February 1992)

Rank — Community Name

S1.1

Mojave Riparian Forest
Sonoran Cottonwood Willow Riparian
Mesquite Bosque
Elephant Tree Woodland
Crucifixion Thorn Woodland
Allthorn Woodland
Arizonan Woodland
Southern California Walnut Forest
Mainland Cherry Forest
Southern Bishop Pine Forest
Torrey Pine Forest
Desert Mountain White Fir Forest
Southern Dune Scrub
Southern Coastal Bluff Scrub
Maritime Succulent Scrub
Riversidean Alluvial Fan Sage Scrub
Southern Maritime Chaparral
Valley Needlegrass Grassland
Great Basin Grassland
Mojave Desert Grassland
Pebble Plains
Southern Sedge Bog
Cismontane AlkaliMarsh

S1.2

Southern Foredunes
Mono Pumice Flat
Southern Interior Basalt Fl. Vernal Pool

S2.1

Venturan Coastal Sage Scrub
Diegan Coastal Sage Scrub
Riversidian Upland Coastal Sage Scrub
Riversidian Desert Sage Scrub
Sagebrush Steppe
Desert Sink Scrub
Mafic Southern Mixed Chaparral
San Diego Mesa Hardpan Vernal P.
San Diego Mesa Claypan Vernal P.
Alkali Meadow
Southern Coastal Salt Marsh
Coastal Brackish Marsh
Transmontane Alkali Marsh
Coastal and Valley Freshwater Marsh
S. Arroyo Willow Riparian Forest
Southern Willow Scrub

Modoc-G. Bas. Cottonwood Willow Rip.
Modoc-Great Basin Riparian Scrub
Mojave Desert Wash Scrub
Engelmann Oak Woodland
Open Engelmann Oak Woodland
Closed Engelmann Oak Woodland
Island Ironwood Forest
Island Cherry Forest
S. Interior Cypress Forest
Bigcone Spruce-Canyon Oak Forest

S2.2

Active Coastal Dunes
Active Desert Dunes
Stab. and Part. Stab. Desert Dunes
Stab. and Part. Stab. Desert Sandfield
Mojave Mixed Steppe
Transmontane Freshwater Marsh
Coulter Pine Forest
S. California Fellfield
White Mountains Fellfield

S2.3

Bristlecone Pine Forest
Limber Pine Forest

Top Priority Rare Natural Communities
From Region Five

Code Number	Location	Few Records	Name
S1.1 Rank			
21330	Cis		Southern Dune Scrub
31200	Cis		Southern Coastal Scrub
32400	Cis		Maritime Succulent Scrub
32720	Cis		Riversidean Alluvial Fan Sage Scrub
37030	Cis	Y	Southern Maritime Chaparral
42110	Cis		Valley Needlegrass Grassland
43000	Des	Y	Great Basin Grassland
43777	Des	Y	Mojave Desert Grassland
47000	Cis		Pebble Plains
51177	Cis	Y	Southern Sedge Bog
52310	Cis		Cismontane Alkali Marsh
61700	Des		Mojave Riparian Forest
61810	Des		Sonoran Cottonwood Willow Riparian
61820	Des		Mesquite Bosque
75100	Des	Y	Elephant Tree Woodland
75200	Des	Y	Crucifixion Thorn Woodland
75300	Des	Y	Allthorn Woodland
75400	Des	Y	Arizonan Woodland
81600	Cis		Southern California Walnut Forest
81820	Cis	Y	Mainland Cherry Forest
83122	Cis	Y	Southern Bishop Pine Forest
83140	Cis		Torrey Pine Forest
85330	Des	Y	Desert Mountain White Fir Forest
S1.2 Rank:			
21230	Cis		Southern Foredunes
35410	Des		Mono Pumice Flat
44310	Cis		Southern Interior Basalt Fl. Vernal Pool
S2.1 Rank:			
32300	Cis	Y	Venturan Coastal Sage Scrub
32500	Cis		Diegan Coastal Sage Scrub
32710	Cis	Y	Riversidian Upland Coastal Sage Scr.
32730	Cis	Y	Riversidian Desert Sage Scrub
35300	Des	Y	Sagebrush Steppe
35120	Des	Y	Desert Sink Scrub
37122	Cis	Y	Mafic Southern Mixed Chaparral
44321	Cis		San Diego Mesa Hardpan Vernal P.
44322	Cis		San Diego Mesa Claypan Vernal P.
45310	Des		Alkali Meadow
52120	Cis		Southern Coastal Salt Marsh
52320	Cis		Coastal Brackish Marsh
52410	Des		Transmontane Alkali Marsh

Coded as either cis (for cismontane) or des (for desert)

NDDB rare communities R-5 Feb. 1992

Code Number	Location	Few Records	Name
52410	Cis		Coastal and Valley Freshwater Marsh
61320	Cis		S. Arroyo Willow Riparian Forest
63320	Cis		Southern Willow Scrub
61610	Des		Modoc-G Bas Cottonwood Willow Rip.
63600	Des	Y	Modoc-Great Basin Riparian Scrub
63700	Des	Y	Mojave Desert Wash Scrub
71180	Cis	Y	Engelmann Oak Wood
71181	Cis	Y	Open Engelmann Oak Wood
71182	Cis	Y	Closed Engelmann Oak Woodland
71190	Cis	Y	Island Oak Woodland
71210	Cis		California Walnut Woodland
81700	Cis	Y	Island Ironwood Forest
81810	Cis		Island Cherry Forest
83230	Cis		S. Interior Cypress Forest
84150	Cis	Y	Bigcone Spruce-Canyon Oak Forest
S2.2 Rank:			
21100	Cis	Y	Active Coastal Dunes
22100	Des		Active Desert Dunes
22200	Des		Stab. and Part Stab. Desert Dunes
22300	Des	Y	Stab. and Part Stab. Desert Sandfield
34220	Des	Y	Mojave Mixed Steppe
52420	Des	Y	Transmontane Freshwater Marsh
84140	Cis	Y	Coulter Pine Forest
81130	Cis	Y	S. California Fellfield
81140	Des	Y	White Mountains Fellfield
S2.3 Rank:			
86400	Des		Bristlecone Pine Forest
86700	Des	Y	Limber Pine Forest

ELEMENT RANKING

GLOBAL RANKING

The *global rank* (G-rank) is a reflection of the overall condition of an element throughout its global range.

SPECIES OR NATURAL COMMUNITY LEVEL

G1 = Less than 6 viable element occurrences (EOs) OR less than 1,000 individuals OR less than 2,000 acres.
G2 = 6-20 EOs OR 1,000-3,000 individuals OR 2,000-10,000 acres.
G3 = 21-100 EOs OR 3,000-10,000 individuals OR 10,000-50,000 acres.
G4 = Apparently secure; this rank is clearly lower than G3 but factors exist to cause some concern; i.e., there is some threat, or somewhat narrow habitat.
G5 = Population or stand demonstrably secure to ineradicable due to being commonly found in the world.

SUBSPECIES LEVEL

Subspecies receive a T-rank attached to the G-rank. With the subspecies, the G-rank reflects the condition of the entire species, whereas the T-rank reflects the global situation of just the subspecies or variety.
For example: *Chorizanthe robusta* var. *hartwegii*. This plant is ranked G2T1. The G-rank refers to the whole species range i.e., *Chorizanthe robusta*. The T-rank refers only to the global condition of var. *hartwegii*.

STATE RANKING

The *state rank* (S-rank) is assigned much the same way as the global rank, except state ranks in California often also contain a threat designation attached to the S-rank.

S1 = Less than 6 EOs OR less than 1,000 individuals OR less than 2,000 acres
    S1.1 = very threatened
    S1.2 = threatened
    S1.3 = no current threats known
S2 = 6-20 EOs OR 1,000-3,000 individuals OR 2,000-10,000 acres
    S2.1 = very threatened
    S2.2 = threatened
    S2.3 = no current threats known
S3 = 21-100 EOs or 3,000-10,000 individuals OR 10,000-50,000 acres
    S3.1 = very threatened
    S3.2 = threatened
    S3.3 = no current threats known
S4 = Apparently secure within California; this rank is clearly lower than S3 but factors exist to cause some concern; i.e. there is some threat, or somewhat narrow habitat. NO THREAT RANK.

S5 = Demonstrably secure to ineradicable in California. NO THREAT RANK.

Notes:

1. Other considerations used when ranking a species or natural community include the pattern of distribution of the element on the landscape, fragmentation of the population/stands, and historical extent as compared to its modern range. It is important to take a **bird's eye or aerial view** when ranking sensitive elements rather than simply counting EOs.

2. Uncertainty about the rank of an element is expressed in two major ways:

   By expressing the rank as a range of values: e.g., S2S3 means the rank is somewhere between S2 and S3.

   By adding a **?** to the rank: e.g., S2? This represents more certainty than S2S3, but less than S2.

3. Other symbols

GH	All sites are historical; the element has not been seen for at least 20 years, but suitable habitat still exists (SH = All California sites are historical).
GX	All sites are extirpated; this element is extinct in the wild (SX = All California sites are extirpated).
GXC	Extinct in the wild; exists in cultivation.
G1Q	The element is very rare, but there are taxonomic questions associated with it.

STATE OF CALIFORNIA—BUSINESS, TRANSPORTATION AND HOUSING AGENCY GRAY DAVIS, Governor

DEPARTMENT OF TRANSPORTATION
DISTRICT 8
464 W Fourth Street, 6th Floor MS 726
San Bernardino, CA 92401-1400
PHONE (909) 383-6327
FAX (909) 383-6890

January 15, 2002

08-Riv-215-40.336/41.488
SCH # 1990020114

Ms. Juanita W. Bullock AICP, ASLA
Capital and Physical Planning
University of California
3637 Canyon Crest Drive, F-101
Riverside, CA 92507

Dear Ms Bullock:

Notice of Preparation of a Draft Environmental Impact Report, University of California, Riverside 2002 Long Range Development Plan, Ms. Juanita Bullock, Applicant

We have received the above referenced notice related to the University's 2002 Long Range Development Plan (LRDP). This 2002 LRDP is intended to serve as an update to the 1990 LRDP previously adopted by the University Regents. The corresponding Draft EIR is being prepared to address newly identified impacts affecting this campus. Located at the eastern end of the City of Riverside, this university campus immediately abuts a one-mile segment of the Interstate-215/State Route 60 corridor.

The proposed UCR 2000 LRDP estimates an increased student population of 25,000 total students by year 2015. An additional 8 million square feet (gross) of new buildings, support facilities and housing facilities are anticipated to support this future enrollment.

We believe this projected growth will result in potentially significant impacts to the existing State transportation facilities. In particular, with regard to drainage runoff and increased traffic volumes along the I-215/SR60 right-of-way.

To address traffic impacts associated with this projected increase in student enrollment, we recommend updating the previously approved 1990 LRDP/EIR traffic analysis to reflect the higher traffic volumes now anticipated. This revised analysis should be consistent with the recently developed Caltrans Guide for the Preparation of Traffic Impact Studies, dated January 2001. Copies of this guide may be made available upon request.

As for other environmental issues, our Environmental Studies Branch has the following questions and comments:

1. NOP, Page 1, Project Location: The west side is developed as agricultural fields is not considered largely undeveloped.
2. Environmental Checklist, Page 4, Surrounding land uses and environmental setting: Will the UCR Specific Plan be updated as a result of LRDP?

3. Environmental Checklist, Page 14, Section 4d: The City of Riverside has designated Quail Run open space as a wildlife corridor and connectivity from Box Springs Canyon Park and should be analyzed in the EIR (see Dr. Len Nunny, Conservation Biology, UCR). The EIR should also discuss invasive species (EO 13112).
4. Environmental Checklist, Page 25, Section 9: Will the LDRP conform to UCR Specific Plan?

When available, please forward copies of the Draft EIR for the 2002 LRDP to us for further review and comment.

Thank you for providing us this Notice of Preparation and the opportunity to offer our preliminary comments. If you have any questions regarding this letter, or require other information, please contact Mr. Kee T. Ooi at (909) 383-4149 for assistance.

Sincerely,

Original signed by Linda Grimes

LINDA GRIMES, Chief
Office of Forecasting/IGR-CEQA Review
Transportation Planning Division

cc: A. Colburn, Environmental Planning
S. Morgan, State Clearinghouse

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Mary V. Price
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and

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Juanita W. Bullock, AICP, ASLA, Campus Physical Planner
University of California, Riverside
Capital and Physical Planning
3637 Canyon Crest Drive, F-101
Riverside, California 92507

12 January 2002

Dear Ms Bullock,

I thank you for providing the opportunity to participate in the scoping process for UCR's 2002 LRDP (I attended the neighborhood meeting on 8 January 2002). Since 1979 I have been a member of the UCR faculty and a homeowner in the neighborhood northeast of UCR. I 'commute' to work by foot or bicycle virtually all the time. The proposed massive scale and rate of campus growth have great potential to destroy the unique aspects of UCR that have made me enjoy living in Riverside and proud to be a member of the UCR community. I urge that the following issues be addressed in the EIR and more broadly in the planning process.

1) Virtually all of the potentially detrimental impacts of growth to the quality of UCR's programs and to its internal and the regional community and environment are exacerbated by the pace and total amount of growth. *I urge UCR to carefully evaluate projected goals for growth, and to consider planning for smaller eventual size or slower or phased growth to ensure that quality is maintained.* Many important things cannot be restored once they are destroyed.

2) *Do not plan in a piecemeal fashion.* The quality of UCR's programs depends on the quality and sense of community of its people – students, faculty, and staff – as well as on the physical plant. EIR checklists tend to focus thinking on individual components of environmental issues. It is important to transcend this piecemeal thinking, and to evaluate the cumulative impact of individual planning decisions on the critical assessment variable: UCR's ability to attract talented people (students and staff alike) and to foster commitment of their creative energy to furthering UCR's programs. Quality-of-life and quality-of-community issues (including the broader Riverside community) are central here.

3) The UCR community extends beyond the limits of the campus proper. UCR personnel live off as well as on campus, their children attend local schools, they recreate off as well as on campus, they travel off-campus, and they shop and use services off campus. Hence, quality-of-life issues integrally involve the neighborhoods in the vicinity

of UCR. *Do not limit planning to the area of the campus proper; explicitly consider off-site opportunities and needs for mitigating effects of growth on UCR's community.*

4) *Please assess the effects of growth on the need for and use of recreational opportunities outside of developed recreational facilities on the campus.* Include forms of recreation in undeveloped wildland parks, such as Box Springs or Sycamore Canyon parks. How will the increased use of these lands by UCR people impact these parks? For example, how does the frequency of wildfire vary with the intensity of human recreational use?

5) At present the UCR campus, with its "park-like" open space, provides a very important recreational resource for UCR people as well as the local neighborhood. Not only do people regularly walk or jog around campus, but they also utilize the open spaces in the married student housing and the undeveloped lands at the northeast edge of campus for recreational purposes. *Please assess carefully the impacts of loss of campus open spaces on open-space-dependent recreational opportunities in the vicinity of UCR.* Please think creatively about how this loss might be mitigated by creating new parks or improving existing parks in the neighborhoods around UCR (there aren't many!), and by designing biking or walking routes through the campus. Also please assess the impact of the character of UCR's boundaries (i.e., open and green, vs. bounded by huge obstructing buildings) on how welcoming the campus seems to the Riverside community. Finally, please evaluate and mitigate the detrimental impacts of off-site flood control retention basins on off-campus recreation.

6) *Please assess impacts of growth on traffic patterns around UCR and on-campus, and plan creatively to foster safe pedestrian and bicycle travel both in the vicinity of campus, and on campus itself.* UCR will never be successful in implenting an effective alternative transportation program unless this is done.

UCR's record to date is not particularly good in this regard. For example, many people in neighborhoods to the northeast of campus walk or bicycle to campus by a route that goes through the Blaine-Watkins intersection. The most direct route from there to the center of campus is through married student housing, along Aberdeen Drive, and then to the intersection with north campus drive. One used to be able to walk or bicycle straight south from this intersection to the central mall of campus. Bourns Hall now blocks that traffic, and people (students and commuters alike) have to go around it, either negotiating parking lot 19 (and loading areas for Bourns, Geology, and Physics) to the east or steep steps to the west of Bourns. In a similar fashion, the new Science library has made it far harder and more dangerous for a cyclist entering campus from Big Springs Road. There used to be a gentle uphill path that went directly from the intersection of Big Springs and Campus Drive into campus. Now a cyclist must negotiate a complex zig-zag route through the congestion at the library entrance. And I won't even mention the horror of the extremely dangerous freeway underpass at the Martin Luther King entrance to campus.

Similarly, while the new stop signs along Watkins do a good job of slowing traffic there, at the same time a lane for parking was added to this popular cycle route, thus increasing the hazard of crashing into a suddenly opened car door.

And finally, getting around campus, and particularly getting from east to west sides of the freeway on a bicycle is a challenge, to say the least. Planning for efficient circulation within campus, and planning for a cycle-friendly campus, needs to be done.

7) *Please assess, and mitigate, the real impacts that campus growth will have on biological resources and wildlife movement corridors.* Coastal sage scrub (CSS) habitat both in the Box Springs and on Coyote Hill and the botanical garden on campus is a highly threatened habitat type in California. Loss of CSS has prompted listing of a number of species as threatened, endangered, or species of special concern by the Federal government or the State of California. Currently undeveloped lands on campus contain habitat that is home to a number of these species. I am familiar with several small mammal species of state concern, including: San Diego pocket mouse *(Chaetodipus fallax fallax)*, Los Angeles pocket mouse (*Perognathus longimembris brevinasus*), San Diego desert woodrat (*Neotoma lepida intermedia*). It is well understood that effective conservation of threatened species depends on preserving habitat area, maintaining habitat quality, and preserving corridors among habitat fragments. The latter two are related, because often habitat quality is affected by the entire community of wildlife species that occur on an area. Coyotes, for example, indirectly help mouse populations by preying on domestic cats and foxes that are more effective mouse predators than are coyotes.

There is currently a wildlife corridor known to be used by carnivores from the Box Springs Mountains, across Watkins Drive, onto the natural areas and the botanic garden area of campus. And culverts under the freeway connect all of this to Sycamore Canyon Park. *I urge UCR to preserve existing coastal sage scrub habitat on campus and to make every effort to maintain its quality by keeping open and improving the existing wildlife movement corridor. Not only is such habitat a biological resource, but it also is an important educational resourcefor ucr students in environmental sciences and conservation biology.*

8) UCR is unique among UC campuses in having nearby suburban neighborhoods with housing that is affordable for staff, faculty, and student groups. This has added greatly to UCR's strong sense of community and represents an important resource for the campus community. *Please analyse the effects of growth on housing economics and quality-of-life in these important resources for the campus.* Analyse impacts on traffic, parking, noise, glare, and safety. Consider ways in which upgrading the two small shopping areas on Blaine and Watkins/Big Springs road (including promoting a grocery store) could help to revitalize these areas and improve student life in dormitories on campus.

Thank you once again for this opportunity to participate in the scoping process.

Sincerely,

Mary V Price

Mary V. Price
Professor of Biology

To: Mary Price <mary.price@ucr.edu>
From: Nita Bullock <nita.bullock@ucr.edu>
Subject: Re: UCR 2002 LRDP scoping
Cc:
Bcc:
Attached:

Thank you for your comments. I will enter them into the record.

At 01:59 PM 1/13/02 -0800, you wrote:

> Dear Ms Bullock,
>
> Please accept the attached scoping comments for UCR's 2002 LRDP scoping process. It is in microsoft word format; I am also sending a hard copy via campus mail.
>
> Sincerely,
> Mary Price
>
> ***
>
> Mary V. Price
> Department of Biology
> University of California
> Riverside, CA 92521
>
> mary.price@ucr.edu
> Office: (909) 787-3292
> Fax: (909) 787-4286
> http://cnas.ucr.edu/~bio/faculty/Price.html
>
> ***

Mary V. Price
2540 Thayer Court
Riverside, CA 92507
(909) 686-5436

and

Department of Biology
University of California
Riverside CA 92521
(909) 787-3292

Juanita W. Bullock, AICP, ASLA, Campus Physical Planner
University of California, Riverside
Capital and Physical Planning
3637 Canyon Crest Drive, F-101
Riverside, California 92507

12 January 2002

Dear Ms Bullock,

I thank you for providing the opportunity to participate in the scoping process for UCR's 2002 LRDP (I attended the neighborhood meeting on 8 January 2002). Since 1979 I have been a member of the UCR faculty and a homeowner in the neighborhood northeast of UCR. I 'commute' to work by foot or bicycle virtually all the time. The proposed massive scale and rate of campus growth have great potential to destroy the unique aspects of UCR that have made me enjoy living in Riverside and proud to be a member of the UCR community. I urge that the following issues be addressed in the EIR and more broadly in the planning process.

1) Virtually all of the potentially detrimental impacts of growth to the quality of UCR's programs and to its internal and the regional community and environment are excacerbated by the pace and total amount of growth. *I urge UCR to carefully evaluate projected goals for growth, and to consider planning for smaller eventual size or slower or phased growth to ensure that quality is maintained.* Many important things cannot be restored once they are destroyed.

2) *Do not plan in a piecemeal fashion.* The quality of UCR's programs depends on the quality and sense of community of its people – students, faculty, and staff – as well as on the physical plant. EIR checklists tend to focus thinking on individual components of environmental issues. It is important to transcend this piecemeal thinking, and to evaluate the cumulative impact of individual planning decisions on the critical assessment variable: UCR's ability to attract talented people (students and staff alike) and to foster commitment of their creative energy to furthering UCR's programs. Quality-of-life and quality-of-community issues (including the broader Riverside community) are central here.

3) The UCR community extends beyond the limits of the campus proper. UCR personnel live off as well as on campus, their children attend local schools, they recreate off as well as on campus, they travel off-campus, and they shop and use services off campus. Hence, quality-of-life issues integrally involve the neighborhoods in the vicinity

of UCR. *Do not limit planning to the area of the campus proper; explicitly consider off-site opportunities and needs for mitigating effects of growth on UCR's community.*

4) *Please assess the effects of growth on the need for and use of recreational opportunities outside of developed recreational facilities on the campus.* Include forms of recreation in undeveloped wildland parks, such as Box Springs or Sycamore Canyon parks. How will the increased use of these lands by UCR people impact these parks? For example, how does the frequency of wildfire vary with the intensity of human recreational use?

5) At present the UCR campus, with its "park-like" open space, provides a very important recreational resource for UCR people as well as the local neighborhood. Not only do people regularly walk or jog around campus, but they also utilize the open spaces in the married student housing and the undeveloped lands at the northeast edge of campus for recreational purposes. *Please assess carefully the impacts of loss of campus open spaces on open-space-dependent recreational opportunities in the vicinity of UCR.* Please think creatively about how this loss might be mitigated by creating new parks or improving existing parks in the neighborhoods around UCR (there aren't many!), and by designing biking or walking routes through the campus. Also please assess the impact of the character of UCR's boundaries (i.e., open and green, vs. bounded by huge obstructing buildings) on how welcoming the campus seems to the Riverside community. Finally, please evaluate and mitigate the detrimental impacts of off-site flood control retention basins on off-campus recreation.

6) *Please assess impacts of growth on traffic patterns around UCR and on-campus, and plan creatively to foster safe pedestrian and bicycle travel both in the vicinity of campus, and on campus itself.* UCR will never be successful in implenting an effective alternative transportation program unless this is done.

UCR's record to date is not particularly good in this regard. For example, many people in neighborhoods to the northeast of campus walk or bicycle to campus by a route that goes through the Blaine-Watkins intersection. The most direct route from there to the center of campus is through married student housing, along Aberdeen Drive, and then to the intersection with north campus drive. One used to be able to walk or bicycle straight south from this intersection to the central mall of campus. Bourns Hall now blocks that traffic, and people (students and commuters alike) have to go around it, either negotiating parking lot 19 (and loading areas for Bourns, Geology, and Physics) to the east or steep steps to the west of Bourns. In a similar fashion, the new Science library has made it far harder and more dangerous for a cyclist entering campus from Big Springs Road. There used to be a gentle uphill path that went directly from the intersection of Big Springs and Campus Drive into campus. Now a cyclist must negotiate a complex zig-zag route through the congestion at the library entrance. And I won't even mention the horror of the extremely dangerous freeway underpass at the Martin Luther King entrance to campus.

Similarly, while the new stop signs along Watkins do a good job of slowing traffic there, at the same time a lane for parking was added to this popular cycle route, thus increasing the hazard of crashing into a suddenly opened car door.

And finally, getting around campus, and particularly getting from east to west sides of the freeway on a bicycle is a challenge, to say the least. Planning for efficient circulation within campus, and planning for a cycle-friendly campus, needs to be done.

7) *Please assess, and mitigate, the real impacts that campus growth will have on biological resources and wildlife movement corridors.* Coastal sage scrub (CSS) habitat both in the Box Springs and on Coyote Hill and the botanical garden on campus is a highly threatened habitat type in California. Loss of CSS has prompted listing of a number of species as threatened, endangered, or species of special concern by the Federal government or the State of California. Currently undeveloped lands on campus contain habitat that is home to a number of these species. I am familiar with several small mammal species of state concern, including: San Diego pocket mouse *(Chaetodipus fallax fallax*), Los Angeles pocket mouse (*Perognathus longimembris brevinasus*), San Diego desert woodrat (*Neotoma lepida intermedia*). It is well understood that effective conservation of threatened species depends on preserving habitat area, maintaining habitat quality, and preserving corridors among habitat fragments. The latter two are related, because often habitat quality is affected by the entire community of wildlife species that occur on an area. Coyotes, for example, indirectly help mouse populations by preying on domestic cats and foxes that are more effective mouse predators than are coyotes.

There is currently a wildlife corridor known to be used by carnivores from the Box Springs Mountains, across Watkins Drive, onto the natural areas and the botanic garden area of campus. And culverts under the freeway connect all of this to Sycamore Canyon Park. *I urge UCR to preserve existing coastal sage scrub habitat on campus and to make every effort to maintain its quality by keeping open and improving the existing wildlife movement corridor. Not only is such habitat a biological resource, but it also is an important educational resourcefor ucr students in environmental sciences and conservation biology.*

8) UCR is unique among UC campuses in having nearby suburban neighborhoods with housing that is affordable for staff, faculty, and student groups. This has added greatly to UCR's strong sense of community and represents an important resource for the campus community. *Please analyse the effects of growth on housing economics and quality-of-life in these important resources for the campus.* Analyse impacts on traffic, parking, noise, glare, and safety. Consider ways in which upgrading the two small shopping areas on Blaine and Watkins/Big Springs road (including promoting a grocery store) could help to revitalize these areas and improve student life in dormitories on campus.

Thank you once again for this opportunity to participate in the scoping process.

Sincerely,

Mary V. Price
Professor of Biology

To: Marek Chrobak <marek@cs.ucr.edu>
From: Nita Bullock <nita.bullock@ucr.edu>
Subject: Re: comments for EIR for LRDP
Cc:
Bcc:
Attached:

Thank you for your comments. I will enter them into the record.

At 05:36 PM 1/11/02 -0800, you wrote:

> Hello. I've heard that you are the person to whom we can send comments for issues to be addressed in the EIR for LRDP.
>
> Here are my comments.
>
> I find UCR to be one of the most bicycle-hostile campuses I have ever been to. This is quite ironic, given that in our climate cycling is viable year round.
>
> In particular, there is no safe way to enter or leave the campus in the downtown direction. Leaving the campus via the University Avenue, we have the exit from Fwy 60, with cars going 30-40 mph on the exit ramp merging into the traffic on University. Entering the campus is not much better, since cyclists need to cross left into the bike lane, while the cars going towards the freeway entrance change into the leftmost lane.
>
> The Canyon Crest Drive entrance is extremely dangerous, especially when entering the campus. Here, there is no bike lane. It's a little better now than before thanks to speed bumps, but the traffic there is still fast and there is no room for cyclists.
>
> The ideal solution would be a network of designated bicycle paths (these can be also used by pedestrians, roller-skaters, etc). In addition to commuting, these paths would also be useful for recreation (especially if they can be create a connection downtown, or to the underutilized river-bottom bike path near Mt. Rubidoux.)
>
> Marek Chrobak
>
> \---
>
> Marek Chrobak marek@cs.ucr.edu
> Department of Computer Science and Engineering (909)787-3769

University of California, Riverside, CA 92521   fax (909)787-4643

2540 Thayer Court
Riverside CA 92521
January 14, 2002

Juanita W. Bullock AICP, ASLA
UCR Campus Physical Planner
Capital and Physical Planning
3637 Canyon Crest Drive, F-101
Riverside, CA 92507

Dear Ms. Bullock

I would like to add some comments to the 2002 Long Range Development Plan for UCR.

Since I arrived at UCR in 1979, I have worked myself up the faculty ranks to Full Professor Step V. I have seen a lot of change at UCR in nearly 25 years, some for the better and some not. In short: change and growth are not automatically good, and will not automatically make UCR more "vibrant", to use the term one commonly hears from our Administration.

To make UCR truly more vibrant, the LRDP process must be creative and bold in some ways while being properly cautious in others. Otherwise we will end up with a larger campus but with a diminished community, with lower morale in students, staff and faculty, and lower quality of life.

The first question in planning at this point should be to ask whether further growth in the size of the campus community is actually in UCR's best interest. This best interest is balanced against others, such as UC's obligation to teach future generations of students, but we should alsways be asking where the balance lies. rather than assuming that growth to a very large "buildout" point of 25,000 students is a given.

Insofar as we face at least some period of further growth in the coming years, I want to raise a few specific issues that have not been at all satisfactorily included in growth to date.

(1) *Establishment of a campus that is friendly to alternative transportation.* I personally use alternative transportation by walking or bicycling to campus from its northeast side. My route takes me through the intersection of Blaine St. and Watkins Drive, which is a very dangerous one. Next comes a series of makeshift routes around obstacles on campus, such as married student housing and the Bournes Engineering building. Some of these obstacles are new; for example Bournes was built with absolutely no provision for the bicycle and walking path it replaced. The situation is as bad or worse when one approaches campus from other directions. **Hence I urge the LRDP to reverse this unfortunate trend and to immediately add explicit planning for alternative transportation onto and through campus to future projects, and to retroactively**

identify logical existing routes of travel and create adequate bicycle and walking paths, and other amenities, to improve those routes.

(2) *Encouragement of a "college town" atmosphere around the campus.* I've had the luck to work in the past at some truly vibrant university campuses. One feature that kept students, faculty and staff on campus more, and allowed them to mingle more, was the presence of more opportunities for relaxing and carrying out the normal tasks of the day close by or on campus, i.e., the presence of coffee shops, cafes, small stores, and other businesses. In contrast the main part of the UCR campus is bordered by a freeway on one side and by moribund or semi-moribund business locations on the other sides. The University Village and other projects on University Avenue are not enough to change this. **I urge the LRDP to "think outside the envelope" and to look beyond the campus proper. UCR needs to team with the City or with other entities to seize opportunites to foster an immediate surrounding for the campus that is attractive, stimulating and varied. Surely for example the University and its allies could find ways to rejuvenate the largely vacant shopping center near Blaine and Watkins, and to revitalize the one on Watkins and Big Springs. With proper incentives these areas could be repopulated with businesses that serve many needs of the campus community and reflect its diversity**.

(3) *Encouragement of other improvements in areas near to campus.* An expanded campus community will need expanded opportunities of other kinds off campus. For example, there are good potential opportunities for students and others to enjoy outdoor recreation in the areas near campus, but the potential needs to be better realized. **Hence I urge the LRDP to include a plan for UCR to collaborate with the City and County to expand and improve urban and wildland parks near the campus, and their amenities. New urban parks can be created. Dedicated paths for hikers, runners and mountain bikers can be developed and maintained**.

In short, the impact of UCR does not stop at its campus boundaries, and the vision of this planning process should not either. I urge you to take this opportunity to plan inclusively, in cooperation with the University's surroundings. Without this we will have a larger campus community, but not a well-functioning or vibrant one.

Sincerely,

Nickolas M. Waser
Professor of Biology

To: LetitiaPepper@cs.com
From: Nita Bullock <nita.bullock@ucr.edu>
Subject: Re: January 8 scoping meeting announcement
Cc: Mark Horne <mhorne@EIPAssociates.com>
Bcc: Charlotte Strem <Charlotte.Strem@ucop.edu>, tricia Thrasher <Tricia@ucrac1.ucr.edu>
Attached:

This is a scoping meeting for the proposed EIR which has not been drafted at this point. Still collecting information. The scoping meeting will take comment and concerns on the Initial Study and pending EIR. It is anticipated that the draft LRDP and draft EIR will be ready for public review sometime in April or May.

At 12:50 AM 1/5/02 -0500, you wrote:

> Hi Nita,
>
> I got this announcement about the scoping meeting. I have a question.
>
> I've heard that by law, a scoping meeting is now (as of January 1, 2002) required before the preparation of an EIR. Yet it seems like the EIR has already been prepared, because this message is soliciting comments on the proposed EIR at the January 8 meeting.
>
> So -- I think either the meeting should be for comments on the EIR, or it should be a scoping meeting for comments to be incorporated into the preparation of the EIR. Which is it?
>
> Thanks -- and I'll share your response with the UCRNA e-mail list.

To: LetitiaPepper@cs.com
From: Nita Bullock <nita.bullock@ucr.edu>
Subject: Re: Additional comments re scope of EIR
Cc:
Bcc: Mark Horne <mhorne@EIPAssociates.com>, MOuellette@bbklaw.com, TEAntonucci@bbklaw.com
Attached:

Please send me a copy of the comment letter with the handwritten notes - all the copies were taken at the meeting. You didn't indicate that the copy you handed me at the meeting was different then the copy you sent via e-mail so it wound up being taken as well.

At 10:51 AM 1/11/02 -0500, you wrote:

Juanita Bullock, Campus Physical Planner
UCR, Capital and Physical Planning
3637 Canyon Crest Drive, F-101
Riverside, CA 92507
By E-mail

January 11, 2002

Re: More Comments on the Initial Study for the UC Riverside 2002 Long Range Development Plan (UCR 2002 LRDP)

Dear Ms. Bullock:

Here are some additional comments on the UCR 2002 LRDP, which occurred to me after the January 8 scoping meeting and the comments made at it.

According to Mark Horne, UCR is not required to engage in such a large and rapid growth spurt; rather, this is something that was up to the discretion of each campus's administration. Thus, for example, according to Mr. Horne, UC Santa Barbara decided not to add any additional student population when asked by the Regents to consider the issue of growth.

Therefore, I'm interested to know the basis or rationale, if any, upon which UCRâ ™s administration decided to engage in the particular amount and speed of growth on which the 2002 LRDP is based.

Also, Iâ ™d like to see the EIR include, as alternatives, a few models showing a project with less growth and growth at a slower pace.

Also, at the scoping meeting Mr. Horne mentioned that the city is looking at using redevelopment to create housing for students. The EIR should show an alternative in which the city doesn't come up with redevelopment as an answer to UCRâ ™s growth. Courts are beginning to get stricter about the use of redevelopment as a way to handle things that aren't really blight. I

don't know if UCR can count on any and all redevelopment projects to be feasible; so, how will it handle the housing issue if 100 percent of any redevelopment projects proposed by the City are not legally feasible?

Also, please note that the hard copy of my January 8 comments, which I gave you at the January 8 meeting, had some handwritten notations that are not on the copy I sent by e-mail.

Sincerely,

Letitia Pepper
503 Highlander Drive
Riverside, CA 92507-3131

From: LetitiaPepper@cs.com
X-PH: V4.4@blue
Date: Sat, 12 Jan 2002 01:07:04 EST
Subject: Re: Additional comments re scope of EIR
To: nita.bullock@ucr.edu
X-Mailer: CompuServe 2000 32-bit sub 107

Too bad. The reason I handed you your own copy was so you would have one before people took the rest. Actually, there were several left at the end.
When I make changes to the copy on my computer, I'll sned you one with a comment that it has no same changes in it as in the one I gave you at the meeting.
I'll send you yet a third letter with more comments in a few minutes.

To: LetitiaPepper@cs.com
From: Nita Bullock <nita.bullock@ucr.edu>
Subject: Re: Third letter with comments re scope of UCR's 2002 LRDP
Cc:
Bcc:
Attached:

I will enter your comments into the record.

At 01:20 AM 1/12/02 -0500, you wrote:

Juanita Bullock, Senior Physical Planner
UCR

January 11, 2001
By E-mail

Re: Further Additional Comments re Scope of UCR's 2002 LRDP
(third letter with comments)

Dear Ms. Bullock:

After attending the scooping meeting on January 8, 2002, and hearing the comments by yourself and Mr. Horne, I've thought of some additional areas on which the EIR should touch.

First, it was stated the UCR's LRDP (prepared in about 1990) planned for further expansion westward, not eastward. According to Mr. Horne, however, the campus has ignored that plan, because everyone wanted to "stay with the Mother Ship," which necessitates doing infill building on the east side of campus.

If the original LRDP called for westward, not eastward, expansion, it seems odd that a mere desire by staff to "stay with the Mother Ship," would have derailed a carefully researched, discussed, and planned LRDP, complete with all that environmental work. In addition, UCR has expanded, and is still planning to expand, to the west, as witness the University Village project, the International Village, the extension offices, and the planned downtown arts building, all of which are to the west of the existing campus. Furthermore, according to yourself and Mr. Horne, the City of Riverside is looking at entering into redevelopment projects to house student to the west of campus, between the main campus and downtown.

Given these westward projections away from the main campus, I think the EIR should discuss as an alternative to the apparent infill plan simply following the westward concept of the 1990 LRDP.

Another issue raised was the "phantom stadium" issue. It was stated that there had been discussion of a stadium on UCR property, at Chicago and Martin Luther King, but for various reasons that stadium is not a viable project at present. However, things do change, sometimes rather quickly. And there have actually been one or more articles in the paper about UCR's desire to attract sports teams to this area for training seasons -- which would require a location for a training facility. I think an ice-skating rink was even on the table at one point.

With this in mind, it seems to me that any long-range EIR that is going to be the basis for subsequent project level EIRs should identify and consider the environmental impact of the potential areas where a stadium, training program, rink or similar, non-curricular project might be located. I think this is particularly so, given the fact that the stadium plan is real enough to have caused the City's head librarian to question whether the city can locate a library in that same area.

Also, my sports aficionado friends tell me that a Division One school MUST have a stadium. Of course, UCR just recently became a Division One school. Is it possible that there are no plans, even conceptual in nature, for a stadium of some kind? If there are, they should be included in the 2002 LRDP, and, of course, in the EIR for the 2002 LRDP. A stadium would have significant impacts on the environment in terms of obvious things like traffic, parking, light pollution, air pollution, and, depending on is location, loss of agricultural land or other open space. Furthermore, the impact of all these items should be considered now, when the EIR for the 2002 LRDP is looking at the cumulative impact of the planned future growth of UCR.

Therefore, in terms of the proposed EIR's scope, I ask that it include a consideration and discussion of the feasibility of the original plan, that did not require infill, as well as a discussion and consideration of such long-range potential projects as a stadium, training program, rink or similar, non-curricular project and such amenities' potential locations, as well as the cumulative impact of such facilities in addition to the other planned aspects of the proposed growth.

Sincerely,

Letitia Pepper
503 Highlander Drive
Riverside, CA 92507-3131

Juanita Bullock, Campus Physical Planner
UCR
Capital and Physical Planning
3637 Canyon Crest Drive, F-101
Riverside, CA 92507
BY HAND DELIVERY

January 14, 2002

Re: Copies of comments on the Initial Study for the UCR 2002 Long Range Development Plan (UCR 2002 LRDP)

Dear Ms. Bullock:

I am hand-delivering to your office copies of the following letters from me, most of which were already sent to you by e-mail. I attempted to send you the corrected version of the January 8, 2002 letter by e-mail but was unable to either on the 13th or this morning, the 14th, although I was able to send messages by e-mail to other people.[1] I mention this because perhaps other people were unable to reach you by e-mail yesterday and today.

They are:

(1) an 8-page long letter dated January 8, 2002

(2) a two-page letter entitled "Further Additional Comments, etc."

(3) a one-page letter entitled "More Comments, etc."

Sincerely,

Letitia Pepper

Letitia Pepper
503 Highlander Drive
Riverside, CA 92507-3131

---

[1] The inability to send these documents by e-mail was accompanied by the following message: "A request to the host has taken longer than expected. Please select Okay to acknowledge this message. If the problem continues, be select Go: System Response to Report the problem."

Juanita Bullock, Campus Physical Planner
UCR
Capital and Physical Planning
3637 Canyon Crest Drive, F-101
Riverside, CA 92507

January 8, 2002

Re: Comments on the Initial Study for the UC Riverside 2002 Long Range Development Plan (UCR 2002 LRDP) [this version contains the handwritten-and-now-typed corrections made in hand writing on the copy I handed you at the January 8, 2002 meeting, but which you misplaced thereafter]

Dear Ms. Bullock:

Here are my comments on the UCR 2002 LRDP.

Procedural Issues

First, the primary source for the environmental analysis of the proposed UCR 2002 LRDP is the LRDP Final EIR. According to the Initial Study (IS), the LRDP Final EIR is available "during normal business hours" at your office, the UCR Capital and Physical Planning, 3637 Canyon Crest Drive, Bannockburn F-101, on the Riverside campus.

To be truly available, the LRDP Final EIR and its supporting documents should be available (1) on UCR's website, just as is the Initial Study, (2) as a hard copy (with supporting documents) at UCR's libraries, where people without a computer can go after work hours and on weekends if they want to review it. (3) copies available for purchase (so people can annotate it with comments). The reason for this is obvious: not everyone is able to go to your office during normal working hours for the time needed to study the LRDP Final EIR.

For the same reason, the proposed UCR 2002 LRDP, when it is ready for comments should also be made available on UCR's website, in its libraries, and be available for purchase.

Substantive Issues re Scope of the EIR

UCR has stated in writing that it *will* prepare an EIR, not a Negative Declaration[1]. Thus, the purpose of these pre-draft EIR comments is to point out deficiencies in the

---

[1] See Initial Study, "Purpose of the Initial Study; . . . Accordingly, the University *will* be preparing an EIR, . . . Since a decision has already been made to prepare an EIR, the purpose of this initial study checklist is to help focus the EIR and to provide information allowing a meaningful response on the anticipated scope of the EIR."

planned scope of the still-to-be-prepared EIR. Here are some apparent deficiencies in the planned scope as set forth in the IS, as well as in the project description.

Project Description Deficiencies

Under ¶ 2, "Surrounding land uses and environmental setting," the IS describes the area to the north of campus as "residential uses *and a series of community parks.*" I am unaware of anything in the area to the north of the campus that could be characterized as a "series of community parks." To the north and north-east of campus there is Islander Park, a natural, community park (as to which there is pending litigation over whether it will still be a community park if it is turned into a 2002 LRDP-related flood control project). There is also Highland Park, a developed neighborhood park, and Mt. Vernon, an undeveloped neighborhood park (much of which has already been sold off by the city for development as a church). In other words, there is no *series* of community parks in this area.

(1) Under "IMPACT QUESTION," Aesthetics, ¶ (a), the area surrounding the UCR Campus is described as "Predominantly *urban* in character, with the exception of the mountains to the south and east of the campus." The area to the north and north east is *not* urban -- it is, at most, suburban, and even is zoned as a residential conservation zone.

(2) Under "Hydrology and Water Quality, ¶ (e)," "create or contribute run-off water," as well as in other sections of the IS, the IS refers to correcting "existing drainage problems on and east of the campus." As far as I can tell, the "existing drainage problem" is the natural drainage, which is only a problem to the extent that UCR wants to build on the natural flood plain. This is not a *drainage* problem, it is a *proposed development* problem, and should be defined accordingly.

(3) Under "Hydrology and Water Quality, ¶ (g)," "place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map," as well as in other sections of the IS, the IS refers to evaluating whether the 2002 LRDP would result in the placement of housing within the *current* or *proposed future* 100-year flood hazard area." The EIR must deal with things *as they are,* not as they *might* be. Accordingly, the EIR should address the existing 100-year flood hazard area.

Deficiencies in the Proposed Scope of the EIR

According to the "General Instructions, ¶ A," "All answers must take account of the whole action involved, *including off-site as well as on-site, cumulative as well as project-level, indirect as well as direct, and construction as well as operational impacts.*" However, in many areas, as discussed below, the proposed scope for the EIR ignores off-

campus effects, or inappropriately limits its consideration of issues based on political, rather than environmental and geographic, boundaries.

(1) **Under "IMPACT QUESTION," Aesthetics, ¶ (a)**, "The EIR will analyze the potential for LRDP implementation to affect **scenic vistas** including those *within the City of Riverside as well as the campus*." The scenic vistas to be affected also include those outside the City of Riverside's boundaries, in other words, in the County of Riverside, but which scenic vistas are still visible from the City and from the campus.

(2) **Under "4. Biological Resources, ¶ a:** "The EIR will evaluate the potential for development to affect **sensitive plant and animal species** and habitat *on campus.* According to the "General Instructions, ¶ A," "All answers must take account of the whole action involved, *including off-site as well as on-site, cumulative as well as project-level, indirect as well as direct, and construction as well as operational impacts.*" Thus, limiting this evaluation to affects *on campus* is inappropriate, and contrary to the General Instructions.

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There are a number of reasons why this description improperly narrows the scope of the proposed EIR. First, the area to the north and north-east of campus is not an "urbanized area." It is a suburban area, in part zoned residential conservation, and also includes the Islander Park, a natural, community park, that provides a wildlife connection with the Box Springs Mountains (BSM), BSM preserve area, and the campus botanical gardens. Furthermore, even a suburban area provides an area in which wildlife lives, moves, and raises its young. I personally know where foxes have had their dens and raised young in the backyards of suburban homes, and where foxes have raised their young in a den on the UCR campus. Coyotes are also frequent visitors to the campus and to our suburban area. I have also personally seen a bobcat and jackrabbits in the botanical gardens, and a friend of mine also saw a bobcat there.

Furthermore, the above-noted comment in the IS ignores the fact that one issue is migratory birds, not only animals that are limited to travel on the ground. The campus provides a stop-over location for migratory birds, such as cedar waxwings and mountain bluebirds (which I have personally observed on campus), and certain species of hummingbirds. Thus, even *if* the campus were surrounded by an urbanized area, which it

is not, this would have no impact on the use of the campus, and non-campus areas subject to impact from the proposed 2002 LRDP, by migratory birds.

Furthermore, according to the "General Instructions, ¶ A," "All answers must take account of the whole action involved, *including off-site as well as on-site, cumulative as well as project-level, indirect as well as direct, and construction as well as operational impacts.*" The LRDP contemplates off-site changes, e.g., the flood control project in Islander Park. To the extent the scope of the proposed EIR appears to exclude any consideration of the impact of this flood control project on the potential for interfere with **wildlife movement, disturbance of wildlife corridors or impeding of wildlife nursery sites, the scope is too narrow.**

(4) **"8. Hydrology and Water Quality, ¶ (b),"** the IS says that "to the extent that the campus draws additional water fro the City, . . . Additional *on-campus development* could result in additional demand on groundwater supplies." By limiting consideration to only on-campus development, the proposed scope of the EIR is too narrow. According to the "General Instructions, ¶ A," "All answers must take account of the whole action involved, *including off-site as well as on-site, cumulative as well as project-level, indirect as well as direct, and construction as well as operational impacts.*"

At an earlier meeting with UCR personnel, we (the community) were told that, at best, only about 1/3 of the anticipated new students will be housed on campus. Thus, the EIR must consider the *off-campus* development necessary to supply these students with housing, and must also consider the additional demand on water supplies of students house off-campus.

(5) **"8. Hydrology and Water Quality, ¶ (c),"** states that "The infill of new building and facilities . . . in the eastern portion of the campus is not anticipated to substantially alter existing drainage patterns *in that portion of the campus*." According to the "General Instructions, ¶ A," "All answers must take account of the whole action involved, *including off-site as well as on-site, cumulative as well as project-level, indirect as well as direct, and construction as well as operational impacts.*" The proposed LRDP contemplates off-site changes, e.g., the flood control project in Islander Park (as to which there is pending litigation over whether it will still be a community park if it is turned into a 2002 LRDP-related flood control project, and whether the project is legal under various state laws). To the extent the scope of the proposed EIR appears to exclude any consideration of the impact of this flood control project on the potential to alter existing drainage patterns, the scope is too narrow.

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(7) "8. Hydrology and Water Quality, ¶ (g). This section of the IS apparently contemplates only looking at whether the 2002 LRDP would result in the placement of housing within the current or proposed future 100-year flood hazard area" *on campus*.

According to the "General Instructions, ¶ A," "All answers must take account of the whole action involved, *including off-site as well as on-site, cumulative as well as project-level, indirect as well as direct, and construction as well as operational impacts*. Thus, the scope of the EIR must include looking at whether housing *off-campus* will needs be placed in the 100 year flood plain.

(8) "LAND USE AND PLANNING, ¶ (b), "conflict with any applicable land use plan, policy, [etc.]" The IS says that UCR is constitutionally exempt from local zoning and land use plan/element requirements. (Obviously, that is true only of land it itself owns as part of its campus.) It then says the EIR will evaluate consistency of current and proposed future land uses, and identify potential conflicts between "*on-campus land uses* and any potential conflicts with uses in the City, [etc.]" This is too narrow a scope. For example, the University is a proponent of the flood control project at Islander Park, so that it can build on the 100-year flood plain on campus. Thus, the 2002 LRDP must evaluate conflicts between *off-campus* land uses and any potential conflicts with local land use ordinances and laws, e.g., the City's General Plan.

(9) "LAND USE AND PLANNING, ¶ (c), "Conflict with any applicable habitat conservation plan or natural community conservation plan," see (8), (b) above; see also City's residential conservation zoning ordinances.

(10) MINERAL RESOURCES, (a), "loss of availability of known mineral resource of value to the region, etc." According to this section of the IS, "No mineral resources of regional or state-wide importance are known to exist *on the UC Riverside campus,* and no such activities *have been associated with the development of the campus*." Again, the scope is too narrow. How will the 20002 LRDP affect *off-campus* **mineral resources?** Also, the 2002 LRDP requires the completion of the Islander Park project, which entails mining the park for fill dirt, which is a mineral resource. The mining of minerals is, in fact, associated with the proposed development of the campus.

(11) POPULATION AND HOUSING, (a) Induce substantial population growth in an area, etc." According to this portion of the IS, the EIR will evaluate the potential for this demand [for housing] to exceed the projected housing supply in the City and adjacent areas, . . ." This is both too broad a scope and too narrow a scope.

The EIR needs to look at the projected housing supply not just in the city as a whole, but in the area around UCR, and it must look at the issue in terms of the rental cost of the projected housing supply as well as the rental cost of the housing being impacted by the growth. In other words, for example, if the increased student population causes rental prices in the surrounding area to rise from $400 per month to $600 per month, the issue of non-rental housing in the La Sierra area is irrelevant to the population being displaced by UCR's growth. However, in addition, the EIR must look at the cumulative, city-wide impact of the rapid increase of a transient student population on the

availability and cost of rentals city-wide, in other words, at the cumulative effect of the UCR growth combined with that in other universities and colleges. In the past two years, I have heard from several families that I know that their housing costs have gone up quickly and dramatically, because of the increased student population, the willingness of students to live in more cramped conditions than do families, and landlords' decisions to take advantage of this by raising rents. Tow of these families have been forced to move out of the area of UCR because of this trend.

(12) HOUSING, (c) Displace substantial numbers of people, necessitating the construction of replacement housing elsewhere?" and (d) "Result in other impacts?" This section states that if displacement is proposed as part of the LRDP Update, the EIR will address the availability of housing alternatives for displaced students and their families. " This is much too narrow a scope for the EIR. First, even if displacement isn't *proposed*, but will result, the EIR must address the issue of displacement. (See comment directly above about increased rents causing displacement.)

Second, it must address the issue of the displacement of *non-students*, not just students and their families. One of the problems with the increase number of students in this area is that the price of rental units has gone up significantly; this is something of which I have personal knowledge. And this is happening in other areas within the city near colleges and universities, e.g., near the area of California Baptist. There is a cumulative effect in terms of the displacement of residents who need low and lower income housing as a result of an increased demand by persons with more money, e.g., students who are willing to live in arrangements with a number of other students, share rooms and thus afford to pay more rent per square foot.

(13) POPULATION AND HOUSING, generally. In terms of the housing issue, one of the on-going issues created by UCR's presence near a suburban area is the movement of students into that single-family residential area, and the impact of groups of students living in single family homes. Some of the problems associated with this have been increased noise levels due to large and loud parties, increased cars that need parking spaces, and which, because single family homes were not designed to house four or five adults, each with his or her own car, parking problems such as cars being parked on lawns, or many cars parked at the curb, which has a negative aesthetic effect (many "nicer" communities require cars to be parked in driveways or garages, not at curbs, in residential areas, and forbid cars parked at curbs overnight). This influx of students also creates a need for increased police **and code enforcement** services.

(14) PUBLIC SERVICES, (a) (ii) Police protection. The scope is too narrow; it only looks at service for UCR *campus*. AN increase in students who will be living off-campus will mean an increased need for off-campus police services. **(iv) Parks.** The IS says increased student enrollment will result in additional demand for recreational space, and that therefore the EIR will evaluate the environmental impacts of "new, expanded, or

altered to respond to any such demand." This is too narrow a scope. The EIR needs to address *lost* facilities, too, particularly in light of the pending litigation over Islander Park as a flood control project, and in light of the plan for UCR to close the Riverside Sports Complex to city residents.

(15) PUBLIC SERVICES, generally. To the extent this section implicitly seems to be concerned with the need for additional services only *on campus*, it is too narrow. It must take into account and evaluate the effect of the increased student population living off-campus as well as on-campus.

(16) RECREATION. The IS says that the proposed 2002 LRDP will include the provision of additional athletic and recreational facilities for "students, faculty and staff." In the past, the community has been able to use on-campus facilities for recreational purposes, e.g., the track for jogging and walking, and the Riverside Sports Complex. Growth at UCR has already resulted in a loss to local residents of the use of the track; changes under the 2002 LRDP may result in the further unavailability of such resources to the non-campus population; also, e.g., Islander Park. The impact of this loss of use must be included in the EIR.

In addition, the City of Riverside is currently embarked on a reassessment of its General Plan's Open Space and Park Element; changes resulting from such reassessment must be considered so that the cumulative effect of the planned growth of UCR population can be accurately assessed.

The IS says that "[i]mplementation of the 2002 LRDP may result in proposals to displace existing recreational facilities to provide sites for academic and support facilities that require proximity to other existing academic or support uses." This appears to refer to the plan to build structures on the existing playing fields near the corner of Canyon Crest and University, which in turn relates to the pending litigation in the Islander Flood Control case (*Save Islander Park* v. *City of Riverside, et al*) "May" result seems to be inaccurate, since this choice of this particular area for buildings *will* result in such displacement. In addition, to say that this siting choice is because proximity is "*require[d]*" assumes a fact that is neither established by a rule of physics, nature, or otherwise, and which ignores competing considerations. .

Playing fields are a perfect use of a flood plain area on a large campus. Leaving them where they are and building in another area of campus would negate the alleged need for the Islander Park flood control project, and would mean no loss of that recreational area and no displacement of existing on-campus playing fields. Thus, one issue which should be reviewed in the EIR is an alternative to this particular siting plan.

(17) TRANSPORTATION/TRAFFIC. Generally, this entire section has too narrow a scope. It is directed at *on-campus* issues, but must also address off-campus issues. For example, the IS says the EIR will evaluate the adequacy of the proposed *campus* parking inventory. This growth will result in additional cars *off-campus;* what about the

adequacy of parking for them. The lack of off-campus parking is already becoming more and more apparent, e.g., the cars parked across from the apartments at Spruce and Watkins Drive and all along the curbs of near-by streets at Blaine and Canyon Crest (which primarily house UCR students (witness the Highland Hauler that picks up and drops off at both locations).

In addition, section (g) mentions the issue of whether the 2002 LRDP would conflict with policies, plans or programs supporting alternative transportation. The proposed Islander Flood Control project (which is the basis for pending litigation, *Save Islander Park* v. *City of Riverside, et al.*) is an example of how the proposed growth conflicts with a county plan for a Metrolink line in the same area as the proposed basins. This issue must be addressed in the EIR. Also, the scope proposed is too narrow, to the extent it appears to be concerned only with on-campus traffic and parking issues.

(18) UTILITY/SERVICES SYSTEMS/ENERGY Again, the scope is too narrow. IT indicates the EIR will be concerned with "the on-campus residential population." Obviously, students, faculty and support staff who live off-campus will also require utilities, services systems, and energy. The issue of available water, especially under a new state law that requires planning for adequate water supplies, is particularly important , yet the IS indicates the EIR will be concerned only with "increased *campus* demand for water supplies." The same is true of landfill capacity; the IS indicates the EIR will be concerned only with "an increase in *campus* solid waste generation." The large population increase of people living off-campus requires that that off-campus population's increased need for water and generation of solid waste be looked at as part of the environmental consequences of the 2002 LRDP.

Sincerely,

Letitia Pepper
503 Highlander Drive
Riverside, CA 92507-3131

Juanita Bullock, Senior Physical Planner
UCR

January 11, 2001
By E-Mail

Re: Further Additional Comments re Scope of UCR's 2002 LRDP (third letter with comments)

Dear Ms. Bullock:

After attending the scooping meeting on January 8, 2002, and hearing the comments by yourself and Mr. Horne, I've thought of some additional areas on which the EIR should touch.

First, it was stated the UCR's LRDP (prepared in about 1990) planned for further expansion westward, not eastward. According to Mr. Horne, however, the campus has ignored that plan, because everyone wanted to "stay with the Mother Ship," which necessitates doing infill building on the east side of campus.

If the original LRDP called for eastward, not eastward, expansion, it seems odd that a mere desire by staff to "stay with the Mother Ship," would have derailed a carefully researched, discussed, and planned LRDP, complete with all that environmental work. In addition, UCR *has* expanded, and is planning to expand, to the west, as witness the University Village project, the International Village, the extension offices, and the planned downtown arts building, all of which are to the west of the existing campus. Furthermore, according to yourself and Mr. Horne, the City of Riverside is looking at entering into redevelopment projects to house student to the west of campus, between the main campus and downtown.

Given these westward projections away from the main campus, I think the EIR should discuss as an alternative to the apparent in-fill plan simply following the westward concept of the 1990 LRDP.

Another issue raised was the "phantom stadium" issue. It was stated that there had been discussion of a stadium on UCR property, at Chicago and Martin Luther King, but for various reasons that stadium is not a viable project *at present*. However, things do change, sometimes rather quickly. And there have actually been one or more articles in the paper about UCR's desire to attract sports teams to this area for training seasons – which would require a location for a training facility. I think an ice-skating rink was even on the table at one point.

With this in mind, it seems to me that any long-range EIR that is going to be the basis for subsequent project level EIRs, should identify and consider the environmental impact of the *potential* areas where a stadium, training program, rink or similar, non-curricular project might be located. I think this is particularly so, given the fact that the

stadium plan *is* real enough to have caused the City's head librarian to question whether the city can locate a library in that same area.

Therefore, in terms of the proposed EIR's scope, I ask that it include a consideration and discussion of the feasibility of the original plan, that did not require in-fill, as well as a discussion and consideration of such long-range potential projects as a stadium, training program, rink or similar, non-curricular project and their location.

Sincerely,

Letitia E Pepper

Letitia Pepper
503 Highlander Drive
Riverside, CA 92507-3131

Juanita Bullock, Campus Physical Planner
UCR, Capital and Physical Planning
3637 Canyon Crest Drive, F-101
Riverside, CA 92507
By E-Mail

January 11, 2002

Re: More Comments on the Initial Study for the UC Riverside 2002 Long Range Development Plan (UCR 2002 LRDP)

Dear Ms. Bullock:

Here are some additional comments on the UCR 2002 LRDP, which occurred to me after the January 8 scoping meeting and the comments made at it.

According to Mark Horne, UCR is not **required** to engage in such a large and rapid growth spurt; rather, this is something that was up to the discretion of each campus's administration. Thus, for example, according to Mr. Horne, UC Santa Barbara decided not to add any additional student population when asked by the Regents to consider the issue of growth.

Therefore, I'm interested to know the basis or rationale, if any, upon which UCR's administration decided to engage in the particular amount and speed of growth on which the 2002 LRDP is based.

Also, I'd like to see the EIR include, as alternatives, a few models showing a project with less growth and growth at a slower pace.

Also, at the scoping meeting Mr. Horne mentioned that the city is looking at using redevelopment to create housing for students. The EIR should show an alternative in which the city doesn't come up with redevelopment as an answer to UCR's growth. Courts are beginning to get stricter about the use of redevelopment as a way to handle things that aren't really blight. I don't know if UCR can count on any and all redevelopment projects to be feasible; so, how will it handle the housing issue if 100 percent of any redevelopment projects proposed by the City are not legally feasible?

Also, please note that the hard copy of my January 8 comments, which I gave you at the January 8 meeting, had some hand-written notations that are not on the copy I sent by e-mail.

Sincerely,

Letitia Pepper

Letitia Pepper
503 Highlander Drive
Riverside, CA 92507-3131

To: LetitiaPepper@cs.com
From: Nita Bullock <nita.bullock@ucr.edu>
Subject: Re: Third letter with comments re scope of UCR's 2002 LRDP
Cc:
Bcc:
Attached:

I received the packet and will enter it into the record.

At 02:45 AM 1/15/02 -0500, you wrote:

> Thanks. You should have received a letter from me today. At 9:30 a.m., I handed Donna, the receptionist in your office, a packet consisting of a cover letter and attached to it the three letter of comments I've previously handed or E-mailed you, so they are all in one package, in a hard copy for your files.

From: LetitiaPepper@cs.com
X-PH: V4.4@blue
Date: Tue, 8 Jan 2002 11:07:45 EST
Subject: Comments re scope of proposed UCR 2002 LRDP
To: nita.bullock@ucr.edu
X-Mailer: CompuServe 2000 32-bit sub 107

Attached is a file with the letter with my comments on the scope of UCR's proposed 2002 LRDP. To summarize, the scope is too narrow, and does not adequately address all off-campus effects.

LRDPSCOP.DOC

Juanita Bullock, Campus Physical Planner
UCR
Capital and Physical Planning
3637 Canyon Crest Drive, F-101
Riverside, CA 92507

January 8, 2002

Re: Comments on the Initial Study for the UC Riverside 2002 Long Range Development Plan (UCR 2002 LRDP)

Dear Ms. Bullock:

Here are my comments on the UCR 2002 LRDP.

Procedural Issues

First, the primary source for the environmental analysis of the proposed UCR 2002 LRDP is the LRDP Final EIR. According to the Initial Study (IS), the LRDP Final EIR is available "during normal business hours" at your office, the UCR Capital and Physical Planning, 3637 Canyon Crest Drive, Bannockburn F-101, on the Riverside campus.

To be truly available, the LRDP Final EIR and its supporting documents should be available (1) on UCR's website, just as is the Initial Study, (2) as a hard copy (with supporting documents) at UCR's libraries, where people without a computer can go after work hours and on weekends if they want to review it. (3) copies available for purchase (so people can annotate it with comments). The reason for this is obvious: not everyone is able to go to your office during normal working hours for the time needed to study the LRDP Final EIR.

For the same reason, the proposed UCR 2002 LRDP, when it is ready for comments should also be made available on UCR's website, in its libraries, and be available for purchase.

Substantive Issues re Scope of the EIR

UCR has stated in writing that it *will* prepare an EIR, not a Negative Declaration[1]. Thus, the purpose of these pre-draft EIR comments is to point out

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[1] See Initial Study, "Purpose of the Initial Study; . . . Accordingly, the University *will* be preparing an EIR, . . . Since a decision has already been made to prepare an EIR, the purpose of this initial study checklist is to help focus the EIR and to provide information allowing a meaningful response on the anticipated scope of the EIR."

deficiencies in the planned scope of the still-to-be-prepared EIR. Here are some apparent deficiencies in the planned scope as set forth in the IS, as well as in the project description.

Project Description Deficiencies

Under ¶ 2, "Surrounding land uses and environmental setting," the IS describes the area to the north of campus as "residential uses *and a series of community parks*." I am unaware of anything in the area to the north of the campus that could be characterized as a "series of community parks." To the north and north-east of campus there is Islander Park, a natural, community park (as to which there is pending litigation over whether it will still be a community park if it is turned into a 2002 LRDP-related flood control project). There is also Highland Park, a developed neighborhood park, and Mt. Vernon, an undeveloped neighborhood park (much of which has already been sold off by the city for development as a church). In other words. there is no *series* of community parks in this area.

(1) Under "IMPACT QUESTION," Aesthetics, ¶ (a), the area surrounding the UCR Campus is described as "Predominantly *urban* in character, with the exception of the mountains to the south and east of the campus." The area to the north and north east is *not* urban -- it is, at most, suburban, and even is zoned as a residential conservation zone.

(2) Under "Hydrology and Water Quality, ¶ (e)," "create or contribute run-off water," as well as in other sections of the IS, the IS refers to correcting "existing drainage problems on and east of the campus." As far as I can tell, the "existing drainage problem" is the natural drainage, which is only a problem to the extent that UCR wants to build on the natural flood plain. This is not a *drainage* problem, it is a *proposed development* problem, and should be defined accordingly.

(3) Under "Hydrology and Water Quality, ¶ (g)," "place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map," as well as in other sections of the IS, the IS refers to evaluating whether the 2002 LRDP would result in the placement of housing within the *current* or *proposed future* 100-year flood hazard area." The EIR must deal with things *as they are,* not as they *might* be. Accordingly, the EIR should address the existing 100-year flood hazard area.

Deficiencies in the Proposed Scope of the EIR

According to the "General Instructions, ¶ A," "All answers must take account of the whole action involved, *including off-site as well as on-site, cumulative as well as project-level, indirect as well as direct, and construction as well as operational impacts.*" However, in many areas, as discussed below, the proposed scope for the EIR ignores off-campus effects, or inappropriately limits its consideration of issues based on political, rather than environmental and geographic, boundaries.

(1) Under "IMPACT QUESTION," Aesthetics, ¶ (a), "The EIR will analyze the potential for LRDP implementation to affect **scenic vistas** including those *within the City of Riverside as well as the campus*." The scenic vistas to be affected also include those outside the City of Riverside's boundaries, in other words, in the County of Riverside, but which scenic vistas are still visible from the Coati and from the campus.

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There are a number of reasons why this description improperly narrows the scope of the proposed EIR. First, the area to the north and north-east of campus is not an "urbanized area." It is a suburban area, in part zoned residential conservation, and also includes the Islander Park, a natural, community park, that provides a wildlife connection with the Box Springs Mountains (BSM), BSM preserve area, and the campus botanical gardens. Furthermore, even a suburban area provides an area in which wildlife lives, moves, and raises its young. I personally know where foxes have had their dens and raised young in the backyards of suburban homes, and where foxes have raised their young in a den on the UCR campus. Coyotes are also frequent visitors to the campus and to our

suburban area. I have also personally seen a bobcat and jackrabbits in the botanical gardens, and a friend of mine also saw a bobcat there..

Furthermore, the above-noted comment in the IS ignores the fact that one issue is migratory birds, not only animals that are limited to travel on the ground. The campus provides a stop-over location for migratory birds, such as cedar waxwings and mountain bluebirds (which I have personally observed on campus), and certain species of hummingbirds. Thus, even *if* the campus were surrounded by an urbanized area, which it is not, this would have no impact on the use of the campus by migratory birds.

Furthermore, according to the "General Instructions, ¶ A," "All answers must take account of the whole action involved, *including off-site as well as on-site, cumulative as well as project-level, indirect as well as direct, and construction as well as operational impacts.*" The LRDP contemplates off-site changes, e.g., the flood control project in Islander Park. To the extent the scope of the proposed EIR appears to exclude any consideration of the impact of this flood control project on the potential for interfere with **wildlife movement, disturbance of wildlife corridors or impeding of wildlife nursery sites, the scope is too narrow.**

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At an earlier meeting with UCR personnel, we (the community) were told that, at best, only about 1/3 of the anticipated new students will be housed on campus. Thus, the EIR must consider the *off-campus* development necessary to supply these students with housing, and must also consider the additional demand on water supplies of students house off-campus.

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whether it will still be a community park if it is turned into a 2002 LRDP-related flood control project, and whether the project is legal under various state laws). To the extent the scope of the proposed EIR appears to exclude any consideration of the impact of this flood control project on the potential to alter existing drainage patterns, the scope is too narrow.

(6) **"8. Hydrology and Water Quality, ¶ (d) and (e),"** see comment immediately above.

(7) **"8. Hydrology and Water Quality, ¶ (g).** This section of the IS apparently contemplates only looking at whether the 2002 LRDP would result in the placement of housing within the current or proposed future 100-year flood hazard area" *on campus*. According to the "General Instructions, ¶ A," "All answers must take account of the whole action involved, *including off-site as well as on-site, cumulative as well as project-level, indirect as well as direct, and construction as well as operational impacts*. Thus, the scope of the EIR must include looking at whether housing *off-campus* will needs be placed in the 100 year flood plain.

(8) **"LAND USE AND PLANNING, ¶ (b), "conflict with any applicable land use plan, policy, [etc.]"** The IS says that UCR is constitutionally exempt from local zoning and land use plan/element requirements. (Obviously, that is true only of land it itself owns as part of its campus.) It then says the EIR will evaluate consistency of current and proposed future land uses, and identify potential conflicts between "*on-campus land uses* and any potential conflicts with uses in the City, [etc.]" This is too narrow a scope. For example, the University is a proponent of the flood control project at Islander Park, so that it can build on the 100-year flood plain on campus. Thus, the 2002 LRDP must evaluate conflicts between *off-campus* land uses and any potential conflicts with local land use ordinances and laws, e.g., the City's General Plan.

(9) **"LAND USE AND PLANNING, ¶ (c), "Conflict with any applicable habitat conservation plan or natural community conservation plan," see (8), (b) above; see also City's residential conservation zoning ordinances.**

(10) **MINERAL RESOURCES, (a), "loss of availability of known mineral resource of value to the region, etc."** According to this section of the IS, "No mineral resources of regional or state-wide importance are known to exist *on the UC Riverside campus,* and no such activities *have been associated with the development of the campus*." Again, the scope is too narrow. How will the 20002 LRDP affect *off-campus* **mineral resources?** Also, the 2002 LRDP requires the completion of the Islander Park project, which entails mining the park for fill dirt,

which is a mineral resource. , the mining of minerals is, in fact, associated with the proposed development of the campus.

(11) POPULATION AND HOUSING, (a) Induce substantial population growth in an area, etc." According to this portion of the IS, the EIR will evaluate the potential for this demand [for housing] to exceed the projected housing supply in the City and adjacent areas, . . ." This is both too broad a scope and too narrow a scope.

The EIR needs to look at the projected housing supply not just in the city as a whole, but in the area around UCR, and it must look at the issue in terms of the rental cost of the projected housing supply as well as the rental cost of the housing being impacted by the growth. In other words, for example, if the increased student population causes rental prices in the surrounding area to rise from $400 per month to $600 per month, the issue of non-rental housing in the La Sierra area is irrelevant to the population being displaced by UCR's growth. However, in addition, the EIR must look at the cumulative, city-wide impact of the rapid increase of a transient student population on the availability and cost of rentals city-wide, in other words, at the cumulative effect of the UCR growth combined with that in other universities and colleges. In the past two years, I have heard from several families that I know that their housing costs have gone up quickly and dramatically, because of the increased student population, the willingness of students to live in more cramped conditions than do families, and landlords' decisions to take advantage of this by raising rents. Tow of these families have been forced to move out of the area of UCR because of this trend.

(12) HOUSING, (c) Displace substantial numbers of people, necessitating the construction of replacement housing elsewhere?" and (d) "Result in other impacts?" This section states that if displacement is proposed as part of the LRDP Update, the EIR will address the availability of housing alternatives for displaced students and their families. " This is much too narrow a scope for the EIR. First, even if displacement isn't *proposed*, but will result, the EIR must address the issue of displacement. (See comment directly above about increased rents causing displacement.)

Second, it must address the issue of the displacement of *nonstudents*, not just students and their families. One of the problems with the increase number of students in this area is that the price of rental units has gone up significantly; this is something of which I have personal knowledge. And this is happening in other areas within the city near colleges and universities, e.g., near the area of California Baptist. ,there is a cumulative effect in terms of the displacement of residents who need low and lower income housing as a result of an increased demand by persons with more money, e.g., students who are willing to live in arrangements with a

number of other students, share rooms and thus afford to pay more rent per square foot.

(13) POPULATION AND HOUSING, generally. In terms of the housing issue, one of the on-going issues created by UCR's presence near a suburban area is the movement of students into that single-family residential area, and the impact of groups of students living in single family homes. Some of the problems associated with this have been increased noise levels due to large and loud parties, increased cars that need parking spaces, and which, because single family homes were not designed to house four or five adults, each with his or her own car, parking problems such as cars being parked on lawns, or many cars parked at the curb, which has a negative aesthetic effect (many "nicer" communities require cars to be parked in driveways or garages, not at curbs, in residential areas, and forbid cars parked at curbs overnight).

(14) PUBLIC SERVICES, (a) (ii) Police protection. The scope is too narrow; it only looks at service for UCR *campus*. AN increase in students who will be living off-campus will mean an increased need for off-campus police services. **(iv) Parks**. The IS says increased student enrollment will result in additional demand for recreational space, and that therefore the EIR will evaluate the environmental impacts of "new, expanded, or altered to respond to any such demand." This is too narrow a scope. The EIR needs to address *lost* facilities, too, particularly in light of the pending litigation over Islander Park as a flood control project, and in light of the plan for UCR to close the Riverside Sports Complex to city residents.

(15) PUBLIC SERVICES, generally. To the extent this section implicitly seems to be concerned with the need for additional services only *on campus*, it is too narrow. It must take into account and evaluate the effect of the increased student population living off-campus as well as on-campus.

(16) RECREATION. The IS says that the proposed 2002 LRDP will include the provision of additional athletic and recreational facilities for "students, faculty and staff." In the past, the community has been able to use on-campus facilities for recreational purposes, e.g., the track for jogging and walking, and the Riverside Sports Complex. Growth at UCR has already resulted in a loss to local residents of the use of the track; changes under the 2002 LRDP may result in the further unavailability of such resources to the non-campus population; also, e.g., Islander Park. The impact of this loss of use must be included in the EIR.

In addition, the City of Riverside is currently embarked on a reassessment of its General Plan's Open Space and Park Element; changes resulting from such

reassessment must be considered so that the cumulative effect of the planned growth of UCR population can be accurately assessed.

The IS says that "[i]mplementation of the 2002 LRDP may result in proposals to displace existing recreational facilities to provide sites for academic and support facilities that require proximity to other existing academic or support uses." This appears to refer to the plan to build structures on the existing playing fields near the corner of Canyon Crest and University, which in turn relates to the pending litigation in the Islander Flood Control case (*Save Islander Park* v. *City of Riverside, et al*) "May" result seems to be inaccurate, since this choice of this particular area for buildings *will* result in such displacement. In addition, to say that this siting choice is because proximity is "*require[d]*" assumes a fact that is neither established by a rule of physics, nature, or otherwise, and which ignores competing considerations. .

Playing fields are a perfect use of a flood plain area on a large campus. Leaving them where they are and building in another area of campus would negate the alleged need for the Islander Park flood control project, and would mean no loss of that recreational area and no displacement of existing on-campus playing fields. Thus, one issue which should be reviewed in the EIR is an alternative to this particular siting plan.

(17) TRANSPORTATION/TRAFFIC. Generally, this entire section has too narrow a scope. It is directed at *on-campus* issues, but must also address off-campus issues. For example, the IS says the EIR will evaluate the adequacy of the proposed *campus* parking inventory. This growth will result in additional cars *off-campus;* what about the adequacy of parking for them. The lack of off-campus parking is already becoming more and more apparent, e.g., the cars parked across from the apartments at Spruce and Watkins Drive and all along the curbs of near-by streets at Blaine and Canyon Crest (which primarily house UCR students (witness the Highland Hauler that picks up and drops off at both locations).

In addition, section (g) mentions the issue of whether the 2002 LRDP would conflict with policies, plans or programs supporting alternative transportation. The proposed Islander Flood Control project (which is the basis for pending litigation, *Save Islander Park* v. *City of Riverside, et al.*) is an example of how the proposed growth conflicts with a county plan for a Metrolink line in the same area as the proposed basins. This issue must be addressed in the EIR. Also, the scope proposed is too narrow, to the extent it appears to be concerned only with on-campus traffic and parking issues.

(18) UTILITY/SERVICES SYSTEMS/ENERGY Again, the scope is too narrow. IT indicates the EIR will be concerned with "the on-campus residential population." Obviously, students, faculty and support staff who live off-campus

will also require utilities, services systems, and energy. The issue of available water, especially under a new state law that requires planning for adequate water supplies, is particularly important , yet the IS indicates the EIR will be concerned only with "increased *campus* demand for water supplies." The same is true of landfill capacity; the IS indicates the EIR will be concerned only with "an increase in *campus* solid waste generation." The large population increase of people living off-campus requires that that off-campus population's increased need for water and generation of solid waste be looked at as part of the environmental consequences of the 2002 LRDP.

Sincerely,

Letitia Pepper
503 Highlander Drive
Riverside, CA 92507-3131

UC Riverside
2002 Long Range Development Plan

Environmental Impact Report Scoping Meeting

January 8, 2002

Issues that should be addressed in the EIR:

Connections of botanic Garden to Box Springs Mt. Park & Sycamore Canyon Park –

increasing traffic on the 60 freeway and the effect on the university.

✓ Provide bike paths [multipurpose] & safe bike parking.

✓ Student use of local parks and specifically the Box Springs Mnt. Park – What will happen to [illegible] area between Canyon Crest and the Freeway.

Name: Jane Block

Address: 424 Two Trees Rd.
Riverside CA 92507

E-mail: jblock@empirenet.com

The Notice of Preparation, which includes the Initial Study, for the 2002 LRDP EIR is available for review at the Capital & Physical Planning Office, 3637 Canyon Crest Drive, Riverside CA, 92507 or on the internet at www.lrdp.ucr.edu. Additional information may be obtained by calling Nita Bullock, Campus Physical Planner, at (909) 787 -7376. Written comments should be sent by January 14, 2002.

Beth Braker
P. 1/2

UC Riverside
2002 Long Range Development Plan

Environmental Impact Report Scoping Meeting

January 8, 2002

Issues that should be addressed in the EIR:

① Why is target set at 25,000? Would like to see analysis of ~~of~~ impact of lower target for growth, as well as analysis of impact of rate of growth from 13 k to 25 k

② Impact of increased runoff due to increase in buildings + associated lots. Use of greenscaping to decrease runoff

③ Impact of traffic (throughput + parking issues, air quali on neighborhoods

④ Development of environmentally friendly transit alternatives - pedestrian walkways, bikeways, shuttles.

Name: Beth Braker

Address: 636 Sandalewood Court
Riverside CA 92507

E-mail: bbraker~~@~~55 @ yahoo.com

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Beth Braker
p. 2/2

UC Riverside
2002 Long Range Development Plan

Environmental Impact Report Scoping Meeting

January 8, 2002

Issues that should be addressed in the EIR:

⑤ Loss of green/open space

⑥ Biological resources - sensitive species, coordination w/ Riv. County Multiple Species Habitat Conservation Plan

⑦ Issues of noise pollution

⑧ Issues of impact on open space + designated parkland

⑨ ~~Road~~ Entrances to campus so not through neighorhoods

⑩ Parking not in neighborhoods

⑪ Existing infrastructure (shops, gas stations) inadequate for influx

Name: ________________

Address: ________________

E-mail: ________________

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⑫ Public safety issues of increased pedestrian + bike traffic

⑬

UC Riverside
2002 Long Range Development Plan

Environmental Impact Report Scoping Meeting

January 8, 2002

Issues that should be addressed in the EIR:

The parking structure planned for Lot 13 is incompatible with the single-family homes bordering the university to the east. A parking structure would cause noise, light, and air pollution, as well as destroying our view. Because these houses are standing about 15-20 feet above the university property, they are especially vulnerable to the degradation a parking structure would cause. When we bought our house, we were told tennis courts might one day be built on the open land that is now Lot 13. Why not return to this old plan?

Name: Barbara Gable

Address: 270 Barret Road
Riverside, CA 92507

E-mail: barbgable@aol.com

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3:30 pm
RECEIVED ~~4pm~~

UC Riverside
2002 Long Range Development Plan

Environmental Impact Report Scoping Meeting

January 8, 2002

Issues that should be addressed in the EIR:

1. Loss of Parkland to City
2. Destruction of natural land formations
3. Excessive noise, traffic, particulate pollution, and neighborhood disturbance caused by trucks.
4. Parking structure is too close to residences.
5. Impact of increased light, noise, auto exhaust on residential housing.
6. Why can't the parking structure be located further West, nearer to campus buildings, instead of as far East? Parking near buildings makes more sense.

UCR still has so much land. Why build tall structures?

Name: Frederick K. Gable
Address: 270 Barnett Road
Riverside, CA 92507
E-mail: FredGable@aol.com

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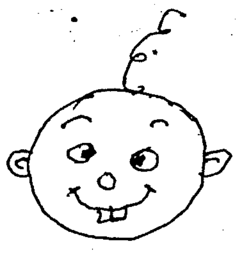
BY M.VL
1/16/02

UC Riverside
2002 Long Range Development Plan

Environmental Impact Report Scoping Meeting

January 8, 2002



SMILE.

Issues that should be addressed in the EIR:

GOOD JOB, EVERYTHING BEING ADDRESSED.

SUGGESTION;
CONSTANTLY MOVING SHUTTLES THROUGHOUT CAMPUS, PARKING LOTS, UNIVERSITY AVE AND CANYON CREST.

IS LAW SCHOOL & MEDICAL SCHOOL DEAD? OR IS SPACE ALLOWED FOR THIS POTENTIAL.

?
NEED VETINARY SCHOOL OF MEDICINE, ODORS AND ALL.

Name: Ralph Guidero
Architect

Address: 5439 Via Alberca
Riverside, CA 92507

1-909-7882882

E-mail: NONE. "HAH"

The Notice of Preparation, which includes the Initial Study, for the 2002 LRDP EIR is available for review at the Capital & Physical Planning Office, 3637 Canyon Crest Drive, Riverside CA, 92507 or on the internet at www.lrdp.ucr.edu. Additional information may be obtained by calling Nita Bullock, Campus Physical Planner, at (909) 787-7376. Written comments should be sent by January 14, 2002.

UC Riverside
2002 Long Range Development Plan

Environmental Impact Report Scoping Meeting

January 8, 2002

Issues that should be addressed in the EIR:

① Several years ago, perhaps as part of the 1990 LRDP, the main drainage through campus was proposed to be restored as a recreational riparian corridor. Yes, this takes up space that could be used for buildings, but I believe the benefits would far outweigh the costs - aesthetically, recreationally + educationally (outdoor classroom opportunities

② I think more student housing should be planned to the west, for those students that want to take advantage of the proximity to University Ave. businesses

③ I have read and agree with all the comments in Letitia Peppers letter of Jan 8, 2002

Name: Nanette Pratini

Address: 597 Massachusetts
Riv. CA 92507

E-mail: pratini@citrus.ucr.edu

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UC Riverside
2002 Long Range Development Plan

Environmental Impact Report Scoping Meeting

January 8, 2002

Issues that should be addressed in the EIR:

concerns that the track is now closed to the public - UCR expects support from the community - what are they doing back for the community?

Will any of this growth, such as soccer fields, be available to those people who live in the neighborhood?

Name: Dan + Debbie Reich
Address: 620 Massachusetts Ave
Riverside CA 92507
E-mail: DRNDR31790 @ aol.com

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1.3

UC Riverside
2002 Long Range Development Plan

Environmental Impact Report Scoping Meeting

January 8, 2002

Issues that should be addressed in the EIR:

Alternative transportation access — this has not been planned in growth to date such that bicycle + walking access has gotten progressively worse. We need dedicated safe routes along paths of major traffic onto campus. This should be coordinated with a comprehensive alternative transportation plan for the expanded campus.

Name: NICKOLAS WASER

Address: 2540 THAYER CT
Riverside CA 92507

E-mail: waser@citrus.ucr.edu

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V-3

UC Riverside
2002 Long Range Development Plan

Environmental Impact Report Scoping Meeting

January 8, 2002

Issues that should be addressed in the EIR:

More recreation opportunities need to be developed not only on campus but nearby. UCR needs to work with city and county to develop/expand parks in nearby neighborhoods and Box Springs Mtns.

Name: NICKOLAS WASER

Address: 2540 Thayer Ct
Riverside CA 92507

E-mail: waser@citrus.ucr.edu.

The Notice of Preparation, which includes the Initial Study, for the 2002 LRDP EIR is available for review at the Capital & Physical Planning Office, 3637 Canyon Crest Drive, Riverside CA, 92507 or on the internet at www.lrdp.ucr.edu. Additional information may be obtained by calling Nita Bullock, Campus Physical Planner, at (909) 787 -7376. Written comments should be sent by January 14, 2002.

3-3

UC Riverside
2002 Long Range Development Plan

Environmental Impact Report Scoping Meeting

January 8, 2002

Issues that should be addressed in the EIR:

Traffic patterns — traffic in nearby neighborhoods, Watkins Drive etc. needs to be addressed. How will congestion, daytime parking on city streets, increased danger to pedestrians etc. be handled?

Name: Nickolas Waser
Address: 2540 Thayer Ct
Riverside CA 92507
E-mail: waser@citrus.ucr.edu

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EIP
ASSOCIATES

January 16, 2002

To: Nita Bullock, UCR Capital Planning

From: Mark Horne, EIP Associates

Re: UCR LRDP EIR
Agency Scoping Meetings

In response to the Notice of Preparation filed by the UCR campus on the preparation of an Environmental Impact Report for the proposed 2002 LRDP, EIP Associates scheduled scoping meetings with the following agencies: California Department of Fish and Game, the County of Riverside (Planning Department); the City of Riverside; the South Coast Air Quality Management District, and the Santa Ana Regional Water Quality Control Board. Based on Michelle Ouelette's contact with the U.S. Fish and Wildlife Service, we are waiting to see their response to the NOP to determine whether a meeting is warranted. This memo summarizes the meetings held to date.

California Department of Fish and Game

On Tuesday, January 8, 2002, Mark Horne and Christy Loper of EIP Associates met with Juan Hernandez, Environmental Specialist III with the California Department of Fish and Game (CDFG), who is responsible for stream alternation agreements in Riverside County.

The UCR campus has several drainages that may be impacted by the implementation of the LRDP. CDFG requested that the EIR state which drainages are functional and which are ephemeral. CDFG advocates avoidance of on-site water features to minimize impacts to fish and wildlife. Impacts to fish and wildlife associated with water features would require mitigation.

Per Sections 1601 and 1603 of the California Fish and Game Code, any project that will impact a river, stream, or lake requires a Notification of Lake or Streambed Alteration. Depending on the extent of proposed activity, a Lake or Streambed Alteration Agreement may be required. This Agreement would be required in addition to a federal permit from U.S. Army Corps of Engineers under Section 404 of the Clean Water Act. The Agreement would include mitigation measures to lessen project impacts to fish and wildlife. Mr. Hernandez indicated the modification of ephemeral drainages (e.g., along the edges of the Southeast Hills) would also require mitigation.

Juan Hernandez explained that CDFG would prefer that any impacts to on-site drainages be mitigated on-site. This could include riparian restoration and enhancement, implementation of a riparian buffer zone, and/or implementation of a riparian conservation easement. The CDFG recommends 100 foot buffer zone from the edge of riparian vegetation (although the buffer width is negotiable). Educational tools such as interpretive signs could also be provided. Mr. Hernandez cited the California State University at Chico as a model for riparian conservation on a college campus.

Mr. Hernandez expressed concern regarding on-site habitat for the Least Bell's Vireo and the Southwestern Willow Flycatcher, in addition to other special status species, and recommended that the LRDP EIR include the results of such studies. When the need for future projects to conduct subsequent project-specific analyses, he agreed that detailed studies could be deferred until specific projects were proposed. He also recommended consultation with a CDFG botanist regarding potential impacts to plants. On-site California Gnatcatcher habitat falls under the jurisdiction of the U.S. Fish and Wildlife Service, and Mr. Hernandez recommended consultation with that agency.

County of Riverside, Planning Department

On Wednesday, January 9, 2002 Mark Horne of EIP Associates met with Aleta Lawrence, Director of Planning for the County of Riverside.

Ms. Lawrence expressed concern about the impact of campus growth on the 60 freeway, as well as on air quality. She noted the many air quality research programs conducted by the campus. Another concern is the impact of campus development on sensitive species.

Ms. Lawrence noted that a Draft General Plan for the County (and a Draft EIR) was due to be released at the end of January, or perhaps in February. (I requested a copy of the EIR for reference, and Ms. Lawrence indicated she would forward my request.) Two companion plans are also in process, but will follow the General Plan by one or more months: a Multi-Species Habitat Plan and a Transportation Plan (CTAP?).

Because of the jurisdictions involved in the habitat plan, release of the plan and the approval process is likely to take some time. Ms. Lawrence suggested we contact Kristi Lovelady at the County for information on the MSHCP. She noted that concerns for habitat not only include protection of land, but the need to preserve or protect habitat corridors. One example cited was the Highgrove Specific Plan, which dealt with potential connections between the Box Springs Mountains and the Santa Ana River.

The county is also concerned about the loss of agricultural lands, but acknowledges the potential for relocation of agricultural research programs to the Coachella Valley field station.

Ms. Lawrence also expressed interest in campus plans for alternative transportation, and noted the need for coordination with the Riverside Transit Authority. She discussed the concept of transportation nodes (which will be discussed in the Transportation Plan), but

UC Riverside will not be identified as one in the forthcoming plan. She suggested we contact Ed Studor in the Transportation Department for information regarding the plan.

South Coast Air Quality Management District

On Wednesday, January 9, 2002 Mark Horne and Michael Brown of EIP Associates met with Steve Smith, Program Supervisor of the CEQA Section.

Mr. Smith indicated that the AQMD had already sent a standard letter to the campus regarding the EIR scope. In general the AQMD relies upon the new source review process for stationary sources, and therefore does not review or comment on the majority of EIRs. The letter will note the general requirements for mitigation, including the potential for use of alternative fuel construction vehicles, and particulate traps on equipment. He also suggested consideration of a new commercial product (Purinox) which is an additive which reduces particulate and NOX emissions from diesel engines.

Mr. Smith also noted the probability that the campus would be subject to fleet vehicle rules, and the AQMD's interest in alternative fuel vehicles for future campus shuttle systems. (Apparently the size of a bus effects whether the vehicle is covered by the fleet rules.) The AQMD would be very interested in campus alternative transportation programs, and requested that the campus consider dedicated lanes for transit vehicles.

We discussed the concept of establishing thresholds for types of construction (e.g, the size of a building, below which significant construction emissions are unlikely to occur). Mr. Smith indicated the district is wary of establishing broad thresholds, but would be willing to review and comment on such thresholds, and recommended that they cover different types of construction (e.g., wood frame vs steel frame, or parking structures).

Mr. Smith noted that the long-awaited Draft CEQA Handbook (updating the 1994 handbook) could be released as early as March. We discussed the need for the LRDP EIR to use any new methodologies, and he acknowledged that the handbook would grandfather any project for which an NOP had been filed prior to the adoption of the handbook. The handbook is going to simplify emissions calculations methodologies, and take out some of the more problematic sections of the current handbook (which will probably include construction screening thresholds). Problems with the URBEMIS air quality model were discussed, which Mr. Smith advises against using at this time because of outdated emission factors. No changes in significance thresholds are anticipated.

A minor update of the South Coast AQMP is scheduled to be released this year, which will incorporate changes in the California State Plan.

City of Riverside

On Thursday, January 10, 2002, Mark Horne of EIP Associates, Bob Davis of Wilbur Smith Associates, and Nita Bullock of UCR met with Craig Aaron (Planning), James Walters, and

Brian May (Police Department); Perry Halterman (Fire Department), Andy Emery (Parks and Recreation); and Tom Boyd (Public Works) of the City of Riverside.

The representatives of the police department noted the existence of the UNET program, and expressed a desire for continued participation in the program, which provides law enforcement services in the vicinity of the campus, with equal participation of UCR and City police staffs. They expressed concern for the impact of off-campus housing, increases in traffic (related to congestion, accidents and traffic enforcement), parking around the campus (including management of off-campus lots, such as the parking structure in University Village), and the potential for increase businesses in the area (at which students may congregate). They had been briefed by Director Whylde (Planning) about the potential for "major" changes along University Avenue. As for the design of the campus edge, they were interested in whether the campus would use the CPTED concepts (Crime Prevention Through Environmental Design) for landscaping and lighting design.

Mr. Emery expressed interest in the potential impact of off-campus housing on parks in the neighborhood, including North Park, the Bobby Bonds Recreation Center, Highland Park, Islander Park and the Sports Complex. After discussing the extent of potential on-campus recreational facilities, Mr. Emery indicated the primary concern was not a spillover of demand, but demand associated with persons that reside off-campus (e.g., from new housing that might be provided in the vicinity of the campus), and whether this may result in demand for additional services in parks (e.g., restrooms). He was also interested in expansion of trails and bike paths, but couldn't provide any details about the concept of a bike trial along the Gage Canal.

Mr. Halterman expressed concern about the impact of false (fire) alarms from the campus. Because UC is not subject to local fees, the City cannot be reimbursed for the cost of responding to false alarms on the campus. Concern was also expressed about a perceived desire of the campus fire marshal to provide fire prevention features that exceed code requirements (with the implication that these features increase the potential for false alarms – e.g., student floor wardens reporting burnt toast). Nita Bullock asked for data on the number of false alarms. Mr. Halterman acknowledged that the Fire Department had no concerns regarding adherence to code requirements with respect to campus buildings.

Director Boyd (Public Works) said traffic was his main concern. The city would prefer that campus related traffic be directed to arterial roads (e.g., Martin Luther King) and be kept off local streets. The city is interested in whether the campus will mitigate the direct impacts of the LRPD, but does not expect the campus to mitigate the effects of third-party development (which might serve campus-related housing demand). When asked about what assumptions should be made about the extent of off-campus growth (related to the University Community Plan, University Avenue, the Marketplace and Downtown), it was suggested that we contact Director Whyld. (A separate meeting is being scheduled to discuss assignment of SGAG traffic data to local streets.)

Sewer transport was acknowledged as another concern. The city is not clear on the previous agreement (and apparently no one currently has located a copy of the agreement). The City

is in the process of completing a sewer capacity study, which won't be completed for several months. The City typically relies on hook-up fees to make improvements, and since UC is not subject to those fees, they would like to devise a mechanism for UC to contribute. Treatment capacity was acknowledged as being sufficient "for now."

Storm drain capacity was noted as another issue, apparently due to the uncertain prospects for the Arroyo project, which we learned was to be the subject of litigation over the City's approval of the project. For the west side of the campus, no specific drainage concerns were noted, however it was suggested that Sandy Caldwell (of Public Works?) might have more information. Mr. Boyd noted that there were no other utility concerns from the City.

Santa Ana Regional Water Quality Control Board:

On January 12, 2001, Mark Horne and Terrance Wong of EIP Associates met with David Woelfel of the Planning Division of the Santa Ana Regional Water Quality Control Board.

Mr. Woelfel suggested that the campus should consider incorporation of Best Management Practices to reduce runoff. He suggested that an EPA website had some useful examples. Concerns of the SARWQCB would relate to the loss of riparian areas and groundwater recharge, which could affect water quality and supply. The potential for increased stormwater runoff, and urban contaminants in that runoff was another concern. They would prefer to see no net increase in runoff from the portion of the campus that is west of the freeway, which would require the used of grassed swales and other BMPs.

Mr. Woelfel suggested we contact either Mike Roth (909-320-2027) or Maria Macario (909-321-4582) regarding specifics regarding future requirements for stormwater mitigation. Mr. Woelfel also indicated it was unlikely that TMDLs would be adopted for the portion of the Santa Ana River to which the campus drains.

EIP
ASSOCIATES

February 27, 2002

To: Nita Bullock, UCR Capital and Physical Planning

From: Mark Horne, EIP Associates

Re: Issues raised at LRDP EIR Public Scoping Meeting

The following list summarizes issues raised in at the Public Scoping Meeting held January 8, 2002, based upon a review of the tape recording of the meeting, and the written comment sheets distributed at the meeting.

AESTHETICS

- Citrus groves represent the history of University and City. Development along MLK should allow for some citrus trees to be preserved.
- Should provide buffer between high-density housing, buildings and especially parking structures.
- Concern about potential loss of open-space and greenbelts. Much open and green space has been lost over the past 10 years.
- Parking structure on Lot 13:
    - There are houses 15-20 ft. above the parking lot and lights can be seen. These houses are especially vulnerable to the degradation a parking structure would cause. A structure is inappropriate at this area. Visual, noise, and compatibility of such a use next to homes is not acceptable. Why not return to old plan of building tennis courts in the open land that is now Lot 13?
    - Why can't the parking structure be located farther west, nearer to campus buildings?

AIR QUALITY

- Concern of impact associated with increased traffic.

BIOLOGICAL RESOURCES

- An existing wildlife corridor does exist on campus that must be addressed in EIR: Botanic Gardens (nature preserve), University Hill, Picnic Hill and Coyote Hill.
- Lots of wildlife on campus, including sensitive species. Need to coordinate with Riverside County MSHCP.
- Increased development has resulted in an increased problem with wildlife predation on pets.
- Important connection between Botanic Gardens to Box Springs Mountains Park & Sycamore Canyon Park.
- What will happen to riparian area between Canyon Crest & the freeway (the Gage basin)?
- As part of the 1990 LRDP, the main drainage through the campus was proposed to be restored as a recreational riparian corridor. I believe the benefits of doing so would far outweigh the costs.
- Must look at impact on species off-campus as well as on-campus. Even suburban land uses may support species.

GEOLOGY & SOILS

- Destruction of natural land formations

HYDROLOGY AND WATER QUALITY

- EIR needs to address the impact of increased runoff due to increase in buildings and associated lots. Should use green space to decrease runoff.
- Area to east of campus is a flood plain, and should not be defined as a drainage problem! More of a development problem.
- Under CEQA, EIR must deal with existing floodplain, not with proposed future 100-year floodplain.

LAND USE AND PLANNING

- How much acreage is needed for a campus of 25,000 students. Should look and study other campuses and their conditions.
- Land facing Big Springs Rd. slated for future student housing. Should conserve some open space.
- Any proposals for acquisition of lands west of Chicago?
- Loss of green/open space
- More student housing should be planned on the west so students can take advantage of the proximity to the University Avenue businesses.
- Any truth to the rumor of a Multi-level parking structure at end of Parking Lot 13? How many levels? Public can not communicate and participate meaningfully if details of the structure are so vague. This particular structure will be most sensitive because it is contiguous with residential housing, and should demand special attention in the EIR. Lot 13 is incompatible with single-family homes.
- (Structure on Lot 13) Visual, noise, and compatibility of such a use next to homes is not acceptable.
- UCLA does not have parking structures adjacent to homes.
- Area to the north of campus is described as residential and a series of community parks. This is not true
- Area to east & northeast is suburban, not urban

NOISE

- Noise pollution
- (Structure on Lot 13) Visual, noise, and compatibility of such a use next to homes is not acceptable.

POPULATION AND HOUSING

- With new family student housing to be located west of freeway, what happens to existing family housing?
- Any possibility of buying existing high-density housing east of UCR around Big Springs Rd. & Watkins Dr.?
- Are UCR & City going to be partners to acquire land for housing?

PUBLIC SERVICES

- Effects of increased population on law enforcement
- Safety issues with people walking to campus.
- The previously-identified location of a future arena is located in an area that the community has identified as a possible location for a branch City library, which is needed to address the absence of a branch library in the area.

RECREATION

- Loss of public recreational opportunities –closing the track to public use and the corner lot used for soccer. What will University give back to the public? Will any of this growth be available to those people who live in the neighborhood?
- Loss of parkland to the City.
- Campus needs to manage use of recreational resources with both the City & County. Should work towards developing/expanding parks in nearby neighborhoods and in the Box Springs Mountains. Students will use the Box Springs Mountains for recreation in the future.
- Corner of Watkins Drive and Valencia Hills is used by the community as open space.
- With the student use of the local parks, and specifically the Box Springs Mountains Park, what will happen to the riparian area between Canyon Crest and the freeway (the Gage basin)?
- Planning can not stop at the boundaries of the campus. Need to coordinate with City (e.g. use of city parks for recreation). Need to be thinking beyond University Avenue.

TRANSPORTATION & TRAFFIC

General

- Potential placement of a Metrolink Station will be impacted by (Arroyo Project) plan to change floodplain, and will have to be addressed in EIR.
- Need entrances to campus that are NOT through neighborhoods.
- Excessive disturbance caused by trucks (noise, air pollution, traffic)
- How will congestion, daytime parking on city streets, increased danger to pedestrians, etc. be handled?
- No parking in neighborhoods.

Traffic

  - Concern about increased traffic & building of multi-level parking structures.
  - Increased traffic on 60 FWY will have a profound effect on the quality of life on the campus.

Bicycles

  - Travel by bicycle must play a big role.
  - Public safety issues of increased pedestrian and bike traffic need to be addressed.
  - University needs to provide bike paths and safe bike parking.
  - Bicycle & walking access has gotten worse! We need dedicated safe routes along paths of major traffic onto campus. This should be coordinated with a comprehensive alternative transportation plan for the expanded campus.

Alternative Transportation

- EIR needs to address the development of environmentally friendly transit alternatives (pedestrian walkways, bikeways, shuttles)
- University should have constantly moving shuttles throughout the campus, parking lots, and on University Ave. and Canyon Crest.
- Is there a cooperative effort between the University and Riverside Transit? Is it being proposed? For example, students at UC Santa Cruz have a pass to travel anywhere by bus. The students would love it!
- One side of campus is part of a county alternative transportation plan to get people on bikes and to walk, while the other side closes off all the easy access. Campus needs to be more aggressive and experience what it is really like to walk and bike along campus.

UTILITIES AND SERVICE SYSTEMS

- 25,000 students will be using the City's sewer system for which citizens get billed for!

- Too narrow of a scope to only look at demand for water & electricity on-campus, since students will be residing off-campus as well.

ALTERNATIVES

- Why is target set at 25,000? Would like to see analysis of impact of lower target for growth as well as analysis of impact of rate of growth from 13k to 25k.
- Analysis needed for a slower phase growth in addition to a lower enrollment target at UCR.

OTHERS

- Students need something to do off-campus. Need some place other than Starbucks.
- Existing infrastructure (shops, gas stations) inadequate for influx of students.
- University must cooperate with City and County in attempt to recreate once thriving businesses.
- Is there space allowed for a Law School & Medical School? Need a veterinary school of medicine.
- Must look at off-campus mineral resources too. University will eventually need some of these resources to raise areas where they will be doing development.
- Proposed scope ignores many off-campus effects. Scope based on political rather than environmental & geographical boundaries.

Appendix B Biological Resources Technical Report

General Biological Evaluation
University of California, Riverside
Long-Range Development Plan
Riverside, California

prepared for:

EIP Associates
11400 West Olympic Blvd., Suite 200
Los Angeles, CA 90064

January 1, 2002

Project Number: BMS01-101

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Appendices

Executive Summary

Natural Resources Assessment, Inc. (NRA, Inc.) was contacted to conduct a general biological evaluation of the Long-Range Development Plan (LRDP) being prepared by the University of California for its Riverside campus. The purpose of the LRDP is to address the needs and demands for expansion of university facilities and capacities, while minimizing conflicts with other campus resources, including biological resources.

The University of California, Riverside (UCR) campus is located in the eastern section of Riverside, near the Box Springs Mountains. The campus is an existing facility, extending into the commercial and residential clusters along University Avenue, Chicago Avenue, Canyon Crest Drive and Blaine Street, as well as into downtown Riverside. NRA, Inc., confined their evaluation to the main campus, and further, to the natural, semi-natural and agricultural areas, with some landscape areas also included as appropriate.

NRA, Inc. reviewed available information on the known sensitive resources in the area as well as other available technical information on the biological resources of the campus. We used the information to focus our survey effort in the field. The field survey consisted of a site overview of the biological resources of the campus, including natural, semi-natural, agricultural and landscape habitats. NRA, Inc. evaluated these sites using both driving and walking surveys, as appropriate. Areas of potential high sensitivity such as drainages and native plant communities, were evaluated on foot. During the survey, notes were made on the plant and animal species observed, the surface characteristics and topography of the campus area, the habitats on site and the overall condition of on site habitats.

The California Natural Diversity Data Base identified 40 sensitive biological resources of concern found in the vicinity of the university. In addition, NRA, Inc. identified additional resources that may be present on or around the campus.

The information provided in evaluating the proposed LRDP and impacts to biological resources include a proposed development plan map, a general project description and information on potential biological resources on campus. There are several areas designated as open space/pedestrian linkages. Detailed information on proposed improvements in open space/pedestrian linkages areas was not available for review; therefore, only general impacts can be assessed. Proposed mitigation measures are similarly general in scope.

The campus can be divided into four types of biological habitats based on the mix of native and non-native plant species. The landscape habitat makes up the bulk of the academic core and includes the lawn, tree and shrub areas that are heavily manicured. This habitat is found mainly on the central campus area and the residential units. The second type is agricultural areas, limited almost entirely to the west campus area. The third common habitat type is natural, and occurs primarily in the hills of the Botanic Gardens as well as the south campus area. There are also smaller isolated pockets of natural habitat scattered on the campus. The fourth and least common type of habitat is semi-natural, and is generally confined to smaller scattered localities around the campus where landscaping and manicuring treatments are less rigorous.

In general, the campus landscape plant communities are dominated by non-native lawn grasses, shrubs and trees. For the most part, the lawns dominant the campus, and trees and shrubs are clustered along buildings, parking medians and the edges of walkways and roadways. There are islands of shrubs and trees, such as occur within the married student housing area and near the administration.

The agricultural fields north of Martin Luther King Boulevard (known as Pennsylvania Avenue in 1989) are dominated by sub-tropical tree projects. The southern teaching and research fields are dominated by a mix of student and faculty experimental plots.

Semi-natural habitats include areas that contain cultivated species (usually trees) but are relatively unmaintained. These habitats include the swale near the Aberdeen-Inverness residence halls, the open space at the base of the Veitch Student Center and the area around Picnic Hill. These areas provide food and cover for wildlife that are less tolerant of human activity than those species found in the landscape and agricultural habitats. The semi-natural habitats also provide roosting and perching sites for migratory bird species.

These habitats undergo some regular maintenance, including lawn maintenance and some tree maintenance (primarily limb removal and leaf cleanup), but most of the shrubs and trees have been left unmanicured.

Natural habitats include ruderal, annual grasslands, coastal sage scrub and riparian plant communities. These communities exist in the currently undeveloped areas of the campus, primarily on the north and south campus.

The analysis of impacts in the open space/pedestrian linkages areas will depend upon the amount and type of development proposed for these areas. In general, impacts will include:

1. Degradation and loss of ruderal habitat
2. Degradation and loss of annual grasslands.
3. Degradation and loss of native scrub and riparian habitats.
4. Degradation and loss of drainages.
5. Degradation and loss of raptor foraging habitat.
6. Loss or disruption of wildlife movement
7. Impacts to sensitive species.

The degradation and loss of ruderal habitat in the vicinity of the campus are not considered to be significant, since this habitat is common and does not have a high biological value.

The degradation and loss of annual grassland habitat is not considered to be significant, since this habitat is common. The loss of raptor foraging habitat as a result of the loss of annual grasslands on campus is not considered to be significant, since annual grassland habitat is limited in extent on the campus.

The loss of coastal sage scrub and riparian habitat is considered to be significant, since both of these habitats are in decline throughout southern California.

The loss of drainages and riparian habitat is significant and will need to be addressed under the provisions of Section 1600 et al of the CDFG Code.

Impacts to wildlife movement are not considered to be significant, since surrounding development has effectively eliminated long-range movement between the campus and other habitats.

Impacts to some sensitive species may be significant depending upon the species of concern and the degree of impact. The California Environmental Quality Act provides for the protection of sensitive species that are not listed but still meet the criteria for listing.

Impacts to listed species are significant, since they are protected under the California Environmental Quality Act and are protected by one or both of the California Endangered Species Act and the Federal Endangered Species Act.

The cumulative loss of ruderal and annual grassland is not considered to be significant, since these habitats are common in southern California. However, the cumulative loss of raptor foraging habitat provided by annual grasslands is considered to be significant.

Cumulative impacts to coastal sage scrub and riparian habitats are considered to be significant. These habitats are in decline in the vicinity of the campus and the greater San Bernardino and Riverside county areas as a result of the conversion of open space to development. In addition, riparian habitat is protected under the provisions of Section 1600 et al of the CDFG Code.

Cumulative impacts to drainages are considered to be significant, since drainages are rapidly disappearing both in the vicinity of the campus and in the greater San Bernardino and Riverside county areas as a result of the conversion of open space to development. In addition, drainages are protected under the provisions of Section 1600 et al of the CDFG Code.

Cumulative impacts to wildlife movement are not considered to be significant, since these impacts have already occurred in this area of Riverside County.

Cumulative impacts to sensitive species are considered to be significant; however, the regional impacts to sensitive species is generally out of the scope of any one project. Regional impacts to specific species or species groups are generally addressed as part of regional management or habitat conservation plan.

The preservation of drainages in the central and south campus areas, as well as the preservation of the open space areas around the Botanic Gardens, offset some of the individual and cumulative impacts of the LRDP. Decisions regarding the preservation or development of open space/pedestrian linkages should evaluate the need to preserve native habitats for general and sensitive species.

Introduction

Natural Resources Assessment, Inc. (NRA, Inc.) was contacted to conduct a general biological evaluation of the Long-Range Development Plan (LRDP) being prepared by the University of California for its Riverside campus. The purpose of the LRDP is to address the needs and demands for expansion of university facilities and capacities, while minimizing conflicts with other campus resources, including biological resources.

Project Location and Description

The University of California, Riverside (UCR) campus is located in the eastern section of Riverside, near the Box Springs Mountains. It extends from south of Martin Luther King Boulevard north to just beyond Blaine Street, and from Chicago Avenue east to Valencia Hill Drive. It includes the house of the Chancellor on Watkins Drive (Figure 1). The campus is located between commercial use areas west of the campus, mainly residential areas to the east and north, and a mix of residential and open space areas to the south.

The campus is an existing facility, extending into the commercial and residential clusters along University Avenue, Chicago Avenue, Canyon Crest Drive and Blaine Street, as well as into downtown Riverside. For purposes of this evaluation, the affected area is confined to the main campus, and further, to the natural, semi-natural and agricultural areas, with some landscape areas also included as appropriate.

The University area lies in Sections 19, 20, 29 and 30, Township 2 south, Range 4 west on the Riverside East 7.5Æ USGS quadrangle, San Bernardino baseline and meridian (Figure 2).

Methods

Research

NRA, Inc. reviewed available information on the known sensitive resources in the area. The literature review included a review of standard field guides and texts on sensitive and non-sensitive biological resources, as well as the following sources:

ò List of sensitive biological resources provided by the California Natural Diversity Data Base
ò General texts and other documents identifying potential resources on the campus.
ò Previous studies conducted on the campus and campus facilities.

NRA, Inc. also reviewed other available technical information on the biological resources of the campus. We used the information to focus our survey effort in the field.

Field Surveys

NRA, Inc. conducted a site overview of the biological resources of the campus, including natural, semi-natural, agricultural and landscape habitats. Their survey included the open spaces in the eastern and southern areas of the campus, internal open spaces containing some non-formal landscaping and the agricultural fields.

NRA, Inc. evaluated these sites using both driving and walking surveys, as appropriate. Areas of potential high sensitivity such as drainages and native plant communities, were evaluated on foot. During the survey, notes were made on the plant and animal species observed, the surface characteristics and topography of the campus area, the habitats on site and the overall condition of on site habitats.

It should be noted that the work was intended as a general evaluation of the biological resources of the site, including the potential presence of sensitive species. Detailed walkover surveys were not conducted over the entire campus, nor were focused surveys for sensitive species conducted. Instead, NRA, Inc. made general notes on species observed, as well as noting those habitats that may support other species not recorded during the survey.

Results

Research

The California Natural Diversity Data Base identified 40 sensitive biological resources of concern found in the vicinity of the university. In addition, NRA, Inc. identified additional resources that may be present on or around the campus. The resources, their habitat preferences, status, seasonal distribution and probability of occurrence are identified in Table 1, Appendix C.

The LRDP was originally evaluated in 1989 by LSA Associates At that time, the campus had more open space than at present. Most of the subsequent building on campus has been in the landscaped areas and has not resulted in the loss of natural or semi-natural habitats. Notable exceptions include the large open space and drainages near the student residential halls, the drainage extending from the eastern campus hills just north of the Botanic Gardens, the hilltop just north of the Botanic Gardens and the Box Springs Arroyo. Other small additional impacts resulted from the construction of a Thermal Energy Storage System in the hills south of the Botanic Gardens (University of California, Riverside 1993).

Field Surveys

The campus can be divided both in terms of a geopolitical division based on land use and road layouts, and on the basis of biological habitats. Geopolitically, the campus divides into the west campus, central campus, south campus and north campus.

Geopolitical Divisions

The west campus is that area of the campus west of Interstate 215 (I-215), and is comprised of mainly agricultural fields south of University Avenue and a mix of commercial, residential and teaching facilities clustered along University and Chicago Avenues.

The central campus (east of I-215) comprises the academic core of the research and teaching facilities, and is dominated by landscape habitats. There are some areas of natural and semi-natural habitats in this area.

The south campus is the large open space south of the campus buildings and the cultivated areas of the Botanic Gardens. It includes the uncultivated areas of the Botanic Gardens and areas immediately to the east.

The north campus includes the areas north of Linden and east of the student residential areas.

Biological Habitats

The campus can be divided into four types of biological habitats based on the mix of native and non-native plant species. The landscape habitat makes up the bulk of the academic core and includes the lawn, tree and shrub areas that are heavily manicured. This habitat is found mainly on the central campus area and the residential units. The second type is agricultural areas, limited almost entirely to the west campus area. The third common habitat type is natural, and occurs primarily in the hills of the Botanic Gardens as well as the south campus area. There are also smaller isolated pockets of natural habitat scattered on the campus. The fourth and least common type of habitat is semi-natural, and is generally confined to smaller scattered localities around the campus where landscaping and manicuring treatments are less rigorous.

Habitat Descriptions

Landscape

In general, the campus landscape plant communities are biologically sterile for native species, dominated by non-native lawn grasses, shrubs and trees. For the most part, the lawns dominant the campus, and trees and shrubs are clustered along buildings, parking medians and the edges of walkways and roadways. There are islands of shrubs and trees, such as occur within the married student housing area and near the administration building, but these islands are small and generally located in areas of high human activity. As a result, wildlife use of these areas tends to be limited to those species tolerant of humans and human activity.

Agricultural Fields

In 1989, the bulk of the west campus was in teaching and research agricultural fields. Since that time, portions of the fields have been converted to either parking areas or additional buildings. A large student parking lot has been constructed on the eastern quarter of the northern fields. Current construction of new buildings is taking place in the south central quarter of the southern fields.

The remaining fields north of Martin Luther King Boulevard (known as Pennsylvania Avenue in 1989) are dominated by sub-tropical tree projects. The remaining southern teaching and research fields are dominated by a mix of student and faculty experimental plots.

The Box Springs Arroyo is a major drainage that runs east to west along the southern section of the teaching and research fields. This drainage was described as modified and channelized in 1989, providing very little native habitat. There are extensive stand of eucalyptus trees along the Box Springs Arroyo that provide perching, roosting and occasionally nesting habitats for raptors, as well as smaller bird species. Some mammals may also use these stands.

The northern fields undergo periodic disturbance as a result of weed control, citrus harvesting and other activities associated with teaching and research work. The southern fields, consisting of a variety of seasonal experimental plots, undergo different and irregular types of impacts. Some sections of these fields have permanent groves and crops that undergo regular maintenance, while others are replanted from year to year with different crops. As a result, these areas are disturbed in different ways both within and between years.

Semi-natural

Semi-natural habitats include areas that contain cultivated species (usually trees) but are relatively unmaintained. These habitats include the swale near the Aberdeen-Inverness residence halls, the open space at the base of the Veitch Student Center and the area around Picnic Hill. These areas provide food and cover for wildlife that are less tolerant of human activity than those species found in the landscape and agricultural habitats. The semi-natural habitats also provide roosting and perching sites for migratory bird species.

These habitats undergo some regular maintenance, including lawn maintenance and some tree maintenance (primarily limb removal and leaf cleanup), but most of the shrubs and trees have been left unmanicured.

Natural

Natural habitats include ruderal, annual grasslands, coastal sage scrub and riparian plant communities. These communities exist in the currently undeveloped areas of the campus, primarily on the north and south campus.

Ruderal

The ruderal plant community is also known as a weedy plant community. It is characterized by periodic or constant disturbances such as weed control, heavy vehicle use, disking, controlled or uncontrolled burning and similar disruptive activities. Ruderal plant communities are generally found in flat open areas, with the plant species dominated by weedy natural and introduced weed species highly adapted to disturbance. Plant species found in the ruderal plant communities on campus include Mediterranean grass (*Schismus barbatus*), short-podded mustard (*Hirschfeldia incana*), red brome (*Bromus madritensis*), horehound (*Marrubium vulgare*) and in areas with denser soils, fiddleneck (*Amsinckia menziesii*). Wildflowers are limited in this habitat, mostly confined to sow thistle (*Sonchus oleraceus*), red-stemmed filaree (*Erodium cicutarium*) and other weedy wildflower species.

On the campus, this plant community is frequently found along the edges of developed areas, such as around parking lots and outlying buildings. It is found throughout the agricultural fields at the edges of dirt roads and cultivated plots. It is the dominant plant community in the large open area east of the student residence dorms. Much of the plant community in this area has been reduced in size since 1989 by the construction of additional residence dorms, the childrenÆs education center and associated parking lots. There was also an area of ruderal habitat on a vacant lot at the northwest corner of Canyon Crest Drive and Blaine Street, but that habitat was lost due to the construction of student housing.

Annual Grassland

The annual grassland plant community occurs primarily on heavy soils and generally flat topography. It is a invasive plant community, replacing the native grasslands formerly found in California. As an invasive plant community, it is tolerant of disturbance, and is generally found in areas that are similar to ruderal habitats but that are undergoing less disturbance. Dominant species in this plant community include slender wild oats (*Avena barbata*), red brome, ripgut grass (*Bromus diandrus*), and occasionally cheatgrass (*Bromus mollis*). Wildflowers that can occur in this plant community include fiddleneck (*Amsinckia intermedia*), golden stars (*Bloomeria crocea*), baby-blue eyes (*Nemophila menziesii*) and croton (*Croton californica*).

Annual grassland forms a mixed plant community with coastal sage scrub. It forms the understory plant community in areas where frequent fires have burned the scrub cover and slowed the recovery of native scrub species.

Annual grassland is found primarily in the hills in the south campus area. There is also a small stand along the southern bank at the eastern end of the Box Springs Arroyo.

Coastal Sage Scrub

Coastal sage scrub is characterized by drought deciduous shrubs forming an open canopy. Coastal sage scrub in southern California can be divided into distinct types depending upon the geographic location. Each type is made up of a different mix of plant species. In the Riverside area, the coastal sage scrub type is known as Riversidean coastal sage scrub. The dominant species in the Riversidean coastal sage scrub include desert brittlebush (*Encelia farinosa*), California sagebrush (*Artemisia californica*), flat-topped buckwheat (*Eriogonum fasciculatum*) and black sage (*Salvia mellifera*). The Riversidean coastal sage scrub can be further subdivided depending upon the slope aspect. On south facing slopes, the dominant scrub species is desert brittlebush. On north facing slopes, the dominant species include California sagebrush, flat-topped buckwheat and black sage. Herbaceous dicots in this plant community include corethrogyne (*Corethrogyne filaginifolia*) and everlasting (*Gnaphalium* spp.).

Depending upon the slope aspect, soils and degree of shrub cover, the understory includes annual grasslands and native wildflowers. In more moist soils, wildflower species in addition to those found in annual grasslands include tidy-tips (*Layia platyglossa*), cream cups (*Platystemon californicus*) and California poppy (*Eschscholzia californica*). In more open areas, plantain (*Plantago ovata*), Mariposa lily (*Calochortus splendens*) and blue dicks (*Dichelostema pulchellum*) are common.

In western Riverside, the coastal sage scrub habitat includes granitic rock outcroppings. These outcrops provide topographic variety and also a source of greater moisture. There are certain plant species that are associated with these rock outcrops that are not found elsewhere. These include California snapdragon (*Scrophularia californica*) and bricklebush (*Brickellia californica*).

Coastal sage scrub is the dominant native habitat on campus. It is confined almost entirely to the steep hillsides and drainages of the south campus, extending into the Botanic Gardens and the adjacent hillsides to the north. A small stand also exists in the southeastern agricultural fields, along the northern bank of the Box Springs Arroyo.

Riparian

The riparian plant community is found along drainage courses. The mix of plant species found in this plant community on campus varies depending upon the available water, soils, and disturbance activities. Some of the drainages are dry watercourses with no surface water, upland soils and a high degree of disturbance. Other drainages have moist soils or surface water, and have remained relatively undisturbed over time.

Starting at the northern campus, there were two drainages that began in the flat fields east of the student residence halls and drained southwest around either side of the hill occupied by the Veitch Student Center buildings. Since that time, most of the northern drainage has been filled in and channelized to accommodate the construction of the new student residence halls. The south drainage and the remaining section of the north drainage near Aberdeen-Inverness are still relatively intact. The upper portion of the south drainage supports a degraded stand of FremontÆs cottonwood (*Populus fremontii*) and mulefat (*Baccharis salicifolia*), along with cocklebur (*Xanthium strumarium*) and tree tobacco (*Nicotiana glauca*). This plant community changes in the vicinity of the Veitch Student Center and the residence halls, with California walnut (*Juglans californica*) being the dominant native and Peruvian pepper tree (*Schinus molle*), bottlebrush (species unknown) and other landscape shrubs forming the canopy species in both the north and south drainages. The understory is predominately non-native lawn grasses, but the line of drainage persists throughout for both the north and south drainage.

The next cluster of four drainages is at the northern boundary of the Botanic Gardens. The first drainage starts east of Parking Lot 13 and has been significantly impacted by the expansion of the parking lot and the construction of the road to the Salinity Lab facility. This drainage formerly ran from the hills at the extreme eastern edge of the campus south to the flat, broad drainage area occupied by Parking Lot 13, turning west to continue down the broader drainage. This drainage now terminates at Parking Lot 13. Plant species in this drainage include mulefat, Peruvian pepper tree on the bottom of the drainage, with coastal sage scrub species on the banks.

The second drainage was described in 1989 as a somewhat artificial gully woodland containing native riparian species such as arroyo willow, Fremont cottonwood, mulefat and Mexican elderberry (*Sambucus mexicana*), and non-native species such as Peruvian pepper tree, common fig (*Ficus palmata*) and others. This gully is apparently fed by runoff from the teaching and research orchards upstream; ordinarily, this small cutting would probably support only coastal sage scrub species.

The third drainage starts at the entrance to the Botanic Gardens (itself situated on a former drainage course) and extends from the entrance down to the visitorÆs parking lot adjacent to Parking Lot 13. Mulefat and California walnut are the dominant species in this drainage.

The fourth drainage starts up in the hills between the Botanic Gardens and the greenhouse area. It extends down to the Botanic Gardens parking lot, where it joins the main drainage. This drainage contains some mulefat in its lower portions, while the upper portion is dry and supports primarily coastal sage scrub species.

The next area is the Box Springs Arroyo in the west campus. This is the large east-west drainage crossing through the teaching and research fields south of Martin Luther King Boulevard. The Arroyo has been severely altered by past practices, including channelization, disking and grading. The eastern half of the Arroyo is essentially a flat, broad and dry wash. Further downstream it becomes a grassy swale. The western half is a dry drainage that is bordered by the eucalyptus stands mentioned earlier.

The Box Springs Arroyo is interrupted by the Gage Canal, an artificial gravity fed channel running north to south across the agricultural, teaching and research fields. The Gage Canal is a concrete lined canal that is well maintained and kept free of any wetland growth by the canal operator. The Canal does not provide any wetland habitat value.

One part of the Arroyo is occupied by old fish ponds and reservoirs, evidently set up for malarial experiments. At the time of the survey, a great egret was observed hunting for fish in these ponds Other water dependent species, such as mallard and horned grebe, were observed diving for pond vegetation on one of the larger reservoirs.

The final drainage occurs in the central campus, running between University Avenue and Bannockburn. This drainage provides the highest quality riparian habitat on campus, forming a dense stand of arroyo willow, Fremont cottonwood, sycamore (*Platanus racemosa*), sedge (*Carex* sp.) and mulefat. There was surface water present at the time of the survey.

Wildlife Communities

Wildlife communities on campus can easily be divided into two types: artificially created habitats suitable for use only by the most tolerant of wildlife species, and semi-natural or natural habitats suitable for most native species as well as those species tolerant of some human activity.

In general, the central campus, west campus and north campus contain mostly artificially created habitats that are of little to no use to most native wildlife species. In addition to limited food and water sources, these areas are strongly impacted by human and vehicle activity. Tree and scrub habitats are used primarily by common bird species such as the northern mockingbird, house finch, house sparrow, scrub jay and AnnaÆs hummingbird. Amphibian species are probably absent, and reptile species would likely be limited to the side-blotched lizard and alligator lizard. Mammal species would include the non-native Norway rat and house mouse, as well as the native BottaÆs gopher and Beechey ground squirrel.

Exceptions to these habitats include the drainage alongside Bannockburn and the remaining drainages, riparian habitat and open fields east of the student residence halls. The Bannockburn drainage provides suitable riparian foraging and nesting habitat for species groups such as warblers, sparrows, hawks, owls and jays, as well as smaller mammals such as the opossum. The remaining drainages provide some plant cover and a temporary source of water for birds, reptiles and mammals species, while the associated riparian habitat also provides some cover, foraging and nesting habitat for native species. The open fields provide foraging habitat for mourning dove, house finch, and some raptor species.

The south campus area, including the drainages and hills north of the Botanic Gardens, includes the largest extent of native habitats on the campus. The relatively large stand of undisturbed coastal sage scrub mixed with annual grasslands provides important habitat for native wildlife, including sensitive species such as the orange-throated whiptail, burrowing owl, California gnatcatcher and Stephens kangaroo rat. The drainages provide water and foraging habitat for other species such as sparrows, warblers, hawks and owls.

Sensitive Biological Resources

Table A in Appendix C provides a discussion of the species likely to be present on the campus, and what habitats they are likely to occupy. Based on the current development plans (2001), most of the habitats preferred by the sensitive species will be set aside as open space.

Habitat Fragmentation and Wildlife Movement

Habitat fragmentation and wildlife movement are closely related issues, with wildlife movement as an important factor to be considered in discussions of habitat fragmentation. Habitat fragmentation is isolation of one area of habitat from a larger area that provides a more complete and functional system.

A concept that is related to the issue of fragmentation is that of wildlife corridors or linkages. These essentially counteract the effects of fragmentation (although not always completely). Corridors serve to connect areas of large habitat that may otherwise be separated. Corridors serve to interconnect water, food, and cover availability, spatially linking these three resources with wildlife in different areas.

Long-Range Development Plan Area

Large movement corridors no longer exist within the Long-Range Development Plan area. The presence of suburban and urban development around the university have effectively cut off most wildlife movement to areas outside of the campus boundaries. Within the campus, small corridors exist along the drainages around the student residential areas and in the Botanic Gardens, however, these corridors do not function to connect isolated habitats or habitat resources.

Habitat fragmentation both in and around the campus has already occurred and is ongoing as a result of the current development activity.

Drainages and Streambeds

Army Corps of Engineers

The Army Corps of Engineers (Corps) regulates discharges of dredged or fill material into waters of the United States. These waters include wetlands and non-wetland bodies of water that meet specific criteria. Corps regulatory jurisdiction pursuant to Section 404 of the Clean Water Act is founded on a connection or nexus between the water body in question and interstate commerce. This connection may be direct, through a tributary system linking a stream channel with traditional navigable waters used in interstate or foreign commerce, or may be indirect, through a nexus identified in the Corps regulations.

California Department of Fish and Game

The California Department of Fish and Game (CDFG), through provisions of the State of California Administrative Code, is empowered to issue agreements for any alteration of a river, stream or lake where fish or wildlife resources may adversely be affected. Streams (and rivers) are defined by the presence of a channel bed and banks, and at least an intermittent flow of water. CDFG regulates wetland areas only to the extent that those wetlands are part of a river, stream or lake as defined by CDFG.

Determining the limits of wetlands is not typically done in obtaining CDFG Agreements. The reason for this is that CDFG generally includes, within the jurisdictional limits of streams and lakes, any riparian habitat present. Riparian habitat includes willows, mulefat and other vegetation typically associated with the banks of a stream or lake shoreline. In most situations, wetlands associated with a stream or lake would fall within the limits of riparian habitat. Thus, defining the limits of CDFG jurisdiction based on riparian habitat will automatically include any wetland areas.

Long-Range Development Plan Area

With the exception of the Box Springs Arroyo, all of the drainages within the LRDP will probably come under the jurisdiction of the California Department of Fish and Game (CDFG). All the drainages have a definable bed and bank for at least a portion of their length. The presence of a bed and banks defines the jurisdictional limits of the CDFG in the absence of riparian habitat. In drainages with extensive riparian habitat (such as the Bannockburn drainage), the CDFGÆs jurisdiction extends outside the bed and banks to the furthest outer extent of the riparian cover.

The Box Springs Arroyo does not have a definable bed or bank, nor does it support riparian or wetland habitat. Therefore, it does not come under the jurisdiction of the CDFG.

None of the drainages come under the jurisdiction of the Corps, since none connect with waters of the U.S.

Discussion

The information provided in evaluating the proposed LRDP and impacts to biological resources include a proposed development plan map, a general project description and information on potential biological resources on campus. There are several areas designated as open space/pedestrian linkages. Detailed information on proposed improvements in open space/pedestrian linkages areas was not available for review; therefore, only general impacts can be assessed. Proposed mitigation measures are similarly general in scope.

The proposed land use designations are as follows:

1 West campus.
  11 The teaching and research fields south of Martin Luther King Boulevard are designated as open space/pedestrian linkages.
  12 Most of the agricultural fields north of Martin Luther King Boulevard are designated as various uses other than open space/pedestrian linkages. Only a small portion near Interstate 215 are designated as in open space/pedestrian linkages.

1 Central campus.
  11 Areas within the academic core will be further developed.
  12 Open space/pedestrian linkages areas will be maintained and expanded, in some cases replacing existing roads.
  13 The drainages along the student residential halls are designated as open space/pedestrian linkages.

1 South campus.
  11 The large natural open space areas north and south of the Botanic Gardens is designated as open space/pedestrian linkages.
  12 The Botanic Gardens are designated as open space/pedestrian linkages.
  13 The drainages are designated as open space/pedestrian linkages.

1 North campus.
  11 Most of the open fields in this area are designated as support and residential areas.
  12 The main southern drainage is designated as open space/pedestrian linkages.

West Campus

The conversion of the agricultural fields north of Martin Luther King Boulevard and the increase in human activity that will occur will result in the loss of potential raptor foraging habitat. This area is already disturbed on a regular basis, and human activity is ongoing. Therefore, this loss is not considered to be significant.

Preservation of the teaching and research fields south of Martin Luther King Boulevard as they currently exist will protect the semi-natural habitats and water resources of this area. Depending upon the future uses proposed in this area, potential impacts include:

1 Loss of ruderal habitat.
2 Loss of the eucalyptus stands.
3 Additional degradation and loss of the Box Springs Arroyo.
4 Loss of foraging habitat for raptors.
5 Loss of mosquito ponds used by water and shore birds.
6 Loss of annual grasslands.
7 Loss of coastal sage scrub habitat.

With the exception of the coastal sage scrub habitat, none of the habitats within the teaching and research fields are native, and most of the area is highly disturbed due to the presence of experimental plots. Due to the disturbed nature of the teaching and agricultural fields, the relatively small size of the semi-natural habitats, these impacts are not considered to be significant.

The loss of raptor foraging habitat is not considered to be significant, since the amount of suitable foraging habitat is small in this area.

The loss of the mosquito ponds and other reservoirs is not considered to be significant, since these waters are not natural and are relatively small in extent.

The coastal sage scrub habitat along the eastern section of the Box Springs Arroyo is small and somewhat degraded. It is also isolated from other stands of coastal sage scrub habitat. However, the stand may be sufficiently extensive to provide potential foraging habitat for the California gnatcatcher. Loss of this potential foraging habitat, if used by the California gnatcatcher, would be considered significant.

Central Campus

Preservation of the drainages near the residential halls as they currently exist will minimize impacts to resident and migratory species that use the semi-natural and natural habitats in these areas. Depending upon the future development of these areas (designated as open space/pedestrian linkages) potential impacts include:

1 Degradation of semi-natural and natural habitats around the Veitch Student Center and Aberdeen Inverness Hall due to increased pedestrian use.
2 Reduction in numbers of wildlife using the semi-natural and natural habitats due to increased student presence along the drainages and adjacent areas.
3 Loss of foraging and roosting habitat for raptors and migratory species.
4 Loss of riparian habitat along the drainages due to the development of pedestrian pathways.
5 Impacts to drainages under the jurisdiction of the CDFG.

The loss of foraging, nesting and roosting habitat, as well as the reduction in wildlife activity, are not considered to be significant due to the current level of human activity within these habitats.

The loss of riparian habitat and drainages is significant and will need to be addressed through the 1600 process with the CDFG. Any mitigation required for loss of habitat will have to be developed as part of that process.

North Campus

The development of the open space in the north campus area will result in the loss of ruderal habitat and raptor foraging habitat. The degradation and loss of ruderal habitat in the vicinity of the campus are not considered to be significant, since this habitat is common in southern California and does not have a high biological value.

The loss of raptor foraging habitat is not considered to be significant, since the amount of suitable foraging habitat is small in this area.

South Campus

Preservation of the open space around the Botanic Gardens will minimize impacts to resident sensitive biological resources. Depending upon the proposed uses within the open space/pedestrian linkage areas, potential impacts include:

1 Loss or degradation of plant communities and associated wildlife habitat due to increased human use of these areas.
2 Reduction in wildlife use of the site due to potential increased pedestrian use.
3 Loss or degradation of drainages and riparian habitat.

Due to the overall high quality of habitat in most of this area, impacts to plant communities, wildlife habitat and wildlife use may be considered significant.

Impacts to some sensitive species may be significant depending upon the species of concern and the degree of impact. The California Environmental Quality Act provides for the protection of sensitive species that are not listed but still meet the criteria for listing.

Impacts to listed species are significant, since they are protected under the California Environmental Quality Act and are protected by one or both of the California Endangered Species Act and the Federal Endangered Species Act.

Mitigation for the loss of plant communities and wildlife habitat would require replacement or preservation elsewhere. The loss of riparian habitat and drainages is significant and will need to be addressed through the 1600 process with the CDFG. Any mitigation for loss or impacts to the drainages and riparian habitat will have to be developed as part of that process.

Recommendations

In the absence of detailed project plans, the following measures are recommended:

1 Preserve, enhance and restore coastal sage scrub areas.
2 Preserve and enhance the uncultivated sections of the Botanic Gardens and around Picnic Hill.
3 Preserve, enhance, restore and expand riparian areas.
4 Preserve existing landscape trees and shrubs along the drainages and in semi-natural habitats.
5 Avoid degradation of natural scrub and riparian habitats. This includes excluding and minimizing human presence in the large open spaces around the Botanic Gardens and along drainage courses.

6 Implement standard controls during construction to avoid direct and indirect impacts to natural and semi-natural habitats. These include:
  61 Prohibit access to areas outside of designated construction limits.
  62 Use existing access roads where possible.
  63 Minimize removal of plant cover.
  64 Prohibit parking, driving, dumping of materials and all other activities in drainages.
  65 All access across drainages should be at right angles. No access up or down drainages will be allowed.
  66 Water from construction projects is generally contaminated and should not be sent down drainages.
  67 Harassment of wildlife, including shooting, throwing rocks, teasing, etc. should be prohibited.
  68 No construction should take place near sensitive habitats during the breeding season for any listed species present, except as approved by the wildlife agencies.

Cumulative Impacts

Cumulative impacts address the loss of campus habitats in conjunction with surrounding development may include the following:

1. Degradation and loss of ruderal habitat
2. Degradation and loss of annual grasslands.
3. Degradation and loss of native scrub and riparian habitats.
4. Degradation and loss of drainages.
5. Degradation and loss of raptor foraging habitat.
6. Impacts to sensitive species.

Cumulative losses of ruderal habitat in the vicinity of the campus are not considered to be significant, since this habitat is common in southern California and does not have a high biological value.

Cumulative losses of annual grassland habitat is not considered to be significant; however, the loss of raptor foraging habitat associated with this habitat type is considered to be significant.

Cumulative losses of coastal sage scrub and riparian habitat is considered to be significant, since both of these habitats are in decline in the vicinity of the campus and the greater San Bernardino and Riverside county areas as a result of the conversion of open space to development. In addition, riparian habitat is protected under the provisions of Section 1600 et al of the CDFG Code.

Cumulative losses of drainages are considered to be significant, since drainages are rapidly disappearing both in the vicinity of the campus and in the greater San Bernardino and Riverside county areas as a result of the conversion of open space to development. In addition, drainages are protected under the provisions of Section 1600 et al of the CDFG Code.

Cumulative impacts to wildlife movement are not considered to be significant, since cumulative impacts have already occurred in this area of Riverside County.

Cumulative impacts to sensitive species are considered to be significant; however, the regional impacts to sensitive species is generally out of the scope of any one project. Regional impacts to specific species or species groups are generally addressed as part of regional management or habitat conservation plan.

The preservation of drainages in the central and south campus areas, as well as the preservation of the open space areas around the Botanic Gardens, offset some of the cumulative impacts of the LRDP. Decisions regarding the preservation or development of open space/pedestrian linkages should evaluate the need to preserve native habitats for general and sensitive species.

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Table 1. Sensitive Biological Resources - University of California, Riverside, Long-Range Development Plan

Resource	Habitat And Distribution	Activity Period	Status Designation	Occurrence Probability
PLANTS				
Munz's onion *Allium munzii*	On clay soils in openings within coastal sage scrub, pinyon juniper woodland, and grasslands; 900 to 3000 ft. elev. Known only from w. Riverside Co. in Temescal Cyn. and Gavilan Plateau areas.	Mar - May	FED: END STATE: THR CNPS: 1B	The only clay soils on campus are in the central campus area, primarily underneath a parking lot near the Administration building. No habitat remains in this area.
Marsh sandwort *Arenaria paludicola*	Perennial plant. Occasionally in boggy meadows, swamps and freshwater marshes. Less than 900 feet elev. San Bernardino, Los Angeles, Santa Barbara cos. To Washington State. In Sbdno., mostly along Santa Ana River.	May - Aug flowering period	FED: END STATE: END CNPS: 1B	No boggy meadows, swamps or freshwater marshes are found within the Long-Range Development Plan area.
Bristly sedge *Carex comosa*	Perennial. Swampy places, San Bernardino Valley. Central California to Washington.	Year round	FED: ND STATE: ND CNPS: 2	No swampy habitats are found within the Long-Range Development Plan area.
Payson's jewel-flower *Caulanthus simulans*	Dry, rocky, open slopes, often in chaparral, pinyon juniper woodland. Between 2000 - 5500 ft. elev. Santa Rosa Mtns., Riverside Co. To interior San Diego co.	April - June	FED: C2* STATE: ND CNPS: 4	Dry, rocky open slope habitat occurs in the large open space south of the Botanic Gardens. However, this area may be too low in elevation to support this species.

Table 1. Sensitive Biological Resources - University of California, Riverside, Long-Range Development Plan

Resource	Habitat And Distribution	Activity Period	Status Designation	Occurrence Probability
Southern tarplant *Centromadia parryi* spp. *australis*	Often in disturbed sites near the coast. Also found on alkaline soils at the edges of marshes and swamps. Found in valley and foothill grasslands, and sometimes vernal pools margins. Southern California and Baja California.	June - September	FED: ND STATE: ND CNPS: 1B	Suitable alkaline soils and vernal pools are lacking in the Long-Range Development Plan area.
Smooth tarplant *Centromadia pungens* ssp. *laevis*	Grassy fields, low elevations in valley grassland. San Diego Co. To San Bernardino Valley and Los Angeles region, away from the coast.	April - September	FED: C2* STATE: ND CNPS: 1B	Grassy fields are lacking in the Long-Range Development Plan area.
Parry's spineflower *Chorizanthe parryi* var. *parryi*	Sandy openings in coastal sage scrub and chaparral, 900 to 3500 ft. Elevation, east Los Angeles Co. to San Gorgonio Pass and west Riverside Co.	April - June flowering period	FED: C2* STATE: ND CNPS: 3	This species may be present within the coastal sage scrub habitat in the large open spaces north and south of the Botanic Gardens.
Long-spined spineflower *Chorizanthe polygonoides var. longispina*	Dry places below 5000 feet; chaparral. West Riverside and San Diego cos.	Not documented	FED: C2* STATE: ND CNPS: 1B	This species may be present within the coastal sage scrub habitat in the large open spaces north and south of the Botanic Gardens.
Salt marsh bird's beak *Cordylanthus*	Coastal salt marsh below 10 meters (30 feet) elevation. Southern California coast.	May - Oct	FED: END STATE: END CNPS: 1B	No coastal salt marsh exists within the Long-Range Development Plan

Table 1. Sensitive Biological Resources - University of California, Riverside, Long-Range Development Plan

Resource	Habitat And Distribution	Activity Period	Status Designation	Occurrence Probability
maritimus ssp. maritimus				area.
Slender-horned spineflower *Dodecahema leptoceras*	Sandy and gravelly soils on alluvial fans and old floodplains; 500 to 2000 ft. elev. Los Angeles, Riverside, and San Bernardino Cos.	Apr - Jun	FED: END STATE: END CNPS: 1B	No alluvial fan or floodplain habitat remains within the Long-Range Development Plan area. This species may have been present at one time along the Box Springs Arroyo, but has been probably been extirpated due to disking and other activities.
Many-stemmed dudleya *Dudleya multicaulis*	In heavy, often clayey soils or grassy slopes in chaparral, coastal sage scrub, valley and foothill grassland. Riverside, San Bernardino, Orange counties. Below 2000 feet.	May - June	FED: C2* STATE: ND CNPS: 1B	Potential habitat exists in the large open space areas north and south of the Botanic Gardens.
Santa Ana River woolly star *Eriastrum densifolium var. sanctorum*	Perennial subshrub found in alluvial fan sage scrub, coastal sage scrub on alluvial deposits along the Santa Ana River, San Bernardino Co.	June - August flowering period	FED.: END STATE: END CNPS: 1B	No alluvial fan scrub habitats or areas exist within the Long-Range Development Plan area.
California bedstraw *Galium californicum ssp. primum*	Herbaceous annual. Chaparral, lower montane coniferous forest. Ecotonal area, edge of shrubs and trees in the pine belt. 4600 - 5600 ft.	Not provided	FED: ND STATE: ND CNPS: 1B	No chaparral or montane coniferous forest habitats exist within the Long-Range Development Plan area.

Table 1. Sensitive Biological Resources - University of California, Riverside, Long-Range Development Plan

Resource	Habitat And Distribution	Activity Period	Status Designation	Occurrence Probability
	elevation. Riverside and San Bernardino cos.			
Palmer's grapplinghook *Harpagonella palmeri*	Chaparral, coastal scrub, valley & foothill grassland in clay soils on dry slopes & mesas below 1500 ft. elev. Cismontane s. Calif. from Los Angeles Co. to NW. Baja Calif., incl. Santa Catalina Isl. One population at Dana Point Headlands.	March - April	FED: C2* STATE: ND CNPS: 2	This species may be present in the large open space areas south and north of the Botanic Gardens.
Coulter's goldfields *Lasthenia glabrata* ssp. *coulteri*	Coastal salt marshes, alkali playas, valley & foothill grasslands, and vernal pools below 3000 ft. elev. inland so. Calif. and along coast from San Luis Obispo Co. to Baja Calif.	Feb - Jun	FED: C2* STATE: ND CNPS: 1B	No suitable habitat exists for this species within the Long-Range Development Plan area.
Robinson's pepper-grass *Lepidium virginicum* ssp. *robinsonii*	Annual. Chaparral, coastal sage scrub habitats, primarily on dry soils. From Los Angeles County south to Baja California.	Jan - April	FED: ND STATE: ND CNPS: 1B	This species may be present in the large open space areas south and north of the Botanic Gardens.
Parish's desert-thorn *Lycium parishii*	Perennial shrub. Sandy to rocky slopes and canyons below 2000 feet. Possibly coastal sage scrub, def. In creosote bush scrub. San Bernardino Valley and western Colorado	March - April flower period	FED: ND STATE: ND CNPS: 2	This species may be present in the large open space area south of the Botanic Gardens.

Table 1. Sensitive Biological Resources - University of California, Riverside, Long-Range Development Plan

Resource	Habitat And Distribution	Activity Period	Status Designation	Occurrence Probability
	Desert.			
Pringle's monardella *Monardella pringlei*	Sandy places, coastal sage scrub near Colton. 900 - 1200 feet.	May - June	FED: C2* STATE: ND CNPS: 1A	This species is probably not present on site, since truly sandy soils are not found within the Long-Range Development Plan area. NOTE: This species is presumed extinct.
California muhly *Muhlenbergia californica*	Perennial. Occasional in wet places up to 7000 feet. Coastal sage scrub, chaparral, yellow pine forest. Cismontane especially around the San Bernardino Valley to the edge of the desert.	July - Sept flowering period	FED: ND STATE: ND CNPS: 1B	Although drainages do occur within the Long-Range Development Plan area, they are not persistently wet for a long enough period of time to maintain populations of this species.
Little mousetail *Mysosurus minimus*	Vernal pools and alkaline marshes below 1500 feet. San Diego to west Riverside County.	April - May	FED: C2* STATE: ND CNPS: 3	No vernal pools or alkaline marshes exist within the Long-Range Development Plan area.
California orcutt grass *Orcuttia californica*	Vernal pools, drying mud flats, vernally mesic grasslands. Ventura Co. to n. Baja Calif., including west Riverside Co.	April - August	FED: END STATE: END CNPS: 1B	No vernal pools or alkaline marshes exist within the Long-Range Development Plan area.
Parish's gooseberry *Ribes divaricatum var. parishii*	Perennial. Willow thickets, swamps, similar moist and damp sites. Coastal sage scrub. San Bernardino region and Los	March - April flowering period	FED: C2* STATE: ND CNPS: 1B	Although drainages do occur within the Long-Range Development Plan area, they are not

Table 1. Sensitive Biological Resources - University of California, Riverside, Long-Range Development Plan

Resource	Habitat And Distribution	Activity Period	Status Designation	Occurrence Probability
	Angeles County.			persistently wet for a long enough period of time to maintain populations of this species.
Gambel's water cress *Rorippa gambelii*	Perennial. Marshes, streambanks and lake margins. Ventura to San Diego cos., including Riverside and San Bernardino cos.	Unknown	FED: ND STATE: ND CNPS: 1B	Marshes, streambanks and lakes do not occur within the Long-Range Development Plan area.
Salt spring checkerbloom *Sidalcea neomexicana*	Alkaline, usually wet places. Coastal sage scrub, chaparral, creosote bush scrub. Los Angeles, Orange, San Bernardino, Riverside Cos.	April to June	FED: ND STATE: ND CNPS: 2	Alkaline or wet soils are not found in the coastal sage scrub habitats within the Long-Range Development Plan area.
Wright's trichocoronis *Trichocoronis wrightii*	Annual plant found on mudflats and shores. At Mystic Lake in Riverside Count and occasionally in the Central Valley. Also found in south Texas and northern Mexico.	May - September	FED: ND STATE: ND CNPS: 2	No mudflats or similar inundated soils occur within the Long-Range Development Plan area.

Table 1. Sensitive Biological Resources - University of California, Riverside, Long-Range Development Plan

Resource	Habitat And Distribution	Activity Period	Status Designation	Occurrence Probability
FISH				
Santa Ana speckled dace ***Rhinichthys osculus* ssp. 3**	**Headwaters of the Santa Ana and San Gabriel rivers. May be extirpated from the Los Angeles River system. Requires permanent flowing streams with summer water temperatures of 17 - 20 degrees centigrade. Usually inhabits shallow cobble and gravel riffles.**	**Year round**	**FED : ND** **STATE: CSC**	**No drainages with sufficient water flow occur within the Long-Range Development Plan area.**
Arroyo chub *Gila orcutti*	Coastal streams of Los Angeles, Orange, and San Diego cos.	Year round	FED: ND STATE: CSC	No drainages with sufficient water flow occur within the Long-Range Development Plan area.
Santa Ana sucker *Catostomus santaanae*	Santa Ana, Santa Clara, San Gabriel and Los Angeles rivers.	Year round	FED: PT STATE: ND	No drainages with sufficient water flow occur within the Long-Range Development Plan area.
AMPHIBIANS				
Western spadefoot *Scaphiopus hammondii*	Grasslands and occasionally hardwood woodlands; largely terrestrial but for breeding, requires rainpools or other ponded water for 3+ weeks; burrows in loose soils during	October - April (following onset of winter rains)	FED: ND STATE: CSC	No drainages within the Long-Range Development Plan area provide sufficient open water and ponding areas for this species.

Table 1. Sensitive Biological Resources - University of California, Riverside, Long-Range Development Plan

Resource	Habitat And Distribution	Activity Period	Status Designation	Occurrence Probability
	dry season; Central Valley and foothills, coast ranges, inland valleys, to Baja Calif.			
Arroyo southwestern toad *Bufo microscaphus californicus*	Washes and arroyos with open water; sand or gravel beds; for breeding, pools with sparse overstory vegetation. Coastal and a few desert streams from Santa Barbara Co. to Baja Calif.	Mar - Jul	FED: END STATE: CSC	No drainages within the Long-Range Development Plan area provide sufficient open water and ponding areas for this species.
California red-legged frog *Rana aurora draytonii*	Streams with slow-moving water and deep pools; dense, shrubby riparian vegetation at pool edges. Coastal streams from Marin Co. to Ventura Co.; between Ventura Co. and Mexican border, known from only four small populations including Santa Rosa Plateau (Riverside Co.).	Dec - Apr	FED: THR STATE: CSC	No drainages within the Long-Range Development Plan area provide the deep pooling and slow moving water preferred by this species.
REPTILES				
Southwestern pond turtle *Clemmys marmorata pallida*	Permanent or nearly permanent water in a wide variety of habitats; requires basking sites such as partially submerged logs, rocks, or open mud banks. Central California to northwestern Baja	Year-round with reduced activity Nov. - Mar.	FED: ND STATE: CSC	No drainages within the Long-Range Development Plan area provide sufficient open water and basking habitat for this species.

Table 1. Sensitive Biological Resources - University of California, Riverside, Long-Range Development Plan

Resource	Habitat And Distribution	Activity Period	Status Designation	Occurrence Probability
	California.			
San Diego horned lizard *Phrynosoma coronatum blainvillei*	Wide variety of habitats including coastal sage scrub, grassland, riparian woodland; typically on or near loose sandy soils; coastal and inland areas from Ventura Co. to Baja Calif.	April - July (with reduced activity Aug. - Oct.)	FED: ND STATE: CSC	This species may be present in the open areas south and north of the Botanic Gardens, as well as in the less disturbed areas of the teaching and research fields south of Martin Luther King Boulevard.
Coronado skink *Eumeces skiltonianus interparietalis*	Early successional stages or open areas in grassland, chaparral, pinyon-juniper and juniper sage woodland, pine oak and pine forests in the coastal ranges of southern California. Also found in rocky areas close to streams, and on dry hillsides.	Active year round	FED: ND STATE: CSC	This species may be present in the open areas north and south of the Botanic Gardens. It may also occur along the drainages in the student residential housing area within the north campus area.
Orange-throated whiptail *Cnemidophorus hyperythrus*	Floodplains and terraces with perennial plants and open areas nearby; sea level to 3000 feet elevation; inland and coastal valleys of Riverside, Orange, and San Diego Cos. to Baja Calif.	March - July (with reduced activity Aug. - Feb.)	FED: ND STATE: CSC	This species may be present in the open areas north and south of the Botanic Gardens. It may also occur along the drainages in the student residential housing area within the north campus area.
Coastal western	Firm, sandy or rocky soils in		FED: ND	This species may be

Table 1. Sensitive Biological Resources - University of California, Riverside, Long-Range Development Plan

Resource	**Habitat And Distribution**	**Activity Period**	**Status Designation**	**Occurrence Probability**
whiptail *Cnemidophorus tigris multiscutatus*	deserts and semiarid areas with sparse vegetation and open areas. Also found in woodland and riparian areas.	Year round	STATE: ND	present in the open areas north and south of the Botanic Gardens. It may also occur along the drainages in the student residential housing area within the north campus area.
Silvery legless lizard *Anniella pulchra pulchra*	Found predominantly in the Coast Ranges, Transverse Mountains, and Peninsular Ranges and in northwest Baja California. Also found in scattered occurrences on the floor of the San Joaquin Valley, in the southern Sierra, Walker Basin and in the Piute, Scodie and Tehachapi Mountains. Desert-edge localities are recorded at the eastern end of Walker Pass in Kern County, Morongo Pass, in San Bernardino County, in the Little San Bernardino Mountains at Whitewater, Riverside County, and on the eastern slopes of the Peninsular Ranges. Prefers areas with sandy or loose organic soils or with abundant leaf litter.	Active year round - some winter activity	FED: ND STATE: CSC	This species may be present along the drainages in the student residential housing area within the north campus area. It may also occur along the riparian drainage near Bannockburn.

Table 1. Sensitive Biological Resources - University of California, Riverside, Long-Range Development Plan

Resource	Habitat And Distribution	Activity Period	Status Designation	Occurrence Probability
Rosy boa *Lichanura trivirgata*	Mix brushy cover and rocky soils. Desert and chaparral, found from the coast to the Mojave and Colorado deserts. Prefers moderate to dense vegetation.	Year round	FED: ND STATE: ND	This species is likely to be present in the large open space areas south and north of the Botanic Gardens.
Northern red-diamond rattlesnake *Crotalus ruber ruber*	Occurs in rocky areas & dense vegetation. Needs rodent burrows cracks in rocks or other surface material. Chaparral, woodland, grassland and desert areas. Coastal San Diego County to the eastern slopes of the mountains.	Year round	FED: C2* STATE: CSC	This species is likely to be present in the large open space areas south and north of the Botanic Gardens.
BIRDS				
White-tailed kite *Elanus leucurus*	Open country in South America and southern North America.	Year-round	FED: ND STATE: ND (nesting)	This species may occasionally forage in the large open fields north of the campus road in the north campus area, as well as in the areas north and south of the Botanic Gardens.
Bald eagle *Haliaeetus leucocephalus*	Winters locally at deep lakes and reservoirs feeding on fish and waterfowl. Locally rare throughout North America.	Nov - Feb	FED: END STATE: END	The bald eagle is known to winter at Lake Mathews and in the Lake Perris area; during the winter, this species could fly over

Table 1. Sensitive Biological Resources - University of California, Riverside, Long-Range Development Plan

Resource	Habitat And Distribution	Activity Period	Status Designation	Occurrence Probability
				site or perch in the Botanic Gardens area.
Northern harrier *Circus cyaneus*	Grassland and marshy habitats in Southern California. Uncommonly in open desert and brushlands.	Year round	FED: ND STATE: CSC	The northern harrier prefers open habitat for low-level foraging. This species may occasionally forage in the agricultural fields north and south of Martin King Boulevard.
Sharp-shinned hawk *Accipiter striatus*	Nests in woodland, coniferous deciduous forest. Winter visitor and migrant to coastal Southern California. Forages over a variety of habitats.	Fall & winter; scarce in summers	FED: ND STATE: CSC	This species may forage along the more heavily vegetated drainages as well as in the area around Picnic Hill and in the Botanic Gardens. It may also forage among the eucalyptus trees in the teaching and research fields.
Cooper's hawk *Accipiter cooperi*	Woodland and semi-open habitats, riparian groves and mountain canyons. Uncommon permanent resident in coastal, mountains, and deserts of Southern California. Transients fairly common on coast in fall.	Year round; predominant in summer	FED: ND STATE: CSC	This species may forage along the more heavily vegetated drainges as well as in the area around Picnic Hill and in the Botanic Gardens. It may also forage among the eucalyptus trees in the teaching and research fields.

Table 1. Sensitive Biological Resources - University of California, Riverside, Long-Range Development Plan

Resource	Habitat And Distribution	Activity Period	Status Designation	Occurrence Probability
Golden eagle *Aquila chrysaetos*	Grasslands, brushlands, deserts, oak savannas, open coniferous forests and montane valleys. Nesting primarily in rugged mountainous country. Uncommon resident in Southern California.	Year round diurnal	FED: ND STATE: CSC (nesting and wintering)	The golden eagle may forage in the open areas around the Botanic Gardens and in the agricultural fields on both sides of Martin Luther King Boulevard.
Merlin *Falco columbarius*	Frequents several habitats including coastal sage scrub and annual grassland. Forages along the coast, and in montane valleys and open deserts with scattered clumps of trees. Rare fall migrant and winter visitor to Southern California.	Fall & winter	FED: ND STATE: CSC	□The merlin may migrate and forage over the open areas around the Botanic Gardens and in the agricultural fields along Martin Luther King Boulevard. They are expected to use these areas very infrequently.
American peregrine falcon *Falco peregrinus anatum*	Wetlands near high cliffs; few known to nest in urban settings on tall buildings. Scattered locations in North America; in California coastal areas and inland mountains.	Fall & Winter (in migration and as winter visitor)	FED: ND STATE: END	The peregrine falcon may pass through the Riverside area during migration and may winter in region, during which times it could fly over site, perch in the available riparian woodland, and/or forage in surrounding habitats.
Prairie falcon *Falco mexicanus*	Nest in cliffs or rocky outcrops; forage in open arid valleys, agricultural fields. Throughout the desert and arid interior portions of coastal	Year round diurnal	FED: ND STATE: CSC	The prairie falcon may forage over the open spaces on campus, including the open space around the Botanic Gardens

Table 1. Sensitive Biological Resources - University of California, Riverside, Long-Range Development Plan

Resource	Habitat And Distribution	Activity Period	Status Designation	Occurrence Probability
	counties. Uncommon resident in Southern California.			and the agricultural fields.
Burrowing owl *Athene cunicularia hypugea*	Grasslands and rangelands, usually occupying ground squirrel burrows. Resident over most of Southern California. Found in agricultural areas.	Year round	FED: ND STATE: CSC	The burrowing owl may be present in the open areas around the Botanic Gardens and in the agricultural fields.
Long-eared owl *Asio otus*	Rare resident in coastal Southern California and uncommon resident in desert areas. Dense willow-riparian woodland and oak woodland. Breeds from valley foothill hardwood up to ponderosa pine habitat.	Nocturnal year round	FED: ND STATE: CSC	This species may forage along the dense riparian woodland habitats in the drainage exiting the Botanic Gardens and along Bannockburn.
Short-eared owl *Asio flammenus*	Primarily a rare and local winter visitant to the coast, and a rare fall transient and winter visitant in the desert, including the Salton Sea and the Colorado River. Also recorded at Mystic Lake in the San Jacinto Valley, Riverside County, in summer 1992, and Harper Dry Lake, San Bernardino County, summer 1993.	Fall - Winter	FED: ND STATE: CSC	This species may forage in the open areas of the Long-Range Development Plan.
Western yellow-	Primarily nests in riparian forest, along broad, lower	Summer	FED: ND	Suitable riparian forest habitats do not exist

Table 1. Sensitive Biological Resources - University of California, Riverside, Long-Range Development Plan

Resource	Habitat And Distribution	Activity Period	Status Designation	Occurrence Probability
billed cuckoo *Coccyzus americanus occidentalis*	flood-bottoms of large river systems. Prefers close tangles of willow, often mixed with cottonwood and an understory of blackberry, nettles or wild grape Known in California from the Mojave and Colorado Rivers.		STATE: END	within the Long-Range Development Plan.
Vaux's swift *Chaetura vauxi*	Fairly common spring and fall transient in southern California. Rare and irregular winter visitor primarily along coast. Nesting sites need protection.	Fall - Spring	FED: ND STATE: CSC	Vaux's swift may forage over the campus, but there are no nesting sites available
Southwestern willow flycatcher *Empidonax traillii extimus*	Breeds and nests in willow riparian forest. Rare and local in So. Calif.	May - Sept.	FED: END STATE: END (nesting)	Suitable riparian forest habitats do not exist on the property within the Long-Range Development Plan.
Bank swallow *Riparia riparia*	Nesting habitat is vertical banks of fine textured soils, most commonly along streams and rivers. In Southern California, fairly common spring and fall transient in interior; very uncommon spring transient and rare fall transient along coast. Casual in winter.	Variable year round	FED: ND STATE: THR	The bank swallow may forage over the campus, but no nesting habitat is available.
Coastal cactus wren *Campylorhynchus*	Tall *Opuntia* required for nesting and roosting. Coastal	Year round	FED: ND	The cactus wren is probably not present on

Table 1. Sensitive Biological Resources - University of California, Riverside, Long-Range Development Plan

Resource	Habitat And Distribution	Activity Period	Status Designation	Occurrence Probability
brunneicapillus couesi	sage scrub. Southern California.		STATE: CSC	site, since none of the open space areas contain the tall *Opuntia* species necessary for nesting.
California gnatcatcher *Polioptila californica*	Coastal sage scrub; occurs only in cismontane Southern California and northwestern Baja California in low-lying foothills and valleys.	Year-round	FED: THR STATE: ND	The California gnatcatcher may be present in the open coastal sage scrub areas north and south of the Botanic Gardens.
Loggerhead shrike *Lanius ludovicianus*	Open fields with scattered trees, open woodland, scrub. Fairly common resident throughout Southern California	Year round	FED: ND STATE: CSC	Suitable habitat for the loggerhead shrike exists in the more open areas of the campus.
Least Bell's vireo *Vireo bellii pusillus*	Riparian forests and willow thickets. Breeds and nests only in southwestern California; winters in Baja Calif.	Apr - Sept	FED: END STATE: END	The willow woodlands along the Bannockburn drainage are probably too small to provide suitable habitat for this species.
Yellow-breasted chat *Icteria virens*	Riparian thickets of willow, brushy tangles near watercourses. Nests in riparian woodland throughout much of western North America. Winters in Central America.	Year round. Nocturnal migrant	FED: ND STATE: CSC	The willow woodlands along the Bannockburn drainage are probably too small to provide suitable habitat for this species.
Southern California rufous-crowned sparrow	Fairly common resident along the coast of California; breeds very locally on desert mountain ranges. Preferred habitat is	Year round	FED: ND STATE: CSC	Suitable open coastal sage scrub habitat occurs in the open areas north and south of the Botanic

Table 1. Sensitive Biological Resources - University of California, Riverside, Long-Range Development Plan

Resource	Habitat And Distribution	Activity Period	Status Designation	Occurrence Probability
Aimophila ruficeps canescens	slopes with sparse shrubs and open grassy areas intermixed. Coastal sage scrub is the most common plant community used.			Gardens.
Tri-colored blackbird *Aeglaius tricolor*	Resident year round in the coast and eastern edge of the desert. Occurs in all coastal counties including interior areas west of the deserts. Breeds in dense colonies is reed beds.	Year round	FED: ND STATE: CSC	The reed bed habitat needed for nesting by this species is not present within the Long-Range Development Plan.
MAMMALS				
California leaf-nosed bat *Macrotus californicus*	In California, these bats primarily occupy low-lying desert areas, where they roost in caves, mines, and old buildings. Historic records extend west to near Chatsworth, Los Angeles County, but most populations from the California coastal basins are believed to have disappeared. Occurs from northern Nevada, Southern California, and western Arizona south to southern Baja California and Sonora.	Year round nocturnal	FED: ND STATE: CSC	Some of the older buildings may provide roosting sites for this species. In addition, it may forage over the property if there are roosting sites such as caves in the nearby mountains.
Townsend's western big-eared bat	Requires caves, mines, tunnels, buildings or other similar structures for roosting. May	Year round Nocturnal	FED: ND STATE: CSC	Some of the older buildings may provide roosting sites for this

Table 1. Sensitive Biological Resources - University of California, Riverside, Long-Range Development Plan

Resource	Habitat And Distribution	Activity Period	Status Designation	Occurrence Probability
Plecotus townsendii, two ssp.	use separate sites for night, day, hibernation or maternity roosts. Found in all but subalpine and alpine habitats throughout California.			species. In addition, it may forage over the property if there are roosting sites such as caves in the nearby mountains.
Pallid bat *Antrozous pallidus*	Day roost in caves, crevices, mines and occasionally hollow trees and buildings. Night roosts may be more open sites, such as porches and open buildings. Hibernation sites are probably rock crevices. Grasslands, shrublands, woodlands and forest from sea level through to mixed conifer. Throughout Southern California.	Spring, Summer, Fall Nocturnal Hibernates in Winters	FED: ND STATE: CSC	Some of the older buildings and eucalyptus trees may provide roosting sites for this species. In addition, it may forage over the property if there are roosting sites such as caves in the nearby mountains.
Spotted bat *Euderma maculatum*	Found in the western North America from southern British Columbia to the Mexican border, at a small number of widely scattered localities. Habitats range from arid deserts and grasslands through mixed conifer forest up to 10,600 foot elevation. Prefers rock crevices in cliffs, also uses caves and buildings.	Spring, Summer, Fall Nocturnal Hibernates in Winters	FED: ND STATE: CSC	Some of the older buildings may provide roosting sites for this species. In addition, it may forage over the property if there are roosting sites such as caves in the nearby mountains.
	Historically from north-central		FED: ND	The campus generally does

Table 1. Sensitive Biological Resources - University of California, Riverside, Long-Range Development Plan

Resource	Habitat And Distribution	Activity Period	Status Designation	Occurrence Probability
California mastiff bat *Eumops californicus*	California south to northern Baja California, eastward across the southwestern United States, and northwestern Mexico to west Texas and Coahuila (Hall, 1981; Williams, 1986). In California, most records are from rocky areas at low elevations where roosting occurs primarily in crevices.		STATE: CSC	not provide rock piles with crevices, except possibly in the open area south of the Botanic Gardens.
Pocketed free-tailed bat *Nyctinomops femorasacca*	Spotty distribution in California, ranging from Southern California south to the Baja Peninsula, and through southwestern Arizona to at least central Mexico (Williams, 1986). In California, pocketed free-tailed bats are typically found in rocky, desert areas with relatively high cliffs.	Warmer months. Nocturnal	FED: ND STATE: CSC	The preferred habitat area for the pocketed free-tailed bat is primarily in desert areas. This species is probably not present on site.
Big free-tailed bat *Nyctinomops macrotis*	Found from northern South America and the Caribbean Islands northward to the western United States (Williams, 1986). In the southwestern U.S., populations appear to be scattered. Known breeding localities are in parts of Arizona, New Mexico, and Texas. Prefers rocky,	Nocturnal spring - fall Hibernates in Winters	FED: ND STATE: CSC	The campus generally does not provide rock piles with crevices, except possibly in the open area south of the Botanic Gardens.

Table 1. Sensitive Biological Resources - University of California, Riverside, Long-Range Development Plan

Resource	Habitat And Distribution	Activity Period	Status Designation	Occurrence Probability
	rugged terrain. Roosts in crevices in high cliffs or rocky outcrops. Ranges up to 8000 foot elevation.			
San Diego black-tailed jackrabbit *Lepus californicus bennettii*	Variety of habitats including herbaceous and desert scrub areas, early stages of open forest and chaparral. Most common in relatively open habitats. Restricted to the cismontane areas of Southern California, extending from the coast to the Santa Monica, San Gabriel, San Bernardino and Santa Rosa mountain ranges.	Year round, diurnal and crepuscular activity	FED: ND STATE: CSC	The San Diego black-tailed jackrabbit was observed during the field surveys in the coastal sage scrub habitat south of the Botanic Gardens.
Los Angeles pocket mouse *Perognathus longimembris brevinasus*	Prefers sandy soil for burrowing, but has been found on gravel washes and stony soils. Found in coastal scrub. Los Angeles, Riverside, and San Bernardino Cos.	Nocturnal; active late spring to early fall.	FED: ND STATE: CSC	The generally loose sandy, gravelly and stony soils preferred by the this species are not found in the coastal sage scrub habitat area. This species is probably not present on site.
Northwestern San Diego pocket mouse *Chaetodippus fallax fallax*	Sandy herbaceous areas, usually with rocks or coarse gravel. Arid coastal areas in grassland, coastal scrub and chaparral. San Diego, San Bernardino, Los Angeles, and	Nocturnal; active year round.	FED: ND STATE: CSC	This species may be present in the open space areas north and south of the Botanic Gardens.

Table 1. **Sensitive Biological Resources - University of California, Riverside, Long-Range Development Plan**

Resource	Habitat And Distribution	Activity Period	Status Designation	Occurrence Probability
	Riverside Cos.			
Stephens kangaroo rat *Dipodomys stephensi*	Open areas with sparse perennial cover with areas of loose soil where the soil depth is at least 0.5 meters. Also inhabit disturbed areas such as fallow fields by using the burrows of other rodents, including pocket gophers and Beechey ground squirrel.	Nocturnal; active year round	FED: END STATE: THR	This species may be present in the open space area south of the Botanic Gardens.
San Bernardino kangaroo rat *Dipodomys merriami parvus*	Primary and secondary alluvial fan scrub habitats, with sandy soils deposited by fluvial (water) rather than aeolian (wind) processes. The preferred substrate appears to be sandy and sandy loam soils and very little herbaceous ground cover. In isolated populations along the Santa Ana and San Jacinto drainage systems.	Nocturnal; active year round	FED: END STATE: ND	Habitat for this species no longer exists within the Long-Range Development Plan area.
San Diego desert woodrat *Neotoma lepida intermedia*	Moderate to dense canopies, particularly in rocky areas. Coastal sage scrub and chaparral. Coastal southern California.	Nocturnal; active year round	FED: ND STATE: CSC	This species is probably present in the coastal sage scrub habitat north and south of the Botanic Gardens.

Table 1. Sensitive Biological Resources - University of California, Riverside, Long-Range Development Plan

Resource	Habitat And Distribution	Activity Period	Status Designation	Occurrence Probability
INVERTEBRATES				
Vernal pool fairy shrimp *Branchinecta lynchi*	Grasslands and ponded areas such as vernal pools, cattle watering holes, basins, etc. In Southern California, species found primarily in the interior of western Riverside Co., central Santa Barbara Co., and eastern Orange Co. Also, more recently discovered in Los Angeles Co.	Spring	FED: THR STATE: ND	There are no ponded habitats suitable for this species present within the Long-Range Development Plan area.
Riverside fairy shrimp *Streptocephalus wottoni*	Known only from ephemeral pools in southern Orange and western Riverside and San Diego Cos.	Spring	FED:END STATE: ND	There are no ponded habitats suitable for this species present within the Long-Range Development Plan area.
Quino checkerspot butterfly *Euphydryas editha quino*	Open grassy sites on grasslands and in open areas in coastal sage scrub. Areas must contain food plants (plantain and owl's clover) with low levels of non-native vegetation, open or bare soils with sparse shrub cover. Historic range was western Riverside County and n. San Diego co; range recently extended to include inland and coastal San Bernardino, L.A.,	Spring	FED: END STATE: ND	There may be suitable habitat for this species in the open space areas south of the Botanic Gardens.

Table 1. Sensitive Biological Resources - University of California, Riverside, Long-Range Development Plan

Resource	Habitat And Distribution	Activity Period	Status Designation	Occurrence Probability
	Orange, Ventura and San Diego cos.			
Delhi sands flower-loving fly *Rhaphiomidas terminatus abdominalis*	Limited information suggests this species is found on "fine, sandy soils, often with wholly or partially consolidated dunes. These soil types are generally classified as the "Delhi" series (primarily Delhi fine sand)" (U.S. Fish and Wildlife Service, 1992). Restricted to western Riverside and San Bernardino Cos.	Above ground emergence August and Sep. Not visible during the rest of the year.	FED: END STATE:ND	No suitable sandy soils exists within the Long-Range Development Plan.
SENSITIVE HABITATS				
Southern cottonwood willow riparian forest	Steep, narrow and shallow, broad canyons and drainages in the foothills of local mountain ranges.	Year round	Declining plant community	This plant community exists along the Bannockburn drainage.

Legend

FED: Federal Classifications

END	Taxa listed as endangered
THR	Taxa listed as threatened
PE	Taxa proposed to be listed as endangered
PT	Taxa proposed to be listed as threatened

C2* - The U.S. Fish and Wildlife Service (USFWS) has recently revised its classifications of candidate taxa (species, subspecies, and other taxonomic designations). Species formerly designated as "Category 1 Candidate for listing" are now known simply as "Candidate". The former designation of "Category 2 Candidate for listing" has been discontinued. The USFWS will continue to assess the need for protection of these taxa and may, in the future, designate such taxa as Candidates. NRA, Inc. has noted the change in species status by marking with an asterisk (*) those C2 candidates that were removed from the list.

C Candidate for listing. Refers to taxa for which the USFWS has sufficient information to support a proposal to list as Endangered or Threatened and issuance of the proposal is anticipated but precluded at this time.

ND Not designated as a sensitive species

STATE: State Classifications

END	Taxa listed as endangered
THR	Taxa listed as threatened
CE	Candidate for endangered listing
CT	Candidate for threatened listing
CFP	California Fully Protected. Species legally protected under special legislation enacted prior to the California Endangered Species Act.
CSC	California Species of Special Concern. Taxa with populations declining seriously or that are otherwise highly vulnerable to human development.
SA	Special Animal. Taxa of concern to the California Natural Diversity Data Base regardless of their current legal or protected status.
ND	Not designated as a sensitive species

CNPS: California Native Plant Society Classifications

1A	Plants presumed by CNPS to be extinct in California
1B	Plants considered by CNPS to be rare or endangered in California and elsewhere
2	Plants considered by CNPS to be rare, threatened or endangered in California, but which are more common elsewhere
3	Review list of plants suggested by CNPS for consideration as endangered but about which more information is needed.
4	Watch list of plants of limited distribution whose status should be monitored

Appendix C Air Quality Data

SIMPLIFIED CALINE4 CARBON MONOXIDE ANALYSIS

Project Number: 10537-00
Project Title: UC Riverside LRDP

Background Information

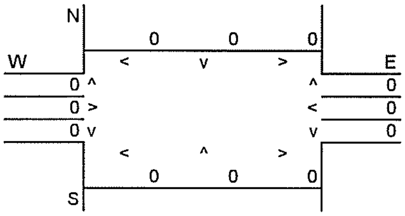
Nearest Air Monitoring Station measuring CO: Riverside-Rubidoux
Background 1-hour CO Concentration (ppm): 9.0
Background 8-hour CO Concentration (ppm): 4.3
Persistence Factor: 0.6
Analysis Year: 2002

Roadway Data

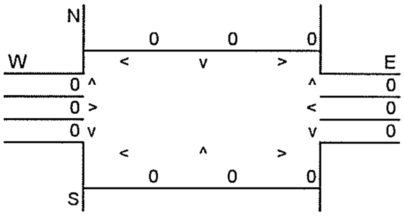
Intersection: X
Analysis Condition: Existing Traffic Volumes

			No. of	Average Speed	
		Roadway Type	Lanes	A.M.	P.M.
North-South Roadway:	X	At Grade	2	10	10
East-West Roadway:	X	At Grade	2	10	10

A.M. Peak Hour Traffic Volumes



P.M. Peak Hour Traffic Volumes



Highest Traffic Volumes (Vehicles per Hour)

N-S Road: 0
E-W Road: 0

N-S Road: 0
E-W Road: 0

Roadway CO Contributions and Concentrations

Emissions = (A x B x C) / 100,000[1]

	A_1	A_2	A_3	B	C			
	Reference CO Concentrations			Traffic	Emission	Estimated CO Concentrations		
Roadway	25 Feet	50 Feet	100 Feet	Volume	Factors[1]	25 Feet	50 Feet	100 Feet
A.M. Peak Traffic Hour								
North-South Road	7.6	5.7	4.0	0	18.24	0.00	0.00	0.00
East-West Road	2.7	2.2	1.7	0	18.24	0.00	0.00	0.00
P.M. Peak Traffic Hour								
North-South Road	7.6	5.7	4.0	0	18.24	0.00	0.00	0.00
East-West Road	2.7	2.2	1.7	0	18.24	0.00	0.00	0.00

[1] Methodology and emission factors from Bay Area Air Quality Management District *BAAQMD CEQA Guidelines* (1996).

Total Roadway CO Concentrations

Peak Hour Emissions = North-South Concentration + East-West Concentration + Background 1-hour Concentration[2]

8-Hour Emissions = ((Highest Peak Hour Concentration - Background 1-hour Concentration) x Persistence Factor) + Background 8-hour Concentration[2]

	A.M. Peak Hour	P.M. Peak Hour	8-Hour
25 Feet from Roadway Edge	9.0	9.0	4.3
50 Feet from Roadway Edge	9.0	9.0	4.3
100 Feet from Roadway Edge	9.0	9.0	4.3

[2] Methodology from Bay Area Air Quality Management District *BAAQMD CEQA Guidelines* (1996).

SIMPLIFIED CALINE4 CARBON MONOXIDE ANALYSIS

Project Number: 10537-00
Project Title: UC Riverside LRDP

Background Information

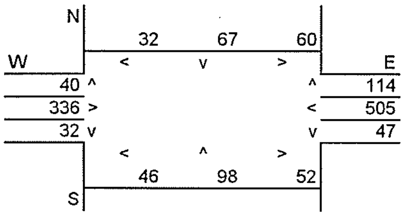
Nearest Air Monitoring Station measuring CO: Riverside-Rubidoux
Background 1-hour CO Concentration (ppm): 9.0
Background 8-hour CO Concentration (ppm): 4.3
Persistence Factor: 0.6
Analysis Year: 2002

Roadway Data

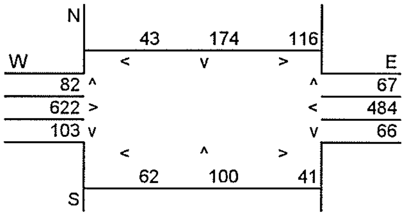
Intersection: 3rd St/Kansas Ave.
Analysis Condition: Existing Traffic Volumes

		Roadway Type	No. of Lanes	Average Speed A.M.	Average Speed P.M.
North-South Roadway:	Kansas Ave.	At Grade	2	20	20
East-West Roadway:	3rd Street	At Grade	4	20	20

A.M. Peak Hour Traffic Volumes



P.M. Peak Hour Traffic Volumes



Highest Traffic Volumes (Vehicles per Hour)

	A.M.		P.M.
N-S Road:	411	N-S Road:	582
E-W Road:	1,114	E-W Road:	1,396

Roadway CO Contributions and Concentrations

Emissions = (A x B x C) / 100,000[1]

Roadway	A_1 Reference CO Concentrations 25 Feet	A_2 50 Feet	A_3 100 Feet	B Traffic Volume	C Emission Factors[1]	Estimated CO Concentrations 25 Feet	50 Feet	100 Feet
A.M. Peak Traffic Hour								
North-South Road	2.7	2.2	1.7	411	9.33	0.10	0.08	0.07
East-West Road	7.0	5.4	3.8	1,114	9.33	0.73	0.56	0.40
P.M. Peak Traffic Hour								
North-South Road	2.7	2.2	1.7	582	9.33	0.15	0.12	0.09
East-West Road	7.0	5.4	3.8	1,396	9.33	0.91	0.70	0.50

[1] Methodology and emission factors from Bay Area Air Quality Management District *BAAQMD CEQA Guidelines* (1996).

Total Roadway CO Concentrations

Peak Hour Emissions = North-South Concentration + East-West Concentration + Background 1-hour Concentration[2]
8-Hour Emissions = ((Highest Peak Hour Concentration - Background 1-hour Concentration) x Persistence Factor) + Background 8-hour Concentration[2]

	A.M. Peak Hour	P.M. Peak Hour	8-Hour
25 Feet from Roadway Edge	9.8	10.1	4.9
50 Feet from Roadway Edge	9.6	9.8	4.8
100 Feet from Roadway Edge	9.5	9.6	4.7

[2] Methodology from Bay Area Air Quality Management District *BAAQMD CEQA Guidelines* (1996).

SIMPLIFIED CALINE4 CARBON MONOXIDE ANALYSIS

Project Number: 10537-00
Project Title: UC Riverside LRDP

Background Information

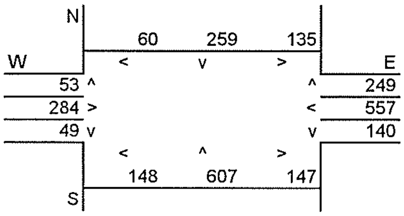
Nearest Air Monitoring Station measuring CO:	Riverside-Rubidoux
Background 1-hour CO Concentration (ppm):	9.0
Background 8-hour CO Concentration (ppm):	4.3
Persistence Factor:	0.6
Analysis Year:	2002

Roadway Data

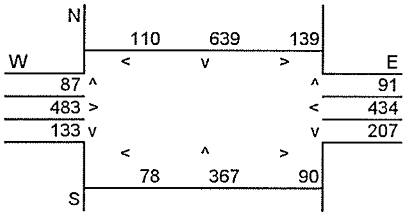
Intersection: 3rd St/Chicago Ave.
Analysis Condition: Existing Traffic Volumes

		Roadway Type	No. of Lanes	Average Speed A.M.	Average Speed P.M.
North-South Roadway:	Chicago Ave.	At Grade	4	20	20
East-West Roadway:	3rd Street	At Grade	4	20	20

A.M. Peak Hour Traffic Volumes



P.M. Peak Hour Traffic Volumes



Highest Traffic Volumes (Vehicles per Hour)

N-S Road:	1,363	N-S Road:	1,514
E-W Road:	1,512	E-W Road:	1,444

Roadway CO Contributions and Concentrations

Emissions = (A x B x C) / 100,000[1]

Roadway	A_1 Reference CO Concentrations 25 Feet	A_2 50 Feet	A_3 100 Feet	B Traffic Volume	C Emission Factors[1]	Estimated CO Concentrations 25 Feet	50 Feet	100 Feet
A.M. Peak Traffic Hour								
North-South Road	2.6	2.2	1.7	1,363	9.33	0.33	0.28	0.22
East-West Road	7.0	5.4	3.8	1,512	9.33	0.99	0.76	0.54
P.M. Peak Traffic Hour								
North-South Road	7.0	5.4	3.8	1,514	9.33	0.99	0.76	0.54
East-West Road	2.6	2.2	1.7	1,444	9.33	0.35	0.30	0.23

[1] Methodology and emission factors from Bay Area Air Quality Management District *BAAQMD CEQA Guidelines* (1996).

Total Roadway CO Concentrations

Peak Hour Emissions = North-South Concentration + East-West Concentration + Background 1-hour Concentration[2]

8-Hour Emissions = ((Highest Peak Hour Concentration - Background 1-hour Concentration) x Persistence Factor) + Background 8-hour Concentration[2]

	A.M. Peak Hour	P.M. Peak Hour	8-Hour
25 Feet from Roadway Edge	10.3	10.3	5.1
50 Feet from Roadway Edge	10.0	10.1	4.9
100 Feet from Roadway Edge	9.8	9.8	4.8

[2] Methodology from Bay Area Air Quality Management District *BAAQMD CEQA Guidelines* (1996).

SIMPLIFIED CALINE4 CARBON MONOXIDE ANALYSIS

Project Number: 10537-00
Project Title: UC Riverside LRDP

Background Information

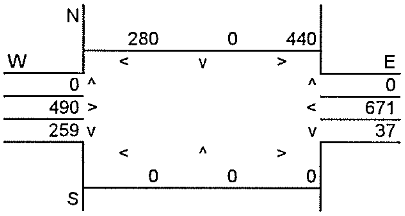
Nearest Air Monitoring Station measuring CO:	Riverside-Rubidoux
Background 1-hour CO Concentration (ppm):	9.0
Background 8-hour CO Concentration (ppm):	4.3
Persistence Factor:	0.6
Analysis Year:	2002

Roadway Data

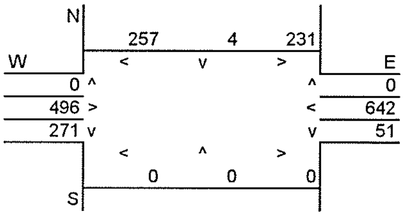
Intersection:	3rd St/SR-60 SBR
Analysis Condition:	Existing Traffic Volumes

		Roadway Type	No. of Lanes	Average Speed A.M.	Average Speed P.M.
North-South Roadway:	SR-60 SBR	At Grade	2	20	20
East-West Roadway:	3rd Street	At Grade	4	20	20

A.M. Peak Hour Traffic Volumes



P.M. Peak Hour Traffic Volumes



Highest Traffic Volumes (Vehicles per Hour)

N-S Road:	720	N-S Road:	492
E-W Road:	1,700	E-W Road:	1,666

Roadway CO Contributions and Concentrations

Emissions = (A x B x C) / 100,000[1]

Roadway	A_1 Reference CO Concentrations 25 Feet	A_2 50 Feet	A_3 100 Feet	B Traffic Volume	C Emission Factors[1]	Estimated CO Concentrations 25 Feet	50 Feet	100 Feet
A.M. Peak Traffic Hour								
North-South Road	2.7	2.2	1.7	720	9.33	0.18	0.15	0.11
East-West Road	7.0	5.4	3.8	1,700	9.33	1.11	0.86	0.60
P.M. Peak Traffic Hour								
North-South Road	2.7	2.2	1.7	492	9.33	0.12	0.10	0.08
East-West Road	7.0	5.4	3.8	1,666	9.33	1.09	0.84	0.59

[1] Methodology and emission factors from Bay Area Air Quality Management District *BAAQMD CEQA Guidelines* (1996).

Total Roadway CO Concentrations

Peak Hour Emissions = North-South Concentration + East-West Concentration + Background 1-hour Concentration[2]

8-Hour Emissions = ((Highest Peak Hour Concentration - Background 1-hour Concentration) x Persistence Factor) + Background 8-hour Concentration[2]

	A.M. Peak Hour	P.M. Peak Hour	8-Hour
25 Feet from Roadway Edge	10.3	10.2	5.1
50 Feet from Roadway Edge	10.0	9.9	4.9
100 Feet from Roadway Edge	9.7	9.7	4.7

[2] Methodology from Bay Area Air Quality Management District *BAAQMD CEQA Guidelines* (1996).

SIMPLIFIED CALINE4 CARBON MONOXIDE ANALYSIS

Project Number: 10537-00
Project Title: UC Riverside LRDP

Background Information

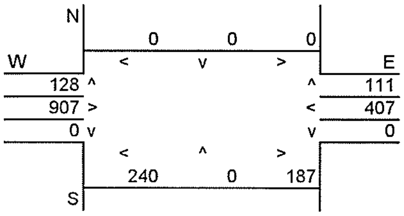
Nearest Air Monitoring Station measuring CO: Riverside-Rubidoux
Background 1-hour CO Concentration (ppm): 9.0
Background 8-hour CO Concentration (ppm): 4.3
Persistence Factor: 0.6
Analysis Year: 2002

Roadway Data

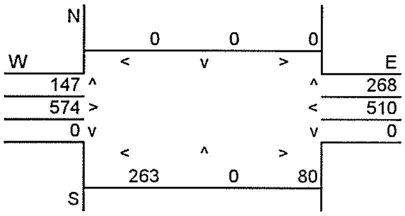
Intersection: Blaine St./SR-60 NBR
Analysis Condition: Existing Traffic Volumes

		Roadway Type	No. of Lanes	Average Speed A.M.	Average Speed P.M.
North-South Roadway:	SR-60 NBR	At Grade	2	20	20
East-West Roadway:	3rd Street	At Grade	4	20	20

A.M. Peak Hour Traffic Volumes



P.M. Peak Hour Traffic Volumes



Highest Traffic Volumes (Vehicles per Hour)

	A.M.		P.M.
N-S Road:	427	N-S Road:	415
E-W Road:	1,682	E-W Road:	1,494

Roadway CO Contributions and Concentrations

Emissions = (A x B x C) / 100,000[1]

Roadway	A_1 Reference CO Concentrations 25 Feet	A_2 50 Feet	A_3 100 Feet	B Traffic Volume	C Emission Factors[1]	Estimated CO Concentrations 25 Feet	50 Feet	100 Feet
A.M. Peak Traffic Hour								
North-South Road	2.7	2.2	1.7	427	9.33	0.11	0.09	0.07
East-West Road	7.0	5.4	3.8	1,682	9.33	1.10	0.85	0.60
P.M. Peak Traffic Hour								
North-South Road	2.7	2.2	1.7	415	9.33	0.10	0.09	0.07
East-West Road	7.0	5.4	3.8	1,494	9.33	0.98	0.75	0.53

[1] Methodology and emission factors from Bay Area Air Quality Management District *BAAQMD CEQA Guidelines* (1996).

Total Roadway CO Concentrations

Peak Hour Emissions = North-South Concentration + East-West Concentration + Background 1-hour Concentration[2]

8-Hour Emissions = ((Highest Peak Hour Concentration - Background 1-hour Concentration) x Persistence Factor) + Background 8-hour Concentration[2]

	A.M. Peak Hour	P.M. Peak Hour	8-Hour
25 Feet from Roadway Edge	10.2	10.1	5.0
50 Feet from Roadway Edge	9.9	9.8	4.9
100 Feet from Roadway Edge	9.7	9.6	4.7

[2] Methodology from Bay Area Air Quality Management District *BAAQMD CEQA Guidelines* (1996).

SIMPLIFIED CALINE4 CARBON MONOXIDE ANALYSIS

Project Number: 10537-00
Project Title: UC Riverside LRDP

Background Information

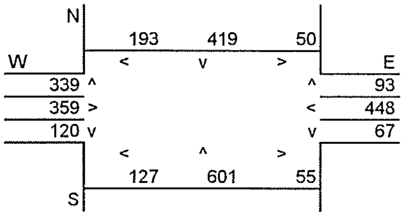
Nearest Air Monitoring Station measuring CO:	Riverside-Rubidoux
Background 1-hour CO Concentration (ppm):	9.0
Background 8-hour CO Concentration (ppm):	4.3
Persistence Factor:	0.6
Analysis Year:	2002

Roadway Data

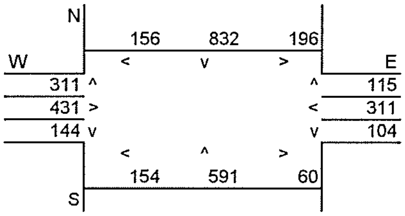
Intersection:	Blaine St./Iowa Ave.
Analysis Condition:	Existing Traffic Volumes

			No. of	Average Speed	
		Roadway Type	Lanes	A.M.	P.M.
North-South Roadway:	Iowa Ave.	At Grade	4	15	15
East-West Roadway:	Blaine St.	At Grade	4	15	15

A.M. Peak Hour Traffic Volumes



P.M. Peak Hour Traffic Volumes



Highest Traffic Volumes (Vehicles per Hour)

N-S Road:	1,695	N-S Road:	2,201
E-W Road:	1,586	E-W Road:	1,507

Roadway CO Contributions and Concentrations

Emissions = (A x B x C) / 100,000[1]

	A_1	A_2	A_3	B	C			
	Reference CO Concentrations			Traffic	Emission	Estimated CO Concentrations		
Roadway	25 Feet	50 Feet	100 Feet	Volume	Factors[1]	25 Feet	50 Feet	100 Feet
A.M. Peak Traffic Hour								
North-South Road	7.0	5.4	3.8	1,695	12.31	1.46	1.13	0.79
East-West Road	2.6	2.2	1.7	1,586	12.31	0.51	0.43	0.33
P.M. Peak Traffic Hour								
North-South Road	7.0	5.4	3.8	2,201	12.31	1.90	1.46	1.03
East-West Road	2.6	2.2	1.7	1,507	12.31	0.48	0.41	0.32

[1] Methodology and emission factors from Bay Area Air Quality Management District *BAAQMD CEQA Guidelines* (1996).

Total Roadway CO Concentrations

Peak Hour Emissions = North-South Concentration + East-West Concentration + Background 1-hour Concentration[2]

8-Hour Emissions = ((Highest Peak Hour Concentration - Background 1-hour Concentration) x Persistence Factor) + Background 8-hour Concentration[2]

	A.M. Peak Hour	P.M. Peak Hour	8-Hour
25 Feet from Roadway Edge	11.0	11.4	5.7
50 Feet from Roadway Edge	10.6	10.9	5.4
100 Feet from Roadway Edge	10.1	10.3	5.1

[2] Methodology from Bay Area Air Quality Management District *BAAQMD CEQA Guidelines* (1996).

SIMPLIFIED CALINE4 CARBON MONOXIDE ANALYSIS

Project Number: 10537-00
Project Title: UC Riverside LRDP

Background Information

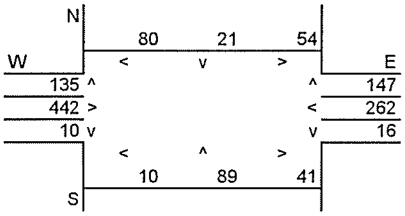
Nearest Air Monitoring Station measuring CO: Riverside-Rubidoux
Background 1-hour CO Concentration (ppm): 9.0
Background 8-hour CO Concentration (ppm): 4.3
Persistence Factor: 0.6
Analysis Year: 2002

Roadway Data

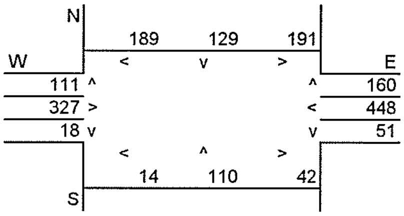
Intersection: Blaine St./Canyon Crest Dr.
Analysis Condition: Existing Traffic Volumes

		Roadway Type	No. of Lanes	Average Speed A.M.	Average Speed P.M.
North-South Roadway:	Canyon Crest Dr.	At Grade	2	20	15
East-West Roadway:	Blaine St.	At Grade	4	20	15

A.M. Peak Hour Traffic Volumes



P.M. Peak Hour Traffic Volumes



Highest Traffic Volumes (Vehicles per Hour)

	A.M.		P.M.
N-S Road:	526	N-S Road:	890
E-W Road:	962	E-W Road:	1,219

Roadway CO Contributions and Concentrations

Emissions = (A x B x C) / 100,000[1]

	A_1	A_2	A_3	B	C			
	Reference CO Concentrations			Traffic	Emission	Estimated CO Concentrations		
Roadway	25 Feet	50 Feet	100 Feet	Volume	Factors[1]	25 Feet	50 Feet	100 Feet
A.M. Peak Traffic Hour								
North-South Road	2.7	2.2	1.7	526	9.33	0.13	0.11	0.08
East-West Road	7.0	5.4	3.8	962	9.33	0.63	0.48	0.34
P.M. Peak Traffic Hour								
North-South Road	2.7	2.2	1.7	890	12.31	0.30	0.24	0.19
East-West Road	7.0	5.4	3.8	1,219	12.31	1.05	0.81	0.57

[1] Methodology and emission factors from Bay Area Air Quality Management District *BAAQMD CEQA Guidelines* (1996).

Total Roadway CO Concentrations

Peak Hour Emissions = North-South Concentration + East-West Concentration + Background 1-hour Concentration[2]

8-Hour Emissions = ((Highest Peak Hour Concentration - Background 1-hour Concentration) x Persistence Factor) + Background 8-hour Concentration[2]

	A.M. Peak Hour	P.M. Peak Hour	8-Hour
25 Feet from Roadway Edge	9.8	10.3	5.1
50 Feet from Roadway Edge	9.6	10.1	4.9
100 Feet from Roadway Edge	9.4	9.8	4.8

[2] Methodology from Bay Area Air Quality Management District *BAAQMD CEQA Guidelines* (1996).

SIMPLIFIED CALINE4 CARBON MONOXIDE ANALYSIS

Project Number: 10537-00
Project Title: UC Riverside LRDP

Background Information

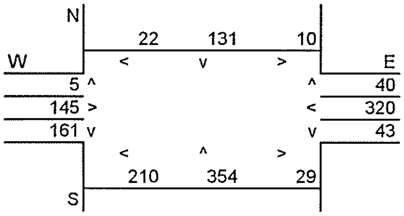
Nearest Air Monitoring Station measuring CO: Riverside-Rubidoux
Background 1-hour CO Concentration (ppm): 9.0
Background 8-hour CO Concentration (ppm): 4.3
Persistence Factor: 0.6
Analysis Year: 2002

Roadway Data

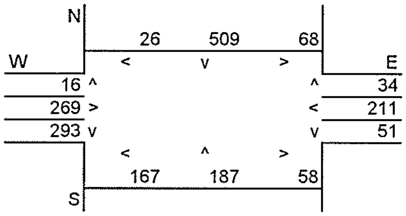
Intersection: Blaine St./Watkins Dr.
Analysis Condition: Existing Traffic Volumes

		Roadway Type	No. of Lanes	Average Speed A.M.	Average Speed P.M.
North-South Roadway:	Watkins Dr.	At Grade	2	20	15
East-West Roadway:	Blaine St.	At Grade	2	20	15

A.M. Peak Hour Traffic Volumes



P.M. Peak Hour Traffic Volumes



Highest Traffic Volumes (Vehicles per Hour)

N-S Road: 928
E-W Road: 863

N-S Road: 1,265
E-W Road: 982

Roadway CO Contributions and Concentrations

Emissions = (A x B x C) / 100,000[1]

	A_1	A_2	A_3	B	C			
	Reference CO Concentrations			Traffic	Emission	Estimated CO Concentrations		
Roadway	25 Feet	50 Feet	100 Feet	Volume	Factors[1]	25 Feet	50 Feet	100 Feet
A.M. Peak Traffic Hour								
North-South Road	7.6	5.7	4.0	928	9.33	0.66	0.49	0.35
East-West Road	2.7	2.2	1.7	863	9.33	0.22	0.18	0.14
P.M. Peak Traffic Hour								
North-South Road	7.6	5.7	4.0	1,265	12.31	1.18	0.89	0.62
East-West Road	2.7	2.2	1.7	982	12.31	0.33	0.27	0.21

[1] Methodology and emission factors from Bay Area Air Quality Management District *BAAQMD CEQA Guidelines* (1996).

Total Roadway CO Concentrations

Peak Hour Emissions = North-South Concentration + East-West Concentration + Background 1-hour Concentration[2]
8-Hour Emissions = ((Highest Peak Hour Concentration - Background 1-hour Concentration) x Persistence Factor) + Background 8-hour Concentration[2]

	A.M. Peak Hour	P.M. Peak Hour	8-Hour
25 Feet from Roadway Edge	9.9	10.5	5.2
50 Feet from Roadway Edge	9.7	10.2	5.0
100 Feet from Roadway Edge	9.5	9.8	4.8

[2] Methodology from Bay Area Air Quality Management District *BAAQMD CEQA Guidelines* (1996).

SIMPLIFIED CALINE4 CARBON MONOXIDE ANALYSIS

Project Number: 10537-00
Project Title: UC Riverside LRDP

Background Information

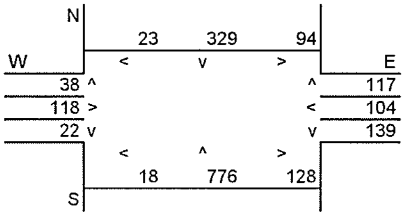
Nearest Air Monitoring Station measuring CO:	Riverside-Rubidoux
Background 1-hour CO Concentration (ppm):	9.0
Background 8-hour CO Concentration (ppm):	4.3
Persistence Factor:	0.6
Analysis Year:	2002

Roadway Data

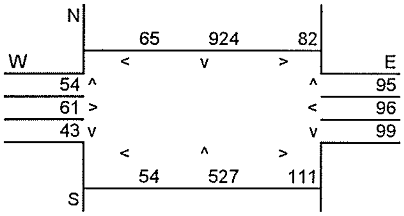
Intersection: Linden St./Chicago Ave
Analysis Condition: Existing Traffic Volumes

			No. of	Average Speed	
		Roadway Type	Lanes	A.M.	P.M.
North-South Roadway:	Chicago Ave.	At Grade	4	20	20
East-West Roadway:	Blaine St.	At Grade	2	20	20

A.M. Peak Hour Traffic Volumes



P.M. Peak Hour Traffic Volumes



Highest Traffic Volumes (Vehicles per Hour)

N-S Road:	1,412	N-S Road:	1,758
E-W Road:	700	E-W Road:	544

Roadway CO Contributions and Concentrations

Emissions = (A x B x C) / 100,000[1]

	A_1	A_2	A_3	B	C			
	Reference CO Concentrations			Traffic	Emission	Estimated CO Concentrations		
Roadway	25 Feet	50 Feet	100 Feet	Volume	Factors[1]	25 Feet	50 Feet	100 Feet
A.M. Peak Traffic Hour								
North-South Road	7.0	5.4	3.8	1,412	9.33	0.92	0.71	0.50
East-West Road	2.7	2.2	1.7	700	9.33	0.18	0.14	0.11
P.M. Peak Traffic Hour								
North-South Road	7.0	5.4	3.8	1,758	9.33	1.15	0.89	0.62
East-West Road	2.7	2.2	1.7	544	9.33	0.14	0.11	0.09

[1] Methodology and emission factors from Bay Area Air Quality Management District *BAAQMD CEQA Guidelines* (1996).

Total Roadway CO Concentrations

Peak Hour Emissions = North-South Concentration + East-West Concentration + Background 1-hour Concentration[2]

8-Hour Emissions = ((Highest Peak Hour Concentration - Background 1-hour Concentration) x Persistence Factor) + Background 8-hour Concentration[2]

	A.M. Peak Hour	P.M. Peak Hour	8-Hour
25 Feet from Roadway Edge	10.1	10.3	5.1
50 Feet from Roadway Edge	9.9	10.0	4.9
100 Feet from Roadway Edge	9.6	9.7	4.7

[2] Methodology from Bay Area Air Quality Management District *BAAQMD CEQA Guidelines* (1996).

SIMPLIFIED CALINE4 CARBON MONOXIDE ANALYSIS

Project Number: 10537-00
Project Title: UC Riverside LRDP

Background Information

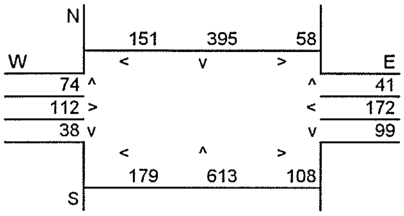
Nearest Air Monitoring Station measuring CO:	Riverside-Rubidoux
Background 1-hour CO Concentration (ppm):	9.0
Background 8-hour CO Concentration (ppm):	4.3
Persistence Factor:	0.6
Analysis Year:	2002

Roadway Data

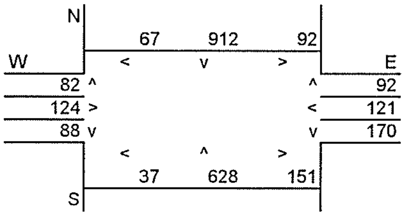
Intersection: Linden St./Iowa Ave.
Analysis Condition: Existing Traffic Volumes

		Roadway Type	No. of Lanes	Average Speed A.M.	Average Speed P.M.
North-South Roadway:	Iowa Ave.	At Grade	4	20	20
East-West Roadway:	Linden St.	At Grade	2	20	20

A.M. Peak Hour Traffic Volumes



P.M. Peak Hour Traffic Volumes



Highest Traffic Volumes (Vehicles per Hour)

N-S Road:	1,432	N-S Road:	1,986
E-W Road:	726	E-W Road:	750

Roadway CO Contributions and Concentrations

Emissions = (A x B x C) / 100,000[1]

	A_1	A_2	A_3	B	C			
	Reference CO Concentrations			Traffic	Emission	Estimated CO Concentrations		
Roadway	25 Feet	50 Feet	100 Feet	Volume	Factors[1]	25 Feet	50 Feet	100 Feet
A.M. Peak Traffic Hour								
North-South Road	7.0	5.4	3.8	1,432	9.33	0.94	0.72	0.51
East-West Road	2.7	2.2	1.7	726	9.33	0.18	0.15	0.12
P.M. Peak Traffic Hour								
North-South Road	7.0	5.4	3.8	1,986	9.33	1.30	1.00	0.70
East-West Road	2.7	2.2	1.7	750	9.33	0.19	0.15	0.12

[1] Methodology and emission factors from Bay Area Air Quality Management District *BAAQMD CEQA Guidelines* (1996).

Total Roadway CO Concentrations

Peak Hour Emissions = North-South Concentration + East-West Concentration + Background 1-hour Concentration[2]

8-Hour Emissions = ((Highest Peak Hour Concentration - Background 1-hour Concentration) x Persistence Factor) + Background 8-hour Concentration[2]

	A.M. Peak Hour	P.M. Peak Hour	8-Hour
25 Feet from Roadway Edge	10.1	10.5	5.2
50 Feet from Roadway Edge	9.9	10.2	5.0
100 Feet from Roadway Edge	9.6	9.8	4.8

[2] Methodology from Bay Area Air Quality Management District *BAAQMD CEQA Guidelines* (1996).

SIMPLIFIED CALINE4 CARBON MONOXIDE ANALYSIS

Project Number: 10537-00
Project Title: UC Riverside LRDP

Background Information

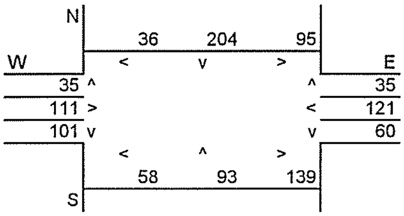
Nearest Air Monitoring Station measuring CO:	Riverside-Rubidoux
Background 1-hour CO Concentration (ppm):	9.0
Background 8-hour CO Concentration (ppm):	4.3
Persistence Factor:	0.6
Analysis Year:	2002

Roadway Data

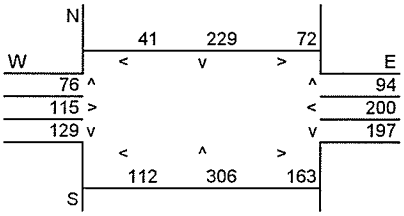
Intersection:	Linden St./Canyon Crest Dr.
Analysis Condition:	Existing Traffic Volumes

			No. of	Average Speed	
		Roadway Type	Lanes	A.M.	P.M.
North-South Roadway:	Canyon Crest Dr.	At Grade	4	20	15
East-West Roadway:	Linden St.	At Grade	2	20	15

A.M. Peak Hour Traffic Volumes



P.M. Peak Hour Traffic Volumes



Highest Traffic Volumes (Vehicles per Hour)

N-S Road:	655	N-S Road:	1,136
E-W Road:	561	E-W Road:	841

Roadway CO Contributions and Concentrations

Emissions = (A x B x C) / 100,000[1]

	A_1	A_2	A_3	B	C			
	Reference CO Concentrations			Traffic	Emission	Estimated CO Concentrations		
Roadway	25 Feet	50 Feet	100 Feet	Volume	Factors[1]	25 Feet	50 Feet	100 Feet
A.M. Peak Traffic Hour								
North-South Road	7.0	5.4	3.8	655	9.33	0.43	0.33	0.23
East-West Road	2.7	2.2	1.7	561	9.33	0.14	0.12	0.09
P.M. Peak Traffic Hour								
North-South Road	7.0	5.4	3.8	1,136	12.31	0.98	0.75	0.53
East-West Road	2.7	2.2	1.7	841	12.31	0.28	0.23	0.18

[1] Methodology and emission factors from Bay Area Air Quality Management District *BAAQMD CEQA Guidelines* (1996).

Total Roadway CO Concentrations

Peak Hour Emissions = North-South Concentration + East-West Concentration + Background 1-hour Concentration[2]

8-Hour Emissions = ((Highest Peak Hour Concentration - Background 1-hour Concentration) x Persistence Factor) + Background 8-hour Concentration[2]

	A.M. Peak Hour	P.M. Peak Hour	8-Hour
25 Feet from Roadway Edge	9.6	10.3	5.1
50 Feet from Roadway Edge	9.4	10.0	4.9
100 Feet from Roadway Edge	9.3	9.7	4.7

[2] Methodology from Bay Area Air Quality Management District *BAAQMD CEQA Guidelines* (1996).

SIMPLIFIED CALINE4 CARBON MONOXIDE ANALYSIS

Project Number: 10537-00
Project Title: UC Riverside LRDP

Background Information

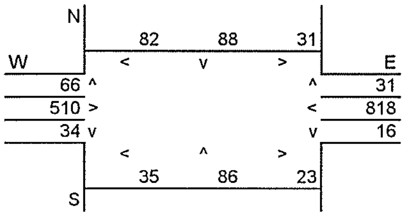
Nearest Air Monitoring Station measuring CO:	Riverside-Rubidoux
Background 1-hour CO Concentration (ppm):	9.0
Background 8-hour CO Concentration (ppm):	4.3
Persistence Factor:	0.6
Analysis Year:	2002

Roadway Data

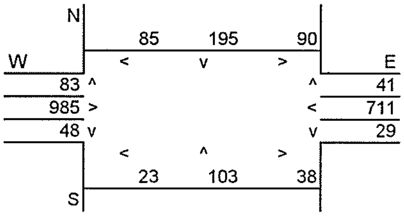
Intersection: University Ave./Kansas Ave.
Analysis Condition: Existing Traffic Volumes

			No. of	Average Speed	
		Roadway Type	Lanes	A.M.	P.M.
North-South Roadway:	Kansas Ave	At Grade	2	20	20
East-West Roadway:	Kansas Ave.	At Grade	4	20	20

A.M. Peak Hour Traffic Volumes



P.M. Peak Hour Traffic Volumes



Highest Traffic Volumes (Vehicles per Hour)

N-S Road:	384	N-S Road:	597
E-W Road:	1,545	E-W Road:	1,935

Roadway CO Contributions and Concentrations

Emissions = (A x B x C) / 100,000[1]

	A_1	A_2	A_3	B	C			
	Reference CO Concentrations			Traffic	Emission	Estimated CO Concentrations		
Roadway	25 Feet	50 Feet	100 Feet	Volume	Factors[1]	25 Feet	50 Feet	100 Feet
A.M. Peak Traffic Hour								
North-South Road	2.7	2.2	1.7	384	9.33	0.10	0.08	0.06
East-West Road	7.0	5.4	3.8	1,545	9.33	1.01	0.78	0.55
P.M. Peak Traffic Hour								
North-South Road	2.7	2.2	1.7	597	9.33	0.15	0.12	0.09
East-West Road	7.0	5.4	3.8	1,935	9.33	1.26	0.98	0.69

[1] Methodology and emission factors from Bay Area Air Quality Management District *BAAQMD CEQA Guidelines* (1996).

Total Roadway CO Concentrations

Peak Hour Emissions = North-South Concentration + East-West Concentration + Background 1-hour Concentration[2]

8-Hour Emissions = ((Highest Peak Hour Concentration - Background 1-hour Concentration) x Persistence Factor) + Background 8-hour Concentration[2]

	A.M. Peak Hour	P.M. Peak Hour	8-Hour
25 Feet from Roadway Edge	10.1	10.4	5.1
50 Feet from Roadway Edge	9.9	10.1	5.0
100 Feet from Roadway Edge	9.6	9.8	4.8

[2] Methodology from Bay Area Air Quality Management District *BAAQMD CEQA Guidelines* (1996).

SIMPLIFIED CALINE4 CARBON MONOXIDE ANALYSIS

Project Number: 10537-00
Project Title: UC Riverside LRDP

Background Information

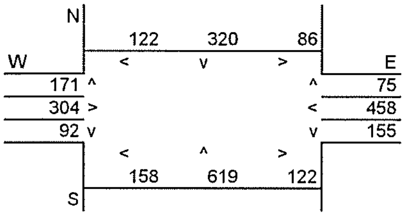
Nearest Air Monitoring Station measuring CO: Riverside-Rubidoux
Background 1-hour CO Concentration (ppm): 9.0
Background 8-hour CO Concentration (ppm): 4.3
Persistence Factor: 0.6
Analysis Year: 2002

Roadway Data

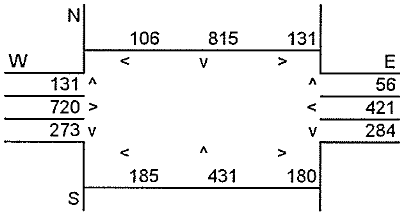
Intersection: University Ave./Chicago Ave.
Analysis Condition: Existing Traffic Volumes

			No. of	Average Speed	
		Roadway Type	Lanes	A.M.	P.M.
North-South Roadway:	Chicago Ave.	At Grade	4	20	20
East-West Roadway:	University Ave.	At Grade	4	20	20

A.M. Peak Hour Traffic Volumes



P.M. Peak Hour Traffic Volumes



Highest Traffic Volumes (Vehicles per Hour)

N-S Road: 1,466
E-W Road: 1,305

N-S Road: 2,168
E-W Road: 1,836

Roadway CO Contributions and Concentrations

Emissions = (A x B x C) / 100,000[1]

	A_1	A_2	A_3	B	C			
	Reference CO Concentrations			Traffic	Emission	Estimated CO Concentrations		
Roadway	25 Feet	50 Feet	100 Feet	Volume	Factors[1]	25 Feet	50 Feet	100 Feet
A.M. Peak Traffic Hour								
North-South Road	7.0	5.4	3.8	1,466	9.33	0.96	0.74	0.52
East-West Road	2.6	2.2	1.7	1,305	9.33	0.32	0.27	0.21
P.M. Peak Traffic Hour								
North-South Road	7.0	5.4	3.8	2,168	9.33	1.42	1.09	0.77
East-West Road	2.6	2.2	1.7	1,836	9.33	0.45	0.38	0.29

[1] Methodology and emission factors from Bay Area Air Quality Management District *BAAQMD CEQA Guidelines* (1996).

Total Roadway CO Concentrations

Peak Hour Emissions = North-South Concentration + East-West Concentration + Background 1-hour Concentration[2]

8-Hour Emissions = ((Highest Peak Hour Concentration - Background 1-hour Concentration) x Persistence Factor) + Background 8-hour Concentration[2]

	A.M. Peak Hour	P.M. Peak Hour	8-Hour
25 Feet from Roadway Edge	10.3	10.9	5.4
50 Feet from Roadway Edge	10.0	10.5	5.2
100 Feet from Roadway Edge	9.7	10.1	4.9

[2] Methodology from Bay Area Air Quality Management District *BAAQMD CEQA Guidelines* (1996).

SIMPLIFIED CALINE4 CARBON MONOXIDE ANALYSIS

Project Number: 10537-00
Project Title: UC Riverside LRDP

Background Information

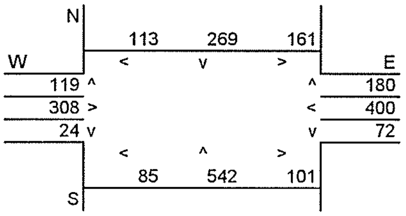
Nearest Air Monitoring Station measuring CO:	Riverside-Rubidoux
Background 1-hour CO Concentration (ppm):	9.0
Background 8-hour CO Concentration (ppm):	4.3
Persistence Factor:	0.6
Analysis Year:	2002

Roadway Data

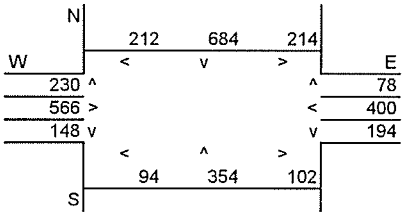
Intersection:	University Ave./Iowa Ave.
Analysis Condition:	Existing Traffic Volumes

			No. of	Average Speed	
		Roadway Type	Lanes	A.M.	P.M.
North-South Roadway:	Iowa Ave.	At Grade	4	20	15
East-West Roadway:	University Ave.	At Grade	4	20	15

A.M. Peak Hour Traffic Volumes



P.M. Peak Hour Traffic Volumes



Highest Traffic Volumes (Vehicles per Hour)

N-S Road:	1,384	N-S Road:	1,772
E-W Road:	1,222	E-W Road:	1,650

Roadway CO Contributions and Concentrations

Emissions = (A x B x C) / 100,000[1]

	A_1	A_2	A_3	B	C			
	Reference CO Concentrations			Traffic	Emission	Estimated CO Concentrations		
Roadway	25 Feet	50 Feet	100 Feet	Volume	Factors[1]	25 Feet	50 Feet	100 Feet
A.M. Peak Traffic Hour								
North-South Road	7.0	5.4	3.8	1,384	9.33	0.90	0.70	0.49
East-West Road	2.6	2.2	1.7	1,222	9.33	0.30	0.25	0.19
P.M. Peak Traffic Hour								
North-South Road	7.0	5.4	3.8	1,772	12.31	1.53	1.18	0.83
East-West Road	2.6	2.2	1.7	1,650	12.31	0.53	0.45	0.35

[1] Methodology and emission factors from Bay Area Air Quality Management District *BAAQMD CEQA Guidelines* (1996).

Total Roadway CO Concentrations

Peak Hour Emissions = North-South Concentration + East-West Concentration + Background 1-hour Concentration[2]

8-Hour Emissions = ((Highest Peak Hour Concentration - Background 1-hour Concentration) x Persistence Factor) + Background 8-hour Concentration[2]

	A.M. Peak Hour	P.M. Peak Hour	8-Hour
25 Feet from Roadway Edge	10.2	11.1	5.5
50 Feet from Roadway Edge	9.9	10.6	5.3
100 Feet from Roadway Edge	9.7	10.2	5.0

[2] Methodology from Bay Area Air Quality Management District *BAAQMD CEQA Guidelines* (1996).

SIMPLIFIED CALINE4 CARBON MONOXIDE ANALYSIS

Project Number: 10537-00
Project Title: UC Riverside LRDP

Background Information

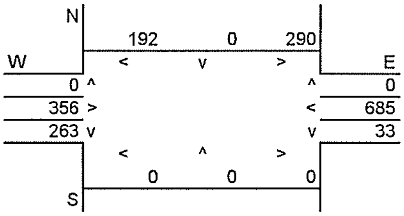
Nearest Air Monitoring Station measuring CO:	Riverside-Rubidoux
Background 1-hour CO Concentration (ppm):	9.0
Background 8-hour CO Concentration (ppm):	4.3
Persistence Factor:	0.6
Analysis Year:	2002

Roadway Data

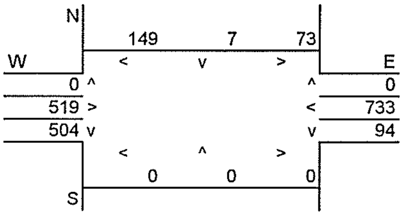
Intersection: University Ave./SR-60 SBR
Analysis Condition: Existing Traffic Volumes

			No. of	Average Speed	
		Roadway Type	Lanes	A.M.	P.M.
North-South Roadway:	SR-60 SBR	At Grade	2	20	20
East-West Roadway:	University Ave.	At Grade	4	20	20

A.M. Peak Hour Traffic Volumes



P.M. Peak Hour Traffic Volumes



Highest Traffic Volumes (Vehicles per Hour)

N-S Road:	482	N-S Road:	605
E-W Road:	1,496	E-W Road:	1,905

Roadway CO Contributions and Concentrations

Emissions = (A x B x C) / 100,000[1]

	A_1	A_2	A_3	B	C			
	Reference CO Concentrations			Traffic	Emission	Estimated CO Concentrations		
Roadway	25 Feet	50 Feet	100 Feet	Volume	Factors[1]	25 Feet	50 Feet	100 Feet
A.M. Peak Traffic Hour								
North-South Road	2.7	2.2	1.7	482	9.33	0.12	0.10	0.08
East-West Road	7.0	5.4	3.8	1,496	9.33	0.98	0.75	0.53
P.M. Peak Traffic Hour								
North-South Road	2.7	2.2	1.7	605	9.33	0.15	0.12	0.10
East-West Road	7.0	5.4	3.8	1,905	9.33	1.24	0.96	0.68

[1] Methodology and emission factors from Bay Area Air Quality Management District *BAAQMD CEQA Guidelines* (1996).

Total Roadway CO Concentrations

Peak Hour Emissions = North-South Concentration + East-West Concentration + Background 1-hour Concentration[2]

8-Hour Emissions = ((Highest Peak Hour Concentration - Background 1-hour Concentration) x Persistence Factor) + Background 8-hour Concentration[2]

	A.M. Peak Hour	P.M. Peak Hour	8-Hour
25 Feet from Roadway Edge	10.1	10.4	5.1
50 Feet from Roadway Edge	9.9	10.1	5.0
100 Feet from Roadway Edge	9.6	9.8	4.8

[2] Methodology from Bay Area Air Quality Management District *BAAQMD CEQA Guidelines* (1996).

SIMPLIFIED CALINE4 CARBON MONOXIDE ANALYSIS

Project Number: 10537-00
Project Title: UC Riverside LRDP

Background Information

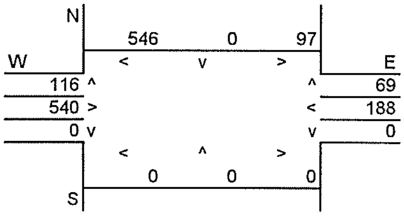
Nearest Air Monitoring Station measuring CO:	Riverside-Rubidoux
Background 1-hour CO Concentration (ppm):	9.0
Background 8-hour CO Concentration (ppm):	4.3
Persistence Factor:	0.6
Analysis Year:	2002

Roadway Data

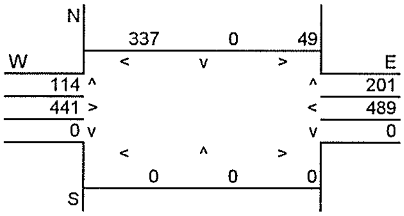
Intersection: University Ave./SR-60 NBR
Analysis Condition: Existing Traffic Volumes

		Roadway Type	No. of Lanes	Average Speed A.M.	Average Speed P.M.
North-South Roadway:	SR-60 NBR	At Grade	2	15	20
East-West Roadway:	University Ave.	At Grade	4	15	20

A.M. Peak Hour Traffic Volumes



P.M. Peak Hour Traffic Volumes



Highest Traffic Volumes (Vehicles per Hour)

N-S Road: 828
E-W Road: 1,390

N-S Road: 701
E-W Road: 1,381

Roadway CO Contributions and Concentrations

Emissions = (A x B x C) / 100,000[1]

	A_1	A_2	A_3	B	C			
	Reference CO Concentrations			Traffic	Emission	Estimated CO Concentrations		
Roadway	25 Feet	50 Feet	100 Feet	Volume	Factors[1]	25 Feet	50 Feet	100 Feet
A.M. Peak Traffic Hour								
North-South Road	2.7	2.2	1.7	828	12.31	0.28	0.22	0.17
East-West Road	7.0	5.4	3.8	1,390	12.31	1.20	0.92	0.65
P.M. Peak Traffic Hour								
North-South Road	2.7	2.2	1.7	701	9.33	0.18	0.14	0.11
East-West Road	7.0	5.4	3.8	1,381	9.33	0.90	0.70	0.49

[1] Methodology and emission factors from Bay Area Air Quality Management District *BAAQMD CEQA Guidelines* (1996).

Total Roadway CO Concentrations

Peak Hour Emissions = North-South Concentration + East-West Concentration + Background 1-hour Concentration[2]

8-Hour Emissions = ((Highest Peak Hour Concentration - Background 1-hour Concentration) x Persistence Factor) + Background 8-hour Concentration[2]

	A.M. Peak Hour	P.M. Peak Hour	8-Hour
25 Feet from Roadway Edge	10.5	10.1	5.2
50 Feet from Roadway Edge	10.1	9.8	5.0
100 Feet from Roadway Edge	9.8	9.6	4.8

[2] Methodology from Bay Area Air Quality Management District *BAAQMD CEQA Guidelines* (1996).

SIMPLIFIED CALINE4 CARBON MONOXIDE ANALYSIS

Project Number: 10537-00
Project Title: UC Riverside LRDP

Background Information

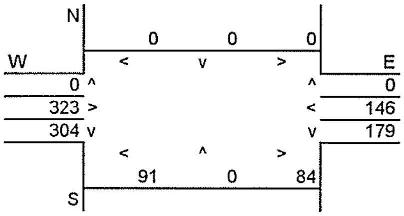
Nearest Air Monitoring Station measuring CO:	Riverside-Rubidoux
Background 1-hour CO Concentration (ppm):	5.1
Background 8-hour CO Concentration (ppm):	3.2
Persistence Factor:	0.6
Analysis Year:	2002

Roadway Data

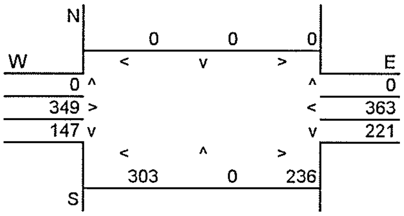
Intersection:	University Ave./Campus Dr.
Analysis Condition:	Existing Traffic Volumes

		Roadway Type	No. of Lanes	Average Speed A.M.	P.M.
North-South Roadway:	Campus Dr.	At Grade	2	20	20
East-West Roadway:	University Ave.	At Grade	4	20	20

A.M. Peak Hour Traffic Volumes



P.M. Peak Hour Traffic Volumes



Highest Traffic Volumes (Vehicles per Hour)

	A.M.		P.M.
N-S Road:	658	N-S Road:	907
E-W Road:	864	E-W Road:	1,169

Roadway CO Contributions and Concentrations

Emissions = (A x B x C) / 100,000[1]

	A_1	A_2	A_3	B	C			
	Reference CO Concentrations			Traffic	Emission	Estimated CO Concentrations		
Roadway	25 Feet	50 Feet	100 Feet	Volume	Factors[1]	25 Feet	50 Feet	100 Feet
A.M. Peak Traffic Hour								
North-South Road	2.7	2.2	1.7	658	9.33	0.17	0.14	0.10
East-West Road	7.0	5.4	3.8	864	9.33	0.56	0.44	0.31
P.M. Peak Traffic Hour								
North-South Road	2.7	2.2	1.7	907	9.33	0.23	0.19	0.14
East-West Road	7.0	5.4	3.8	1,169	9.33	0.76	0.59	0.41

[1] Methodology and emission factors from Bay Area Air Quality Management District *BAAQMD CEQA Guidelines* (1996).

Total Roadway CO Concentrations

Peak Hour Emissions = North-South Concentration + East-West Concentration + Background 1-hour Concentration[2]

8-Hour Emissions = ((Highest Peak Hour Concentration - Background 1-hour Concentration) x Persistence Factor) + Background 8-hour Concentration[2]

	A.M. Peak Hour	P.M. Peak Hour	8-Hour
25 Feet from Roadway Edge	5.8	6.1	3.8
50 Feet from Roadway Edge	5.7	5.9	3.7
100 Feet from Roadway Edge	5.5	5.7	3.5

[2] Methodology from Bay Area Air Quality Management District *BAAQMD CEQA Guidelines* (1996).

SIMPLIFIED CALINE4 CARBON MONOXIDE ANALYSIS

Project Number: 10537-00
Project Title: UC Riverside LRDP

Background Information

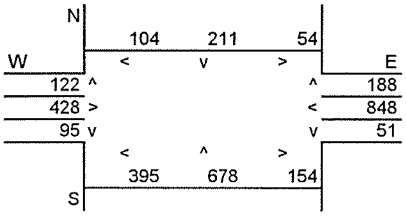
Nearest Air Monitoring Station measuring CO:	Riverside-Rubidoux
Background 1-hour CO Concentration (ppm):	5.1
Background 8-hour CO Concentration (ppm):	3.2
Persistence Factor:	0.6
Analysis Year:	2002

Roadway Data

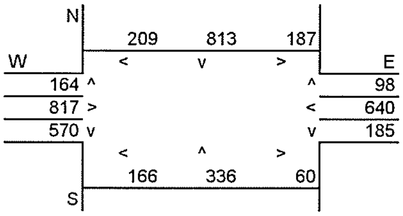
Intersection:	Martin Luther King Blvd./Chicago Ave.
Analysis Condition:	Existing Traffic Volumes

		Roadway Type	No. of Lanes	Average Speed A.M.	Average Speed P.M.
North-South Roadway:	Chicago Ave.	At Grade	4	20	15
East-West Roadway:	Martin Luther King Blvd.	At Grade	4	20	15

A.M. Peak Hour Traffic Volumes



P.M. Peak Hour Traffic Volumes



Highest Traffic Volumes (Vehicles per Hour)

N-S Road:	1,584	N-S Road:	2,130
E-W Road:	1,992	E-W Road:	2,566

Roadway CO Contributions and Concentrations

Emissions = (A x B x C) / 100,000[1]

	A_1	A_2	A_3	B	C			
	Reference CO Concentrations			Traffic	Emission	Estimated CO Concentrations		
Roadway	25 Feet	50 Feet	100 Feet	Volume	Factors[1]	25 Feet	50 Feet	100 Feet
A.M. Peak Traffic Hour								
North-South Road	2.6	2.2	1.7	1,584	9.33	0.38	0.33	0.25
East-West Road	7.0	5.4	3.8	1,992	9.33	1.30	1.00	0.71
P.M. Peak Traffic Hour								
North-South Road	2.6	2.2	1.7	2,130	12.31	0.68	0.58	0.45
East-West Road	7.0	5.4	3.8	2,566	12.31	2.21	1.71	1.20

[1] Methodology and emission factors from Bay Area Air Quality Management District *BAAQMD CEQA Guidelines* (1996).

Total Roadway CO Concentrations

Peak Hour Emissions = North-South Concentration + East-West Concentration + Background 1-hour Concentration[2]

8-Hour Emissions = ((Highest Peak Hour Concentration - Background 1-hour Concentration) x Persistence Factor) + Background 8-hour Concentration[2]

	A.M. Peak Hour	P.M. Peak Hour	8-Hour
25 Feet from Roadway Edge	6.8	8.0	4.9
50 Feet from Roadway Edge	6.4	7.4	4.6
100 Feet from Roadway Edge	6.1	6.7	4.2

[2] Methodology from Bay Area Air Quality Management District *BAAQMD CEQA Guidelines* (1996).

SIMPLIFIED CALINE4 CARBON MONOXIDE ANALYSIS

Project Number: 10537-00
Project Title: UC Riverside LRDP

Background Information

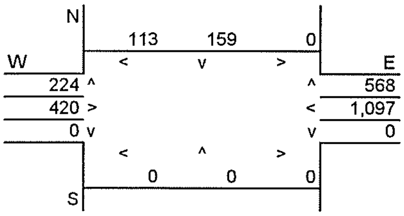
Nearest Air Monitoring Station measuring CO:	Riverside-Rubidoux
Background 1-hour CO Concentration (ppm):	9.0
Background 8-hour CO Concentration (ppm):	4.3
Persistence Factor:	0.6
Analysis Year:	2002

Roadway Data

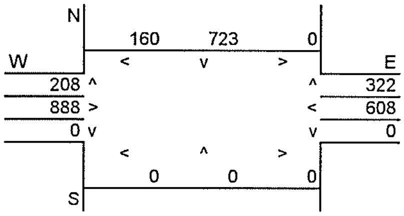
Intersection:	Martin Luther King Blvd./Iowa Ave.
Analysis Condition:	Existing Traffic Volumes

		Roadway Type	No. of Lanes	Average Speed A.M.	Average Speed P.M.
North-South Roadway:	Iowa Ave.	At Grade	2	20	20
East-West Roadway:	Martin Luther King Blvd.	At Grade	4	20	20

A.M. Peak Hour Traffic Volumes



P.M. Peak Hour Traffic Volumes



Highest Traffic Volumes (Vehicles per Hour)

N-S Road:	1,064	N-S Road:	1,413
E-W Road:	2,085	E-W Road:	1,864

Roadway CO Contributions and Concentrations

Emissions = (A x B x C) / 100,000[1]

	A_1	A_2	A_3	B	C			
	Reference CO Concentrations			Traffic	Emission	Estimated CO Concentrations		
Roadway	25 Feet	50 Feet	100 Feet	Volume	Factors[1]	25 Feet	50 Feet	100 Feet
A.M. Peak Traffic Hour								
North-South Road	2.7	2.2	1.7	1,064	9.33	0.27	0.22	0.17
East-West Road	7.0	5.4	3.8	2,085	9.33	1.36	1.05	0.74
P.M. Peak Traffic Hour								
North-South Road	2.7	2.2	1.7	1,413	9.33	0.36	0.29	0.22
East-West Road	7.0	5.4	3.8	1,864	9.33	1.22	0.94	0.66

[1] Methodology and emission factors from Bay Area Air Quality Management District *BAAQMD CEQA Guidelines* (1996).

Total Roadway CO Concentrations

Peak Hour Emissions = North-South Concentration + East-West Concentration + Background 1-hour Concentration[2]

8-Hour Emissions = ((Highest Peak Hour Concentration - Background 1-hour Concentration) x Persistence Factor) + Background 8-hour Concentration[2]

	A.M. Peak Hour	P.M. Peak Hour	8-Hour
25 Feet from Roadway Edge	10.6	10.6	5.3
50 Feet from Roadway Edge	10.3	10.2	5.1
100 Feet from Roadway Edge	9.9	9.9	4.8

[2] Methodology from Bay Area Air Quality Management District *BAAQMD CEQA Guidelines* (1996).

SIMPLIFIED CALINE4 CARBON MONOXIDE ANALYSIS

Project Number: 10537-00
Project Title: UC Riverside LRDP

Background Information

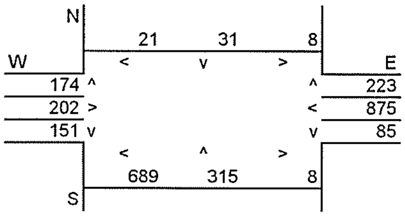
Nearest Air Monitoring Station measuring CO: Riverside-Rubidoux
Background 1-hour CO Concentration (ppm): 9.0
Background 8-hour CO Concentration (ppm): 4.3
Persistence Factor: 0.6
Analysis Year: 2002

Roadway Data

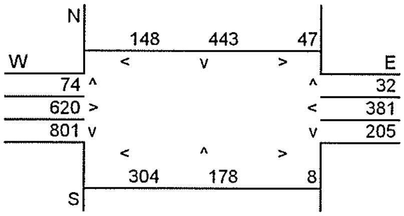
Intersection: Martin Luther King Blvd./Canyon Crest Dr.
Analysis Condition: Existing Traffic Volumes

			No. of	Average Speed	
		Roadway Type	Lanes	A.M.	P.M.
North-South Roadway:	Canyon Crest Dr.	At Grade	2	15	15
East-West Roadway:	Martin Luther King Blvd.	At Grade	4	15	15

A.M. Peak Hour Traffic Volumes



P.M. Peak Hour Traffic Volumes



Highest Traffic Volumes (Vehicles per Hour)

	A.M.		P.M.
N-S Road:	1,279	N-S Road:	1,939
E-W Road:	2,112	E-W Road:	2,328

Roadway CO Contributions and Concentrations

Emissions = (A x B x C) / 100,000[1]

	A_1	A_2	A_3	B	C			
	Reference CO Concentrations			Traffic	Emission	Estimated CO Concentrations		
Roadway	25 Feet	50 Feet	100 Feet	Volume	Factors[1]	25 Feet	50 Feet	100 Feet
A.M. Peak Traffic Hour								
North-South Road	2.7	2.2	1.7	1,279	12.31	0.42	0.35	0.27
East-West Road	7.0	5.4	3.8	2,112	12.31	1.82	1.40	0.99
P.M. Peak Traffic Hour								
North-South Road	2.7	2.2	1.7	1,939	12.31	0.64	0.52	0.41
East-West Road	7.0	5.4	3.8	2,328	12.31	2.01	1.55	1.09

[1] Methodology and emission factors from Bay Area Air Quality Management District *BAAQMD CEQA Guidelines* (1996).

Total Roadway CO Concentrations

Peak Hour Emissions = North-South Concentration + East-West Concentration + Background 1-hour Concentration[2]
8-Hour Emissions = ((Highest Peak Hour Concentration - Background 1-hour Concentration) x Persistence Factor) + Background 8-hour Concentration[2]

	A.M. Peak Hour	P.M. Peak Hour	8-Hour
25 Feet from Roadway Edge	11.2	11.6	5.9
50 Feet from Roadway Edge	10.7	11.1	5.5
100 Feet from Roadway Edge	10.3	10.5	5.2

[2] Methodology from Bay Area Air Quality Management District *BAAQMD CEQA Guidelines* (1996).

SIMPLIFIED CALINE4 CARBON MONOXIDE ANALYSIS

Project Number: 10537-00
Project Title: UC Riverside LRDP

Background Information

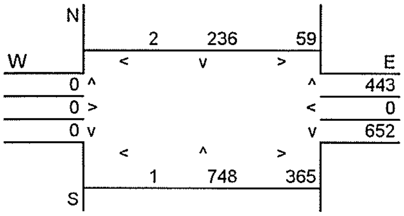
Nearest Air Monitoring Station measuring CO: Riverside-Rubidoux
Background 1-hour CO Concentration (ppm): 9.0
Background 8-hour CO Concentration (ppm): 4.3
Persistence Factor: 0.6
Analysis Year: 2002

Roadway Data

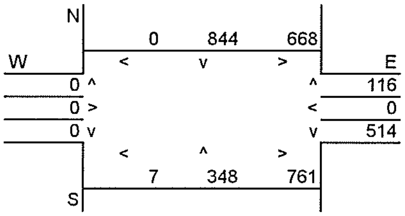
Intersection: Central Ave./Chicago Ave.
Analysis Condition: Existing Traffic Volumes

			No. of	Average Speed	
		Roadway Type	Lanes	A.M.	P.M.
North-South Roadway:	Chicago Ave.	At Grade	4	20	15
East-West Roadway:	Central Ave.	At Grade	2	20	15

A.M. Peak Hour Traffic Volumes



P.M. Peak Hour Traffic Volumes



Highest Traffic Volumes (Vehicles per Hour)

N-S Road:	2,002	N-S Road:	2,474
E-W Road:	1,519	E-W Road:	2,059

Roadway CO Contributions and Concentrations

Emissions = (A x B x C) / 100,000[1]

	A_1	A_2	A_3	B	C			
	Reference CO Concentrations			Traffic	Emission	Estimated CO Concentrations		
Roadway	25 Feet	50 Feet	100 Feet	Volume	Factors[1]	25 Feet	50 Feet	100 Feet
A.M. Peak Traffic Hour								
North-South Road	7.0	5.4	3.8	2,002	9.33	1.31	1.01	0.71
East-West Road	2.7	2.2	1.7	1,519	9.33	0.38	0.31	0.24
P.M. Peak Traffic Hour								
North-South Road	7.0	5.4	3.8	2,474	12.31	2.13	1.64	1.16
East-West Road	2.7	2.2	1.7	2,059	12.31	0.68	0.56	0.43

[1] Methodology and emission factors from Bay Area Air Quality Management District *BAAQMD CEQA Guidelines* (1996).

Total Roadway CO Concentrations

Peak Hour Emissions = North-South Concentration + East-West Concentration + Background 1-hour Concentration[2]

8-Hour Emissions = ((Highest Peak Hour Concentration - Background 1-hour Concentration) x Persistence Factor) + Background 8-hour Concentration[2]

	A.M. Peak Hour	P.M. Peak Hour	8-Hour
25 Feet from Roadway Edge	10.7	11.8	6.0
50 Feet from Roadway Edge	10.3	11.2	5.6
100 Feet from Roadway Edge	10.0	10.6	5.3

[2] Methodology from Bay Area Air Quality Management District *BAAQMD CEQA Guidelines* (1996).

SIMPLIFIED CALINE4 CARBON MONOXIDE ANALYSIS

Project Number: 10537-00
Project Title: UC Riverside LRDP

Background Information

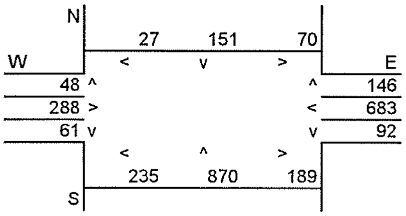
Nearest Air Monitoring Station measuring CO:	Riverside-Rubidoux
Background 1-hour CO Concentration (ppm):	9.0
Background 8-hour CO Concentration (ppm):	4.3
Persistence Factor:	0.6
Analysis Year:	2002

Roadway Data

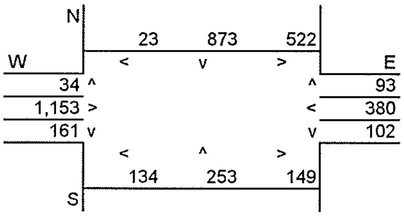
Intersection: Central Ave./Canyon Crest Dr.
Analysis Condition: Existing Traffic Volumes

		Roadway Type	No. of Lanes	Average Speed A.M.	Average Speed P.M.
North-South Roadway:	Canyon Crest Dr.	At Grade	4	15	10
East-West Roadway:	Central Ave.	At Grade	4	15	10

A.M. Peak Hour Traffic Volumes



P.M. Peak Hour Traffic Volumes



Highest Traffic Volumes (Vehicles per Hour)

	A.M.		P.M.
N-S Road:	1,598	N-S Road:	1,798
E-W Road:	1,468	E-W Road:	2,399

Roadway CO Contributions and Concentrations

Emissions = (A x B x C) / 100,000[1]

	A_1	A_2	A_3	B	C			
	Reference CO Concentrations			Traffic	Emission	Estimated CO Concentrations		
Roadway	25 Feet	50 Feet	100 Feet	Volume	Factors[1]	25 Feet	50 Feet	100 Feet
A.M. Peak Traffic Hour								
North-South Road	7.0	5.4	3.8	1,598	12.31	1.38	1.06	0.75
East-West Road	2.6	2.2	1.7	1,468	12.31	0.47	0.40	0.31
P.M. Peak Traffic Hour								
North-South Road	2.6	2.2	1.7	1,798	18.24	0.85	0.72	0.56
East-West Road	7.0	5.4	3.8	2,399	18.24	3.06	2.36	1.66

[1] Methodology and emission factors from Bay Area Air Quality Management District *BAAQMD CEQA Guidelines* (1996).

Total Roadway CO Concentrations

Peak Hour Emissions = North-South Concentration + East-West Concentration + Background 1-hour Concentration[2]

8-Hour Emissions = ((Highest Peak Hour Concentration - Background 1-hour Concentration) x Persistence Factor) + Background 8-hour Concentration[2]

	A.M. Peak Hour	P.M. Peak Hour	8-Hour
25 Feet from Roadway Edge	10.8	12.9	6.6
50 Feet from Roadway Edge	10.5	12.1	6.2
100 Feet from Roadway Edge	10.1	11.2	5.6

[2] Methodology from Bay Area Air Quality Management District *BAAQMD CEQA Guidelines* (1996).

SIMPLIFIED CALINE4 CARBON MONOXIDE ANALYSIS

Project Number: 10537-00
Project Title: UC Riverside LRDP

Background Information

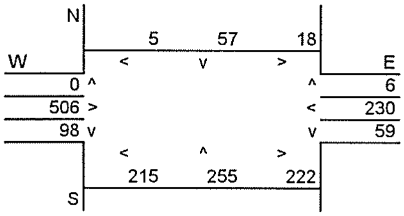
Nearest Air Monitoring Station measuring CO:	Riverside-Rubidoux
Background 1-hour CO Concentration (ppm):	9.0
Background 8-hour CO Concentration (ppm):	4.3
Persistence Factor:	0.6
Analysis Year:	2002

Roadway Data

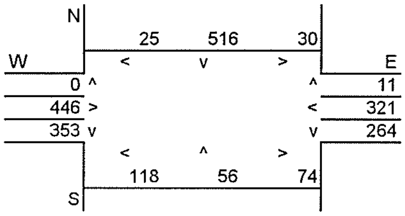
Intersection: Central Ave./Box Springs Blvd
Analysis Condition: Existing Traffic Volumes

		Roadway Type	No. of Lanes	Average Speed A.M.	Average Speed P.M.
North-South Roadway:	Box Springs Blvd	At Grade	2	20	10
East-West Roadway:	Central Ave.	At Grade	4	20	10

A.M. Peak Hour Traffic Volumes



P.M. Peak Hour Traffic Volumes



Highest Traffic Volumes (Vehicles per Hour)

N-S Road:	906	N-S Road:	1,381
E-W Road:	1,054	E-W Road:	1,263

Roadway CO Contributions and Concentrations

Emissions = (A x B x C) / 100,000[1]

Roadway	A_1 Reference CO Concentrations 25 Feet	A_2 50 Feet	A_3 100 Feet	B Traffic Volume	C Emission Factors[1]	Estimated CO Concentrations 25 Feet	50 Feet	100 Feet
A.M. Peak Traffic Hour								
North-South Road	2.7	2.2	1.7	906	9.33	0.23	0.19	0.14
East-West Road	7.0	5.4	3.8	1,054	9.33	0.69	0.53	0.37
P.M. Peak Traffic Hour								
North-South Road	7.6	5.7	4.0	1,381	18.24	1.91	1.44	1.01
East-West Road	2.6	2.2	1.7	1,263	18.24	0.60	0.51	0.39

[1] Methodology and emission factors from Bay Area Air Quality Management District *BAAQMD CEQA Guidelines* (1996).

Total Roadway CO Concentrations

Peak Hour Emissions = North-South Concentration + East-West Concentration + Background 1-hour Concentration[2]

8-Hour Emissions = ((Highest Peak Hour Concentration - Background 1-hour Concentration) x Persistence Factor) + Background 8-hour Concentration[2]

	A.M. Peak Hour	P.M. Peak Hour	8-Hour
25 Feet from Roadway Edge	9.9	11.5	5.8
50 Feet from Roadway Edge	9.7	10.9	5.5
100 Feet from Roadway Edge	9.5	10.4	5.1

[2] Methodology from Bay Area Air Quality Management District *BAAQMD CEQA Guidelines* (1996).

SIMPLIFIED CALINE4 CARBON MONOXIDE ANALYSIS

Project Number: 10537-00
Project Title: UC Riverside LRDP

Background Information

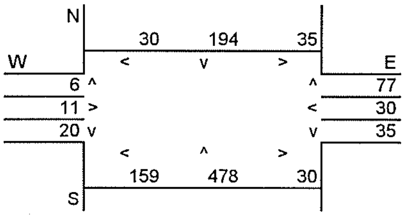
Nearest Air Monitoring Station measuring CO:	Riverside-Rubidoux
Background 1-hour CO Concentration (ppm):	9.0
Background 8-hour CO Concentration (ppm):	4.3
Persistence Factor:	0.6
Analysis Year:	2002

Roadway Data

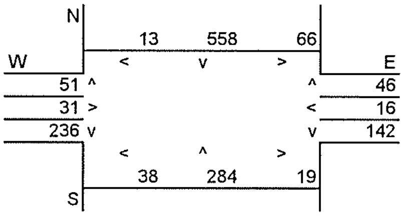
Intersection: Big Springs Rd/Watkins Dr
Analysis Condition: Existing Traffic Volumes

		Roadway Type	No. of Lanes	Average Speed A.M.	Average Speed P.M.
North-South Roadway:	Watkins Dr	At Grade	2	15	10
East-West Roadway:	Big Springs Rd.	At Grade	2	15	10

A.M. Peak Hour Traffic Volumes



P.M. Peak Hour Traffic Volumes



Highest Traffic Volumes (Vehicles per Hour)

N-S Road:	916	N-S Road:	1,277
E-W Road:	256	E-W Road:	385

Roadway CO Contributions and Concentrations

Emissions = (A x B x C) / 100,000[1]

Roadway	A_1 Reference CO Concentrations 25 Feet	A_2 50 Feet	A_3 100 Feet	B Traffic Volume	C Emission Factors[1]	Estimated CO Concentrations 25 Feet	50 Feet	100 Feet
A.M. Peak Traffic Hour								
North-South Road	7.6	5.7	4.0	916	12.31	0.86	0.64	0.45
East-West Road	2.7	2.2	1.7	256	12.31	0.09	0.07	0.05
P.M. Peak Traffic Hour								
North-South Road	7.6	5.7	4.0	1,277	18.24	1.77	1.33	0.93
East-West Road	2.7	2.2	1.7	385	18.24	0.19	0.15	0.12

[1] Methodology and emission factors from Bay Area Air Quality Management District *BAAQMD CEQA Guidelines* (1996).

Total Roadway CO Concentrations

Peak Hour Emissions = North-South Concentration + East-West Concentration + Background 1-hour Concentration[2]
8-Hour Emissions = ((Highest Peak Hour Concentration - Background 1-hour Concentration) x Persistence Factor) + Background 8-hour Concentration[2]

	A.M. Peak Hour	P.M. Peak Hour	8-Hour
25 Feet from Roadway Edge	9.9	11.0	5.5
50 Feet from Roadway Edge	9.7	10.5	5.2
100 Feet from Roadway Edge	9.5	10.1	4.9

[2] Methodology from Bay Area Air Quality Management District *BAAQMD CEQA Guidelines* (1996).

SIMPLIFIED CALINE4 CARBON MONOXIDE ANALYSIS

Project Number: 10537-00
Project Title: UC Riverside LRDP

Background Information

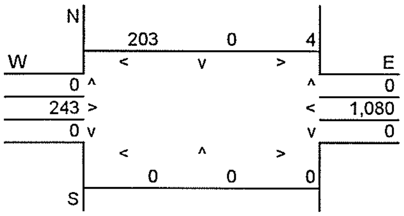
Nearest Air Monitoring Station measuring CO: Riverside-Rubidoux
Background 1-hour CO Concentration (ppm): 9.0
Background 8-hour CO Concentration (ppm): 4.3
Persistence Factor: 0.6
Analysis Year: 2002

Roadway Data

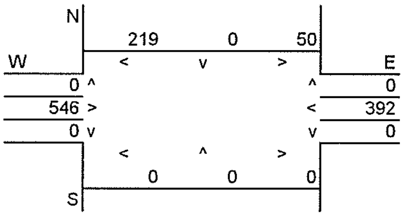
Intersection: Martin Luther King Blvd/SR-60SBR
Analysis Condition: Existing Traffic Volumes

		Roadway Type	No. of Lanes	Average Speed A.M.	Average Speed P.M.
North-South Roadway:	SR-60 SBR	At Grade	2	10	20
East-West Roadway:	Martin Luther King Blvd	At Grade	2	10	20

A.M. Peak Hour Traffic Volumes



P.M. Peak Hour Traffic Volumes



Highest Traffic Volumes (Vehicles per Hour)

N-S Road: 207
E-W Road: 1,526

N-S Road: 269
E-W Road: 1,157

Roadway CO Contributions and Concentrations

Emissions = (A x B x C) / 100,000[1]

Roadway	A_1 Reference CO Concentrations 25 Feet	A_2 Reference CO Concentrations 50 Feet	A_3 Reference CO Concentrations 100 Feet	B Traffic Volume	C Emission Factors[1]	Estimated CO Concentrations 25 Feet	Estimated CO Concentrations 50 Feet	Estimated CO Concentrations 100 Feet
A.M. Peak Traffic Hour								
North-South Road	2.7	2.2	1.7	207	18.24	0.10	0.08	0.06
East-West Road	7.6	5.7	4.0	1,526	18.24	2.12	1.59	1.11
P.M. Peak Traffic Hour								
North-South Road	2.7	2.2	1.7	269	9.33	0.07	0.06	0.04
East-West Road	7.6	5.7	4.0	1,157	9.33	0.82	0.62	0.43

[1] Methodology and emission factors from Bay Area Air Quality Management District *BAAQMD CEQA Guidelines* (1996).

Total Roadway CO Concentrations

Peak Hour Emissions = North-South Concentration + East-West Concentration + Background 1-hour Concentration[2]
8-Hour Emissions = ((Highest Peak Hour Concentration - Background 1-hour Concentration) x Persistence Factor) + Background 8-hour Concentration[2]

	A.M. Peak Hour	P.M. Peak Hour	8-Hour
25 Feet from Roadway Edge	11.2	9.9	5.6
50 Feet from Roadway Edge	10.7	9.7	5.3
100 Feet from Roadway Edge	10.2	9.5	5.0

[2] Methodology from Bay Area Air Quality Management District *BAAQMD CEQA Guidelines* (1996).

SIMPLIFIED CALINE4 CARBON MONOXIDE ANALYSIS

Project Number: 10537-00
Project Title: UC Riverside LRDP

Background Information

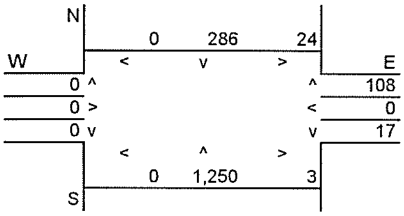
Nearest Air Monitoring Station measuring CO: Riverside-Rubidoux
Background 1-hour CO Concentration (ppm): 9.0
Background 8-hour CO Concentration (ppm): 4.3
Persistence Factor: 0.6
Analysis Year: 2002

Roadway Data

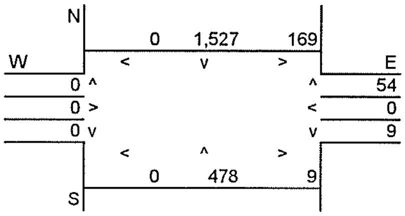
Intersection: Le Conte Dr/Chicago Ave
Analysis Condition: Existing Traffic Volumes

		Roadway Type	No. of Lanes	Average Speed A.M.	Average Speed P.M.
North-South Roadway:	Chicago Ave	At Grade	4	15	20
East-West Roadway:	Le Conte Ave	At Grade	2	15	20

A.M. Peak Hour Traffic Volumes



P.M. Peak Hour Traffic Volumes



Highest Traffic Volumes (Vehicles per Hour)

	A.M.	P.M.
N-S Road:	1,668	2,228
E-W Road:	152	241

Roadway CO Contributions and Concentrations

Emissions = (A x B x C) / 100,000[1]

Roadway	A_1 Reference CO Concentrations 25 Feet	A_2 50 Feet	A_3 100 Feet	B Traffic Volume	C Emission Factors[1]	Estimated CO Concentrations 25 Feet	 50 Feet	 100 Feet
A.M. Peak Traffic Hour								
North-South Road	7.0	5.4	3.8	1,668	12.31	1.44	1.11	0.78
East-West Road	2.7	2.2	1.7	152	12.31	0.05	0.04	0.03
P.M. Peak Traffic Hour								
North-South Road	7.0	5.4	3.8	2,228	9.33	1.46	1.12	0.79
East-West Road	2.7	2.2	1.7	241	9.33	0.06	0.05	0.04

[1] Methodology and emission factors from Bay Area Air Quality Management District *BAAQMD CEQA Guidelines* (1996).

Total Roadway CO Concentrations

Peak Hour Emissions = North-South Concentration + East-West Concentration + Background 1-hour Concentration[2]

8-Hour Emissions = ((Highest Peak Hour Concentration - Background 1-hour Concentration) x Persistence Factor) + Background 8-hour Concentration[2]

	A.M. Peak Hour	P.M. Peak Hour	8-Hour
25 Feet from Roadway Edge	10.5	10.5	5.2
50 Feet from Roadway Edge	10.1	10.2	5.0
100 Feet from Roadway Edge	9.8	9.8	4.8

[2] Methodology from Bay Area Air Quality Management District *BAAQMD CEQA Guidelines* (1996).

SIMPLIFIED CALINE4 CARBON MONOXIDE ANALYSIS

Project Number: 10537-00
Project Title: UC Riverside LRDP

Background Information

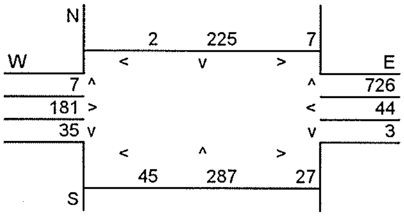
Nearest Air Monitoring Station measuring CO: Riverside-Rubidoux
Background 1-hour CO Concentration (ppm): 9.0
Background 8-hour CO Concentration (ppm): 4.3
Persistence Factor: 0.6
Analysis Year: 2002

Roadway Data

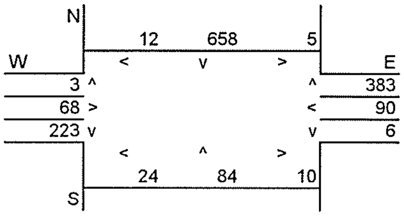
Intersection: El Cerrito Dr/Sycamore Canyon Blvd
Analysis Condition: Existing Traffic Volumes

			No. of	Average Speed	
		Roadway Type	Lanes	A.M.	P.M.
North-South Roadway:	Sycamore Canyon Blvd	At Grade	2	10	10
East-West Roadway:	Le Conte Ave	At Grade	2	10	10

A.M. Peak Hour Traffic Volumes



P.M. Peak Hour Traffic Volumes



Highest Traffic Volumes (Vehicles per Hour)

N-S Road:	1,254	N-S Road:	1,145
E-W Road:	988	E-W Road:	562

Roadway CO Contributions and Concentrations

Emissions = (A x B x C) / 100,000[1]

	A_1	A_2	A_3	B	C			
	Reference CO Concentrations			Traffic	Emission	Estimated CO Concentrations		
Roadway	25 Feet	50 Feet	100 Feet	Volume	Factors[1]	25 Feet	50 Feet	100 Feet
A.M. Peak Traffic Hour								
North-South Road	7.6	5.7	4.0	1,254	18.24	1.74	1.30	0.92
East-West Road	2.7	2.2	1.7	988	18.24	0.49	0.40	0.31
P.M. Peak Traffic Hour								
North-South Road	7.6	5.7	4.0	1,145	18.24	1.59	1.19	0.84
East-West Road	2.7	2.2	1.7	562	18.24	0.28	0.23	0.17

[1] Methodology and emission factors from Bay Area Air Quality Management District *BAAQMD CEQA Guidelines* (1996).

Total Roadway CO Concentrations

Peak Hour Emissions = North-South Concentration + East-West Concentration + Background 1-hour Concentration[2]

8-Hour Emissions = ((Highest Peak Hour Concentration - Background 1-hour Concentration) x Persistence Factor) + Background 8-hour Concentration[2]

	A.M. Peak Hour	P.M. Peak Hour	8-Hour
25 Feet from Roadway Edge	11.2	10.9	5.6
50 Feet from Roadway Edge	10.7	10.4	5.3
100 Feet from Roadway Edge	10.2	10.0	5.0

[2] Methodology from Bay Area Air Quality Management District *BAAQMD CEQA Guidelines* (1996).

SIMPLIFIED CALINE4 CARBON MONOXIDE ANALYSIS

Project Number: 10537-00
Project Title: UC Riverside LRDP

Background Information

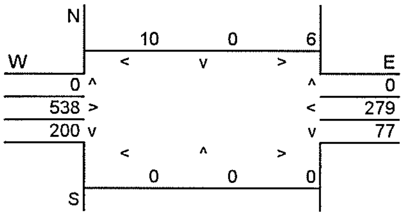
Nearest Air Monitoring Station measuring CO: Riverside-Rubidoux
Background 1-hour CO Concentration (ppm): 9.0
Background 8-hour CO Concentration (ppm): 4.3
Persistence Factor: 0.6
Analysis Year: 2002

Roadway Data

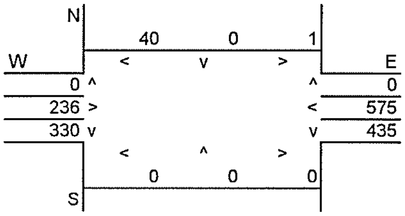
Intersection: Central Ave/SR-60 SBR
Analysis Condition: Existing Traffic Volumes

		Roadway Type	No. of Lanes	Average Speed A.M.	Average Speed P.M.
North-South Roadway:	SR-60 SBR	At Grade	2	20	20
East-West Roadway:	Central Ave	At Grade	2	20	20

A.M. Peak Hour Traffic Volumes



P.M. Peak Hour Traffic Volumes



Highest Traffic Volumes (Vehicles per Hour)

	A.M.		P.M.
N-S Road:	277	N-S Road:	765
E-W Road:	1,027	E-W Road:	1,247

Roadway CO Contributions and Concentrations

Emissions = (A x B x C) / 100,000[1]

	A_1	A_2	A_3	B	C			
	Reference CO Concentrations			Traffic	Emission	Estimated CO Concentrations		
Roadway	25 Feet	50 Feet	100 Feet	Volume	Factors[1]	25 Feet	50 Feet	100 Feet
A.M. Peak Traffic Hour								
North-South Road	2.7	2.2	1.7	277	9.33	0.07	0.06	0.04
East-West Road	7.6	5.7	4.0	1,027	9.33	0.73	0.55	0.38
P.M. Peak Traffic Hour								
North-South Road	2.7	2.2	1.7	765	9.33	0.19	0.16	0.12
East-West Road	7.6	5.7	4.0	1,247	9.33	0.88	0.66	0.47

[1] Methodology and emission factors from Bay Area Air Quality Management District *BAAQMD CEQA Guidelines* (1996).

Total Roadway CO Concentrations

Peak Hour Emissions = North-South Concentration + East-West Concentration + Background 1-hour Concentration[2]

8-Hour Emissions = ((Highest Peak Hour Concentration - Background 1-hour Concentration) x Persistence Factor) + Background 8-hour Concentration[2]

	A.M. Peak Hour	P.M. Peak Hour	8-Hour
25 Feet from Roadway Edge	9.8	10.1	4.9
50 Feet from Roadway Edge	9.6	9.8	4.8
100 Feet from Roadway Edge	9.4	9.6	4.7

[2] Methodology from Bay Area Air Quality Management District *BAAQMD CEQA Guidelines* (1996).

SIMPLIFIED CALINE4 CARBON MONOXIDE ANALYSIS

Project Number: 10537-00
Project Title: UC Riverside LRDP

Background Information

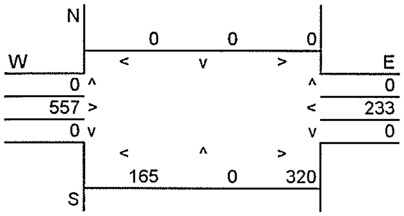
Nearest Air Monitoring Station measuring CO: Riverside-Rubidoux
Background 1-hour CO Concentration (ppm): 9.0
Background 8-hour CO Concentration (ppm): 4.3
Persistence Factor: 0.6
Analysis Year: 2002

Roadway Data

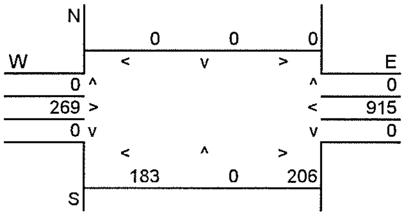
Intersection: Central Ave/SR-60 NBR
Analysis Condition: Existing Traffic Volumes

		Roadway Type	No. of Lanes	Average Speed A.M.	Average Speed P.M.
North-South Roadway:	SR-60 NBR	At Grade	2	20	10
East-West Roadway:	Central Ave	At Grade	2	20	10

A.M. Peak Hour Traffic Volumes



P.M. Peak Hour Traffic Volumes



Highest Traffic Volumes (Vehicles per Hour)

	A.M.		P.M.
N-S Road:	485	N-S Road:	389
E-W Road:	1,110	E-W Road:	1,390

Roadway CO Contributions and Concentrations

Emissions = (A x B x C) / 100,000[1]

Roadway	A_1 Reference CO Concentrations 25 Feet	A_2 50 Feet	A_3 100 Feet	B Traffic Volume	C Emission Factors[1]	Estimated CO Concentrations 25 Feet	50 Feet	100 Feet
A.M. Peak Traffic Hour								
North-South Road	2.7	2.2	1.7	485	9.33	0.12	0.10	0.08
East-West Road	7.6	5.7	4.0	1,110	9.33	0.79	0.59	0.41
P.M. Peak Traffic Hour								
North-South Road	2.7	2.2	1.7	389	18.24	0.19	0.16	0.12
East-West Road	7.6	5.7	4.0	1,390	18.24	1.93	1.45	1.01

[1] Methodology and emission factors from Bay Area Air Quality Management District *BAAQMD CEQA Guidelines* (1996).

Total Roadway CO Concentrations

Peak Hour Emissions = North-South Concentration + East-West Concentration + Background 1-hour Concentration[2]

8-Hour Emissions = ((Highest Peak Hour Concentration - Background 1-hour Concentration) x Persistence Factor) + Background 8-hour Concentration[2]

	A.M. Peak Hour	P.M. Peak Hour	8-Hour
25 Feet from Roadway Edge	9.9	11.1	5.6
50 Feet from Roadway Edge	9.7	10.6	5.3
100 Feet from Roadway Edge	9.5	10.1	5.0

[2] Methodology from Bay Area Air Quality Management District *BAAQMD CEQA Guidelines* (1996).

SIMPLIFIED CALINE4 CARBON MONOXIDE ANALYSIS

Project Number: 10537-00
Project Title: UC Riverside LRDP

Background Information

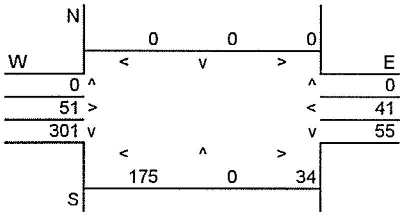
Nearest Air Monitoring Station measuring CO: Riverside-Rubidoux
Background 1-hour CO Concentration (ppm): 9.0
Background 8-hour CO Concentration (ppm): 4.3
Persistence Factor: 0.6
Analysis Year: 2002

Roadway Data

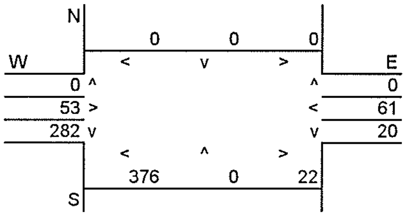
Intersection: Linden St/Aberdeen Dr
Analysis Condition: Existing Traffic Volumes

		Roadway Type	No. of Lanes	Average Speed A.M.	P.M.
North-South Roadway:	Aberdeen Dr	At Grade	2	20	20
East-West Roadway:	Linden St	At Grade	2	20	20

A.M. Peak Hour Traffic Volumes



P.M. Peak Hour Traffic Volumes



Highest Traffic Volumes (Vehicles per Hour)

	A.M.		P.M.
N-S Road:	565	N-S Road:	700
E-W Road:	568	E-W Road:	772

Roadway CO Contributions and Concentrations

Emissions = (A x B x C) / 100,000[1]

	A_1	A_2	A_3	B	C			
	Reference CO Concentrations			Traffic	Emission	Estimated CO Concentrations		
Roadway	25 Feet	50 Feet	100 Feet	Volume	Factors[1]	25 Feet	50 Feet	100 Feet
A.M. Peak Traffic Hour								
North-South Road	2.7	2.2	1.7	565	9.33	0.14	0.12	0.09
East-West Road	7.6	5.7	4.0	568	9.33	0.40	0.30	0.21
P.M. Peak Traffic Hour								
North-South Road	2.7	2.2	1.7	700	9.33	0.18	0.14	0.11
East-West Road	7.6	5.7	4.0	772	9.33	0.55	0.41	0.29

[1] Methodology and emission factors from Bay Area Air Quality Management District *BAAQMD CEQA Guidelines* (1996).

Total Roadway CO Concentrations

Peak Hour Emissions = North-South Concentration + East-West Concentration + Background 1-hour Concentration[2]

8-Hour Emissions = ((Highest Peak Hour Concentration - Background 1-hour Concentration) x Persistence Factor) + Background 8-hour Concentration[2]

	A.M. Peak Hour	P.M. Peak Hour	8-Hour
25 Feet from Roadway Edge	9.5	9.7	4.7
50 Feet from Roadway Edge	9.4	9.6	4.6
100 Feet from Roadway Edge	9.3	9.4	4.5

[2] Methodology from Bay Area Air Quality Management District *BAAQMD CEQA Guidelines* (1996).

SIMPLIFIED CALINE4 CARBON MONOXIDE ANALYSIS

Project Number: 10537-00
Project Title: UC Riverside LRDP

Background Information

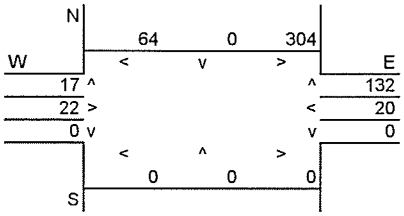
Nearest Air Monitoring Station measuring CO:	Riverside-Rubidoux
Background 1-hour CO Concentration (ppm):	9.0
Background 8-hour CO Concentration (ppm):	4.3
Persistence Factor:	0.6
Analysis Year:	2002

Roadway Data

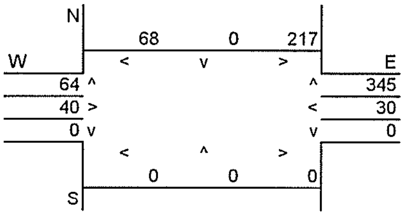
Intersection:	Campus Dr/Aberdeen Dr
Analysis Condition:	Existing Traffic Volumes

			No. of	Average Speed	
		Roadway Type	Lanes	A.M.	P.M.
North-South Roadway:	Aberdeen Dr	At Grade	2	10	10
East-West Roadway:	Campus Dr	At Grade	2	10	10

A.M. Peak Hour Traffic Volumes



P.M. Peak Hour Traffic Volumes



Highest Traffic Volumes (Vehicles per Hour)

N-S Road:	517	N-S Road:	694
E-W Road:	478	E-W Road:	632

Roadway CO Contributions and Concentrations

Emissions = (A x B x C) / 100,000[1]

	A_1	A_2	A_3	B	C			
	Reference CO Concentrations			Traffic	Emission	Estimated CO Concentrations		
Roadway	25 Feet	50 Feet	100 Feet	Volume	Factors[1]	25 Feet	50 Feet	100 Feet
A.M. Peak Traffic Hour								
North-South Road	7.6	5.7	4.0	517	18.24	0.72	0.54	0.38
East-West Road	2.7	2.2	1.7	478	18.24	0.24	0.19	0.15
P.M. Peak Traffic Hour								
North-South Road	7.6	5.7	4.0	694	18.24	0.96	0.72	0.51
East-West Road	2.7	2.2	1.7	632	18.24	0.31	0.25	0.20

[1] Methodology and emission factors from Bay Area Air Quality Management District *BAAQMD CEQA Guidelines* (1996).

Total Roadway CO Concentrations

Peak Hour Emissions = North-South Concentration + East-West Concentration + Background 1-hour Concentration[2]

8-Hour Emissions = ((Highest Peak Hour Concentration - Background 1-hour Concentration) x Persistence Factor) + Background 8-hour Concentration[2]

	A.M. Peak Hour	P.M. Peak Hour	8-Hour
25 Feet from Roadway Edge	10.0	10.3	5.1
50 Feet from Roadway Edge	9.7	10.0	4.9
100 Feet from Roadway Edge	9.5	9.7	4.7

[2] Methodology from Bay Area Air Quality Management District *BAAQMD CEQA Guidelines* (1996).

SIMPLIFIED CALINE4 CARBON MONOXIDE ANALYSIS

Project Number: 10537-00
Project Title: UC Riverside LRDP

Background Information

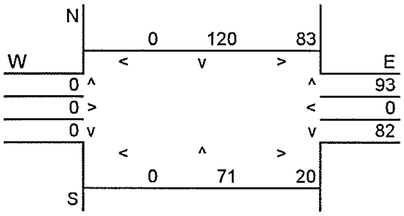
Nearest Air Monitoring Station measuring CO: Riverside-Rubidoux
Background 1-hour CO Concentration (ppm): 9.0
Background 8-hour CO Concentration (ppm): 4.3
Persistence Factor: 0.6
Analysis Year: 2002

Roadway Data

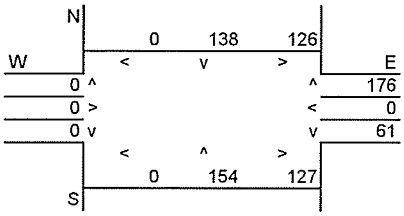
Intersection: Big Springs Rd/Campus Dr
Analysis Condition: Existing Traffic Volumes

			No. of	Average Speed	
		Roadway Type	Lanes	A.M.	P.M.
North-South Roadway:	Big Springs Rd	At Grade	2	10	10
East-West Roadway:	Campus Dr	At Grade	2	10	10

A.M. Peak Hour Traffic Volumes



P.M. Peak Hour Traffic Volumes



Highest Traffic Volumes (Vehicles per Hour)

	A.M.		P.M.
N-S Road:	367	N-S Road:	594
E-W Road:	278	E-W Road:	490

Roadway CO Contributions and Concentrations

Emissions = (A x B x C) / 100,000[1]

	A_1	A_2	A_3	B	C			
	Reference CO Concentrations			Traffic	Emission	Estimated CO Concentrations		
Roadway	25 Feet	50 Feet	100 Feet	Volume	Factors[1]	25 Feet	50 Feet	100 Feet
A.M. Peak Traffic Hour								
North-South Road	7.6	5.7	4.0	367	18.24	0.51	0.38	0.27
East-West Road	2.7	2.2	1.7	278	18.24	0.14	0.11	0.09
P.M. Peak Traffic Hour								
North-South Road	7.6	5.7	4.0	594	18.24	0.82	0.62	0.43
East-West Road	2.7	2.2	1.7	490	18.24	0.24	0.20	0.15

[1] Methodology and emission factors from Bay Area Air Quality Management District *BAAQMD CEQA Guidelines* (1996).

Total Roadway CO Concentrations

Peak Hour Emissions = North-South Concentration + East-West Concentration + Background 1-hour Concentration[2]

8-Hour Emissions = ((Highest Peak Hour Concentration - Background 1-hour Concentration) x Persistence Factor) + Background 8-hour Concentration[2]

	A.M. Peak Hour	P.M. Peak Hour	8-Hour
25 Feet from Roadway Edge	9.6	10.1	4.9
50 Feet from Roadway Edge	9.5	9.8	4.8
100 Feet from Roadway Edge	9.4	9.6	4.7

[2] Methodology from Bay Area Air Quality Management District *BAAQMD CEQA Guidelines* (1996).

SIMPLIFIED CALINE4 CARBON MONOXIDE ANALYSIS

Project Number: 10537-00
Project Title: UC Riverside LRDP

Background Information

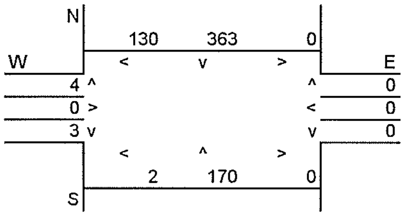
Nearest Air Monitoring Station measuring CO:	Riverside-Rubidoux
Background 1-hour CO Concentration (ppm):	9.0
Background 8-hour CO Concentration (ppm):	4.3
Persistence Factor:	0.6
Analysis Year:	2002

Roadway Data

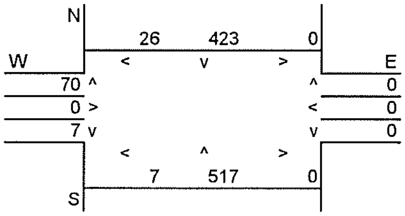
Intersection: Parking Lot 1/campus Dr
Analysis Condition: Existing Traffic Volumes

		Roadway Type	No. of Lanes	Average Speed A.M.	Average Speed P.M.
North-South Roadway:	Campus Dr.	At Grade	2	10	10
East-West Roadway:	Parking Access	At Grade	2	10	10

A.M. Peak Hour Traffic Volumes



P.M. Peak Hour Traffic Volumes



Highest Traffic Volumes (Vehicles per Hour)

	A.M.		P.M.
N-S Road:	667	N-S Road:	1,036
E-W Road:	139	E-W Road:	110

Roadway CO Contributions and Concentrations

Emissions = (A x B x C) / 100,000[1]

	A_1	A_2	A_3	B	C			
	Reference CO Concentrations			Traffic	Emission	Estimated CO Concentrations		
Roadway	25 Feet	50 Feet	100 Feet	Volume	Factors[1]	25 Feet	50 Feet	100 Feet
A.M. Peak Traffic Hour								
North-South Road	7.6	5.7	4.0	667	18.24	0.92	0.69	0.49
East-West Road	2.7	2.2	1.7	139	18.24	0.07	0.06	0.04
P.M. Peak Traffic Hour								
North-South Road	7.6	5.7	4.0	1,036	18.24	1.44	1.08	0.76
East-West Road	2.7	2.2	1.7	110	18.24	0.05	0.04	0.03

[1] Methodology and emission factors from Bay Area Air Quality Management District *BAAQMD CEQA Guidelines* (1996).

Total Roadway CO Concentrations

Peak Hour Emissions = North-South Concentration + East-West Concentration + Background 1-hour Concentration[2]

8-Hour Emissions = ((Highest Peak Hour Concentration - Background 1-hour Concentration) x Persistence Factor) + Background 8-hour Concentration[2]

	A.M. Peak Hour	P.M. Peak Hour	8-Hour
25 Feet from Roadway Edge	10.0	10.5	5.2
50 Feet from Roadway Edge	9.7	10.1	5.0
100 Feet from Roadway Edge	9.5	9.8	4.8

[2] Methodology from Bay Area Air Quality Management District *BAAQMD CEQA Guidelines* (1996).

SIMPLIFIED CALINE4 CARBON MONOXIDE ANALYSIS

Project Number: 10537-00
Project Title: UC Riverside LRDP

Background Information

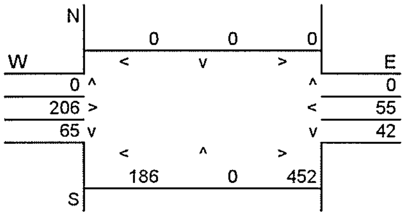
Nearest Air Monitoring Station measuring CO:	Riverside-Rubidoux
Background 1-hour CO Concentration (ppm):	9.0
Background 8-hour CO Concentration (ppm):	4.3
Persistence Factor:	0.6
Analysis Year:	2002

Roadway Data

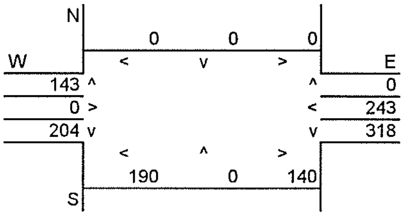
Intersection: Campus Dr/Canyon Crest Dr
Analysis Condition: Existing Traffic Volumes

		Roadway Type	No. of Lanes	Average Speed A.M.	Average Speed P.M.
North-South Roadway:	Canyon Crest Dr	At Grade	2	10	10
East-West Roadway:	Campus Dr	At Grade	2	10	10

A.M. Peak Hour Traffic Volumes



P.M. Peak Hour Traffic Volumes



Highest Traffic Volumes (Vehicles per Hour)

N-S Road:	745	N-S Road:	852
E-W Road:	755	E-W Road:	780

Roadway CO Contributions and Concentrations

Emissions = (A x B x C) / 100,000[1]

Roadway	A_1 Reference CO Concentrations 25 Feet	A_2 50 Feet	A_3 100 Feet	B Traffic Volume	C Emission Factors[1]	Estimated CO Concentrations 25 Feet	50 Feet	100 Feet
A.M. Peak Traffic Hour								
North-South Road	2.7	2.2	1.7	745	18.24	0.37	0.30	0.23
East-West Road	7.6	5.7	4.0	755	18.24	1.05	0.79	0.55
P.M. Peak Traffic Hour								
North-South Road	7.6	5.7	4.0	852	18.24	1.18	0.89	0.62
East-West Road	2.7	2.2	1.7	780	18.24	0.38	0.31	0.24

[1] Methodology and emission factors from Bay Area Air Quality Management District *BAAQMD CEQA Guidelines* (1996).

Total Roadway CO Concentrations

Peak Hour Emissions = North-South Concentration + East-West Concentration + Background 1-hour Concentration[2]

8-Hour Emissions = ((Highest Peak Hour Concentration - Background 1-hour Concentration) x Persistence Factor) + Background 8-hour Concentration[2]

	A.M. Peak Hour	P.M. Peak Hour	8-Hour
25 Feet from Roadway Edge	10.4	10.6	5.2
50 Feet from Roadway Edge	10.1	10.2	5.0
100 Feet from Roadway Edge	9.8	9.9	4.8

[2] Methodology from Bay Area Air Quality Management District *BAAQMD CEQA Guidelines* (1996).

SIMPLIFIED CALINE4 CARBON MONOXIDE ANALYSIS

Project Number: 10537-00
Project Title: UC Riverside LRDP

Background Information

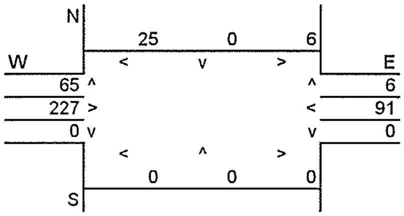
Nearest Air Monitoring Station measuring CO:	Riverside-Rubidoux
Background 1-hour CO Concentration (ppm):	9.0
Background 8-hour CO Concentration (ppm):	4.3
Persistence Factor:	0.6
Analysis Year:	2002

Roadway Data

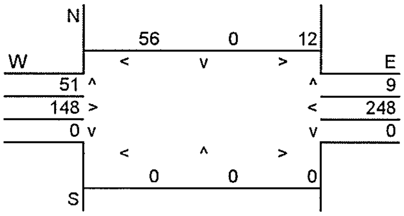
Intersection:	Campus Dr/Citrus Dr
Analysis Condition:	Existing Traffic Volumes

		Roadway Type	No. of Lanes	Average Speed A.M.	Average Speed P.M.
North-South Roadway:	Citrus Dr	At Grade	2	10	10
East-West Roadway:	Campus Dr	At Grade	2	20	20

A.M. Peak Hour Traffic Volumes



P.M. Peak Hour Traffic Volumes



Highest Traffic Volumes (Vehicles per Hour)

	A.M.		P.M.
N-S Road:	102	N-S Road:	128
E-W Road:	408	E-W Road:	503

Roadway CO Contributions and Concentrations

Emissions = (A x B x C) / 100,000[1]

Roadway	A_1 Reference CO Concentrations 25 Feet	A_2 50 Feet	A_3 100 Feet	B Traffic Volume	C Emission Factors[1]	Estimated CO Concentrations 25 Feet	50 Feet	100 Feet
A.M. Peak Traffic Hour								
North-South Road	2.7	2.2	1.7	102	18.24	0.05	0.04	0.03
East-West Road	7.6	5.7	4.0	408	9.33	0.29	0.22	0.15
P.M. Peak Traffic Hour								
North-South Road	2.7	2.2	1.7	128	18.24	0.06	0.05	0.04
East-West Road	7.6	5.7	4.0	503	9.33	0.36	0.27	0.19

[1] Methodology and emission factors from Bay Area Air Quality Management District *BAAQMD CEQA Guidelines* (1996).

Total Roadway CO Concentrations

Peak Hour Emissions = North-South Concentration + East-West Concentration + Background 1-hour Concentration[2]

8-Hour Emissions = ((Highest Peak Hour Concentration - Background 1-hour Concentration) x Persistence Factor) + Background 8-hour Concentration[2]

	A.M. Peak Hour	P.M. Peak Hour	8-Hour
25 Feet from Roadway Edge	9.3	9.4	4.6
50 Feet from Roadway Edge	9.3	9.3	4.5
100 Feet from Roadway Edge	9.2	9.2	4.4

[2] Methodology from Bay Area Air Quality Management District *BAAQMD CEQA Guidelines* (1996).

SIMPLIFIED CALINE4 CARBON MONOXIDE ANALYSIS

Project Number: 10537-00
Project Title: UC Riverside LRDP

Background Information

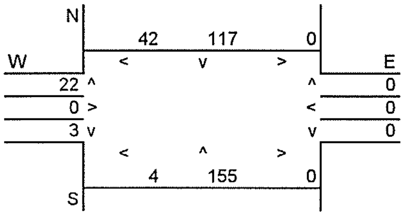
Nearest Air Monitoring Station measuring CO:	Riverside-Rubidoux
Background 1-hour CO Concentration (ppm):	9.0
Background 8-hour CO Concentration (ppm):	4.3
Persistence Factor:	0.6
Analysis Year:	2002

Roadway Data

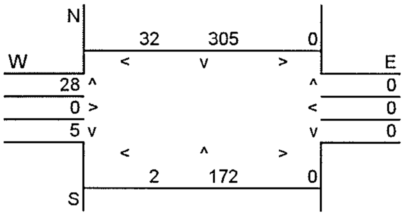
Intersection:	Eucalyptus Dr/Campus Dr
Analysis Condition:	Existing Traffic Volumes

			No. of	Average Speed	
		Roadway Type	Lanes	A.M.	P.M.
North-South Roadway:	Campus Dr	At Grade	2	20	20
East-West Roadway:	Campus Dr	At Grade	2	10	10

A.M. Peak Hour Traffic Volumes



P.M. Peak Hour Traffic Volumes



Highest Traffic Volumes (Vehicles per Hour)

N-S Road:	336	N-S Road:	537
E-W Road:	71	E-W Road:	67

Roadway CO Contributions and Concentrations

Emissions = (A x B x C) / 100,000[1]

	A_1	A_2	A_3	B	C			
	Reference CO Concentrations			Traffic	Emission	Estimated CO Concentrations		
Roadway	25 Feet	50 Feet	100 Feet	Volume	Factors[1]	25 Feet	50 Feet	100 Feet
A.M. Peak Traffic Hour								
North-South Road	7.6	5.7	4.0	336	9.33	0.24	0.18	0.13
East-West Road	2.7	2.2	1.7	71	18.24	0.03	0.03	0.02
P.M. Peak Traffic Hour								
North-South Road	7.6	5.7	4.0	537	9.33	0.38	0.29	0.20
East-West Road	2.7	2.2	1.7	67	18.24	0.03	0.03	0.02

[1] Methodology and emission factors from Bay Area Air Quality Management District *BAAQMD CEQA Guidelines* (1996).

Total Roadway CO Concentrations

Peak Hour Emissions = North-South Concentration + East-West Concentration + Background 1-hour Concentration[2]

8-Hour Emissions = ((Highest Peak Hour Concentration - Background 1-hour Concentration) x Persistence Factor) + Background 8-hour Concentration[2]

	A.M. Peak Hour	P.M. Peak Hour	8-Hour
25 Feet from Roadway Edge	9.3	9.4	4.5
50 Feet from Roadway Edge	9.2	9.3	4.5
100 Feet from Roadway Edge	9.1	9.2	4.4

[2] Methodology from Bay Area Air Quality Management District *BAAQMD CEQA Guidelines* (1996).

SIMPLIFIED CALINE4 CARBON MONOXIDE ANALYSIS

Project Number: 10537-00
Project Title: UC Riverside LRDP

Background Information

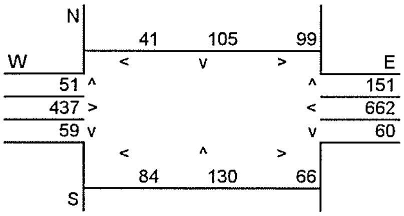
Nearest Air Monitoring Station measuring CO:	Riverside-Rubidoux
Background 1-hour CO Concentration (ppm):	5.1
Background 8-hour CO Concentration (ppm):	3.2
Persistence Factor:	0.6
Analysis Year:	2010

Roadway Data

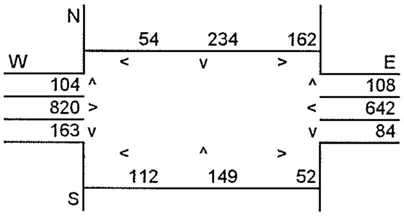
Intersection:	3rd St/Kansas Ave.
Analysis Condition:	Future Plus Project Traffic Volumes (2-Lane Iowa Avenue Scenario)

		Roadway Type	No. of Lanes	Average Speed A.M.	Average Speed P.M.
North-South Roadway:	Kansas Ave.	At Grade	2	20	20
East-West Roadway:	3rd Street	At Grade	4	20	20

A.M. Peak Hour Traffic Volumes



P.M. Peak Hour Traffic Volumes



Highest Traffic Volumes (Vehicles per Hour)

	A.M.		P.M.
N-S Road:	577	N-S Road:	811
E-W Road:	1,475	E-W Road:	1,895

Roadway CO Contributions and Concentrations

Emissions = (A x B x C) / 100,000[1]

Roadway	A_1 Reference CO Concentrations 25 Feet	A_2 50 Feet	A_3 100 Feet	B Traffic Volume	C Emission Factors[1]	Estimated CO Concentrations 25 Feet	50 Feet	100 Feet
A.M. Peak Traffic Hour								
North-South Road	2.7	2.2	1.7	577	5.52	0.09	0.07	0.05
East-West Road	7.0	5.4	3.8	1,475	5.52	0.57	0.44	0.31
P.M. Peak Traffic Hour								
North-South Road	2.7	2.2	1.7	811	5.52	0.12	0.10	0.08
East-West Road	7.0	5.4	3.8	1,895	5.52	0.73	0.56	0.40

[1] Methodology and emission factors from Bay Area Air Quality Management District *BAAQMD CEQA Guidelines* (1996).

Total Roadway CO Concentrations

Peak Hour Emissions = North-South Concentration + East-West Concentration + Background 1-hour Concentration[2]

8-Hour Emissions = ((Highest Peak Hour Concentration - Background 1-hour Concentration) x Persistence Factor) + Background 8-hour Concentration[2]

	A.M. Peak Hour	P.M. Peak Hour	8-Hour
25 Feet from Roadway Edge	5.8	6.0	3.7
50 Feet from Roadway Edge	5.6	5.8	3.6
100 Feet from Roadway Edge	5.5	5.6	3.5

[2] Methodology from Bay Area Air Quality Management District *BAAQMD CEQA Guidelines* (1996).

SIMPLIFIED CALINE4 CARBON MONOXIDE ANALYSIS

Project Number: 10537-00
Project Title: UC Riverside LRDP

Background Information

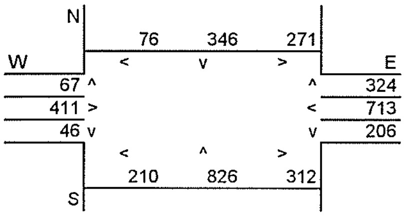
Nearest Air Monitoring Station measuring CO:	Riverside-Rubidoux
Background 1-hour CO Concentration (ppm):	5.1
Background 8-hour CO Concentration (ppm):	3.2
Persistence Factor:	0.6
Analysis Year:	2010

Roadway Data

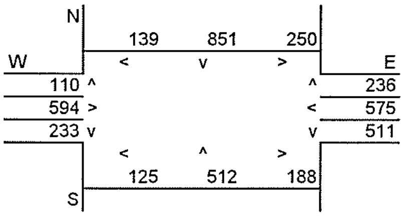
Intersection:	3rd St/Chicago Ave.
Analysis Condition:	Future Plus Project Traffic Volumes (2-Lane Iowa Avenue Scenario)

		Roadway Type	No. of Lanes	Average Speed A.M.	Average Speed P.M.
North-South Roadway:	Chicago Ave.	At Grade	4	15	10
East-West Roadway:	3rd Street	At Grade	4	15	10

A.M. Peak Hour Traffic Volumes



P.M. Peak Hour Traffic Volumes



Highest Traffic Volumes (Vehicles per Hour)

N-S Road:	1,946	N-S Road:	2,420
E-W Road:	2,237	E-W Road:	2,354

Roadway CO Contributions and Concentrations

Emissions = (A x B x C) / 100,000[1]

	A_1	A_2	A_3	B	C			
	Reference CO Concentrations			Traffic	Emission	Estimated CO Concentrations		
Roadway	25 Feet	50 Feet	100 Feet	Volume	Factors[1]	25 Feet	50 Feet	100 Feet
A.M. Peak Traffic Hour								
North-South Road	2.6	2.2	1.7	1,946	7.30	0.37	0.31	0.24
East-West Road	7.0	5.4	3.8	2,237	7.30	1.14	0.88	0.62
P.M. Peak Traffic Hour								
North-South Road	7.0	5.4	3.8	2,420	10.78	1.83	1.41	0.99
East-West Road	2.6	2.2	1.7	2,354	10.78	0.66	0.56	0.43

[1] Methodology and emission factors from Bay Area Air Quality Management District *BAAQMD CEQA Guidelines* (1996).

Total Roadway CO Concentrations

Peak Hour Emissions = North-South Concentration + East-West Concentration + Background 1-hour Concentration[2]

8-Hour Emissions = ((Highest Peak Hour Concentration - Background 1-hour Concentration) x Persistence Factor) + Background 8-hour Concentration[2]

	A.M. Peak Hour	P.M. Peak Hour	8-Hour
25 Feet from Roadway Edge	6.6	7.6	4.7
50 Feet from Roadway Edge	6.3	7.1	4.4
100 Feet from Roadway Edge	6.0	6.5	4.1

[2] Methodology from Bay Area Air Quality Management District *BAAQMD CEQA Guidelines* (1996).

SIMPLIFIED CALINE4 CARBON MONOXIDE ANALYSIS

Project Number: 10537-00
Project Title: UC Riverside LRDP

Background Information

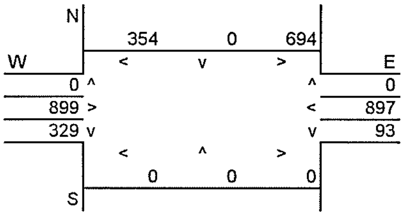
Nearest Air Monitoring Station measuring CO:	Riverside-Rubidoux
Background 1-hour CO Concentration (ppm):	5.1
Background 8-hour CO Concentration (ppm):	3.9
Persistence Factor:	0.6
Analysis Year:	2010

Roadway Data

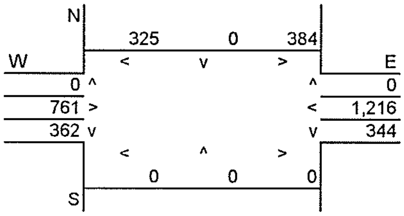
Intersection: 3rd St/SR-60 SBR
Analysis Condition: Future Plus Project Traffic Volumes (2-Lane Iowa Avenue Scenario)

		Roadway Type	No. of Lanes	Average Speed A.M.	Average Speed P.M.
North-South Roadway:	SR-60 SBR	At Grade	2	20	20
East-West Roadway:	3rd Street	At Grade	4	20	20

A.M. Peak Hour Traffic Volumes



P.M. Peak Hour Traffic Volumes



Highest Traffic Volumes (Vehicles per Hour)

	A.M.		P.M.
N-S Road:	1,048	N-S Road:	709
E-W Road:	2,583	E-W Road:	2,705

Roadway CO Contributions and Concentrations

Emissions = (A x B x C) / 100,000[1]

Roadway	A_1 Reference CO Concentrations 25 Feet	A_2 50 Feet	A_3 100 Feet	B Traffic Volume	C Emission Factors[1]	Estimated CO Concentrations 25 Feet	50 Feet	100 Feet
A.M. Peak Traffic Hour								
North-South Road	2.7	2.2	1.7	1,048	5.52	0.16	0.13	0.10
East-West Road	7.0	5.4	3.8	2,583	5.52	1.00	0.77	0.54
P.M. Peak Traffic Hour								
North-South Road	2.7	2.2	1.7	709	5.52	0.11	0.09	0.07
East-West Road	7.0	5.4	3.8	2,705	5.52	1.05	0.81	0.57

[1] Methodology and emission factors from Bay Area Air Quality Management District *BAAQMD CEQA Guidelines* (1996).

Total Roadway CO Concentrations

Peak Hour Emissions = North-South Concentration + East-West Concentration + Background 1-hour Concentration[2]

8-Hour Emissions = ((Highest Peak Hour Concentration - Background 1-hour Concentration) x Persistence Factor) + Background 8-hour Concentration[2]

	A.M. Peak Hour	P.M. Peak Hour	8-Hour
25 Feet from Roadway Edge	6.3	6.3	4.6
50 Feet from Roadway Edge	6.0	6.0	4.4
100 Feet from Roadway Edge	5.7	5.7	4.3

[2] Methodology from Bay Area Air Quality Management District *BAAQMD CEQA Guidelines* (1996).

SIMPLIFIED CALINE4 CARBON MONOXIDE ANALYSIS

Project Number: 10537-00
Project Title: UC Riverside LRDP

Background Information

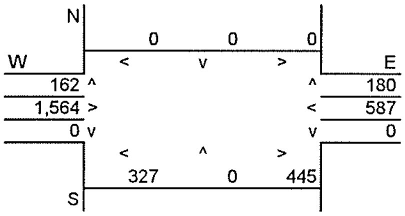
Nearest Air Monitoring Station measuring CO:	Riverside-Rubidoux
Background 1-hour CO Concentration (ppm):	5.1
Background 8-hour CO Concentration (ppm):	3.2
Persistence Factor:	0.6
Analysis Year:	2010

Roadway Data

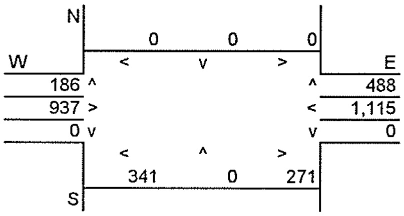
Intersection:	Blaine St./SR-60 NBR
Analysis Condition:	Future Plus Project Traffic Volumes (2-Lane Iowa Avenue Scenario)

			No. of	Average Speed	
		Roadway Type	Lanes	A.M.	P.M.
North-South Roadway:	SR-60 NBR	At Grade	2	20	20
East-West Roadway:	Blaine St.	At Grade	4	20	20

A.M. Peak Hour Traffic Volumes



P.M. Peak Hour Traffic Volumes



Highest Traffic Volumes (Vehicles per Hour)

N-S Road:	772	N-S Road:	674
E-W Road:	2,776	E-W Road:	2,811

Roadway CO Contributions and Concentrations

Emissions = (A x B x C) / 100,000[1]

	A_1	A_2	A_3	B	C			
	Reference CO Concentrations			Traffic	Emission	Estimated CO Concentrations		
Roadway	25 Feet	50 Feet	100 Feet	Volume	Factors[1]	25 Feet	50 Feet	100 Feet
A.M. Peak Traffic Hour								
North-South Road	2.7	2.2	1.7	772	5.52	0.12	0.09	0.07
East-West Road	7.0	5.4	3.8	2,776	5.52	1.07	0.83	0.58
P.M. Peak Traffic Hour								
North-South Road	2.7	2.2	1.7	674	5.52	0.10	0.08	0.06
East-West Road	7.0	5.4	3.8	2,811	5.52	1.09	0.84	0.59

[1] Methodology and emission factors from Bay Area Air Quality Management District *BAAQMD CEQA Guidelines* (1996).

Total Roadway CO Concentrations

Peak Hour Emissions = North-South Concentration + East-West Concentration + Background 1-hour Concentration[2]
8-Hour Emissions = ((Highest Peak Hour Concentration - Background 1-hour Concentration) x Persistence Factor) + Background 8-hour Concentration[2]

	A.M. Peak Hour	P.M. Peak Hour	8-Hour
25 Feet from Roadway Edge	6.3	6.3	3.9
50 Feet from Roadway Edge	6.0	6.0	3.8
100 Feet from Roadway Edge	5.8	5.8	3.6

[2] Methodology from Bay Area Air Quality Management District *BAAQMD CEQA Guidelines* (1996).

SIMPLIFIED CALINE4 CARBON MONOXIDE ANALYSIS

Project Number: 10537-00
Project Title: UC Riverside LRDP

Background Information

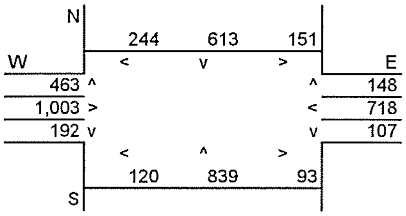
Nearest Air Monitoring Station measuring CO:	Riverside-Rubidoux
Background 1-hour CO Concentration (ppm):	5.1
Background 8-hour CO Concentration (ppm):	3.2
Persistence Factor:	0.6
Analysis Year:	2010

Roadway Data

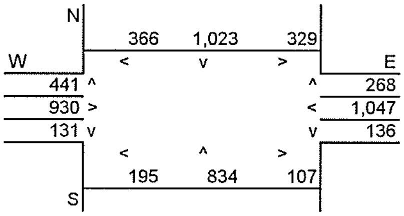
Intersection:	Blaine St./Iowa Ave.
Analysis Condition:	Future Plus Project Traffic Volumes (2-Lane Iowa Avenue Scenario)

			No. of	Average Speed	
		Roadway Type	Lanes	A.M.	P.M.
North-South Roadway:	Iowa Ave.	At Grade	4	15	10
East-West Roadway:	Blaine St.	At Grade	4	15	10

A.M. Peak Hour Traffic Volumes



P.M. Peak Hour Traffic Volumes



Highest Traffic Volumes (Vehicles per Hour)

N-S Road:	2,458	N-S Road:	3,261
E-W Road:	2,740	E-W Road:	3,110

Roadway CO Contributions and Concentrations

Emissions = (A x B x C) / 100,000[1]

	A_1	A_2	A_3	B	C			
	Reference CO Concentrations			Traffic	Emission	Estimated CO Concentrations		
Roadway	25 Feet	50 Feet	100 Feet	Volume	Factors[1]	25 Feet	50 Feet	100 Feet
A.M. Peak Traffic Hour								
North-South Road	2.6	2.2	1.7	2,458	7.30	0.47	0.39	0.31
East-West Road	7.0	5.4	3.8	2,740	7.30	1.40	1.08	0.76
P.M. Peak Traffic Hour								
North-South Road	7.0	5.4	3.8	3,261	10.78	2.46	1.90	1.34
East-West Road	2.6	2.2	1.7	3,110	10.78	0.87	0.74	0.57

[1] Methodology and emission factors from Bay Area Air Quality Management District *BAAQMD CEQA Guidelines* (1996).

Total Roadway CO Concentrations

Peak Hour Emissions = North-South Concentration + East-West Concentration + Background 1-hour Concentration[2]

8-Hour Emissions = ((Highest Peak Hour Concentration - Background 1-hour Concentration) x Persistence Factor) + Background 8-hour Concentration[2]

	A.M. Peak Hour	P.M. Peak Hour	8-Hour
25 Feet from Roadway Edge	7.0	8.4	5.2
50 Feet from Roadway Edge	6.6	7.7	4.8
100 Feet from Roadway Edge	6.2	7.0	4.3

[2] Methodology from Bay Area Air Quality Management District *BAAQMD CEQA Guidelines* (1996).

SIMPLIFIED CALINE4 CARBON MONOXIDE ANALYSIS

Project Number:	10537-00
Project Title:	UC Riverside LRDP

Background Information

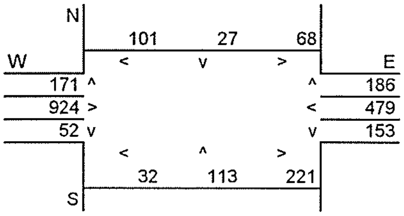
Nearest Air Monitoring Station measuring CO:	Riverside-Rubidoux
Background 1-hour CO Concentration (ppm):	5.1
Background 8-hour CO Concentration (ppm):	3.2
Persistence Factor:	0.6
Analysis Year:	2010

Roadway Data

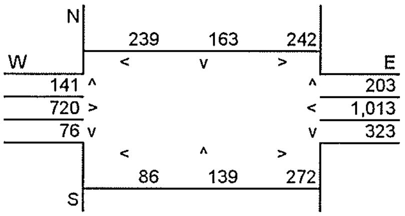
Intersection:	Blaine St./Canyon Crest Dr.
Analysis Condition:	Future Plus Project (2-Lane Iowa Avenue Scenario)

		Roadway Type	No. of Lanes	Average Speed A.M.	Average Speed P.M.
North-South Roadway:	Canyon Crest Dr.	At Grade	2	20	15
East-West Roadway:	Blaine St.	At Grade	4	20	15

A.M. Peak Hour Traffic Volumes



P.M. Peak Hour Traffic Volumes



Highest Traffic Volumes (Vehicles per Hour)

N-S Road:	666	N-S Road:	1,127
E-W Road:	2,031	E-W Road:	2,773

Roadway CO Contributions and Concentrations

Emissions = (A x B x C) / 100,000[1]

Roadway	A_1 Reference CO Concentrations 25 Feet	A_2 50 Feet	A_3 100 Feet	B Traffic Volume	C Emission Factors[1]	Estimated CO Concentrations 25 Feet	50 Feet	100 Feet
A.M. Peak Traffic Hour								
North-South Road	2.7	2.2	1.7	666	5.52	0.10	0.08	0.06
East-West Road	7.0	5.4	3.8	2,031	5.52	0.78	0.61	0.43
P.M. Peak Traffic Hour								
North-South Road	2.7	2.2	1.7	1,127	7.30	0.22	0.18	0.14
East-West Road	7.0	5.4	3.8	2,773	7.30	1.42	1.09	0.77

[1] Methodology and emission factors from Bay Area Air Quality Management District *BAAQMD CEQA Guidelines* (1996).

Total Roadway CO Concentrations

Peak Hour Emissions = North-South Concentration + East-West Concentration + Background 1-hour Concentration[2]

8-Hour Emissions = ((Highest Peak Hour Concentration - Background 1-hour Concentration) x Persistence Factor) + Background 8-hour Concentration[2]

	A.M. Peak Hour	P.M. Peak Hour	8-Hour
25 Feet from Roadway Edge	6.0	6.7	4.2
50 Feet from Roadway Edge	5.8	6.4	4.0
100 Feet from Roadway Edge	5.6	6.0	3.7

[2] Methodology from Bay Area Air Quality Management District *BAAQMD CEQA Guidelines* (1996).

SIMPLIFIED CALINE4 CARBON MONOXIDE ANALYSIS

Project Number: 10537-00
Project Title: UC Riverside LRDP

Background Information

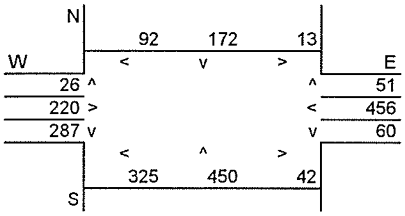
Nearest Air Monitoring Station measuring CO:	Riverside-Rubidoux
Background 1-hour CO Concentration (ppm):	5.1
Background 8-hour CO Concentration (ppm):	3.2
Persistence Factor:	0.6
Analysis Year:	2010

Roadway Data

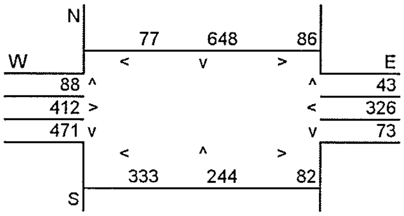
Intersection: Blaine St./Watkins Dr.
Analysis Condition: Future Plus Project Traffic Volumes (2-Lane Iowa Avenue Scenario)

			No. of	Average Speed	
		Roadway Type	Lanes	A.M.	P.M.
North-South Roadway:	Watkins Dr.	At Grade	2	20	15
East-West Roadway:	Blaine St.	At Grade	2	20	15

A.M. Peak Hour Traffic Volumes



P.M. Peak Hour Traffic Volumes



Highest Traffic Volumes (Vehicles per Hour)

N-S Road:	1,336	N-S Road:	1,851
E-W Road:	1,406	E-W Road:	1,707

Roadway CO Contributions and Concentrations

Emissions = (A x B x C) / 100,000[1]

	A_1	A_2	A_3	B	C			
	Reference CO Concentrations			Traffic	Emission	Estimated CO Concentrations		
Roadway	25 Feet	50 Feet	100 Feet	Volume	Factors[1]	25 Feet	50 Feet	100 Feet
A.M. Peak Traffic Hour								
North-South Road	2.7	2.2	1.7	1,336	5.52	0.20	0.16	0.13
East-West Road	7.6	5.7	4.0	1,406	5.52	0.59	0.44	0.31
P.M. Peak Traffic Hour								
North-South Road	7.6	5.7	4.0	1,851	7.30	1.03	0.77	0.54
East-West Road	2.7	2.2	1.7	1,707	7.30	0.34	0.27	0.21

[1] Methodology and emission factors from Bay Area Air Quality Management District *BAAQMD CEQA Guidelines* (1996).

Total Roadway CO Concentrations

Peak Hour Emissions = North-South Concentration + East-West Concentration + Background 1-hour Concentration[2]
8-Hour Emissions = ((Highest Peak Hour Concentration - Background 1-hour Concentration) x Persistence Factor) + Background 8-hour Concentration[2]

	A.M. Peak Hour	P.M. Peak Hour	8-Hour
25 Feet from Roadway Edge	5.9	6.5	4.0
50 Feet from Roadway Edge	5.7	6.1	3.8
100 Feet from Roadway Edge	5.5	5.9	3.7

[2] Methodology from Bay Area Air Quality Management District *BAAQMD CEQA Guidelines* (1996).

SIMPLIFIED CALINE4 CARBON MONOXIDE ANALYSIS

Project Number: 10537-00
Project Title: UC Riverside LRDP

Background Information

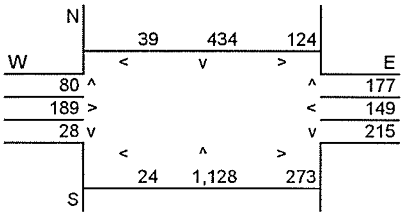
Nearest Air Monitoring Station measuring CO:	Riverside-Rubidoux
Background 1-hour CO Concentration (ppm):	5.1
Background 8-hour CO Concentration (ppm):	3.2
Persistence Factor:	0.6
Analysis Year:	2010

Roadway Data

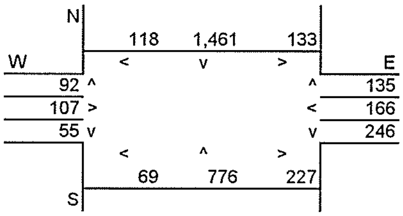
Intersection:	Linden St./Chicago Ave
Analysis Condition:	Future Plus Project Traffic Volumes (2-Lane Iowa Avenue Scenario)

			No. of	Average Speed	
		Roadway Type	Lanes	A.M.	P.M.
North-South Roadway:	Chicago Ave.	At Grade	4	20	20
East-West Roadway:	Linden St.	At Grade	2	20	20

A.M. Peak Hour Traffic Volumes



P.M. Peak Hour Traffic Volumes



Highest Traffic Volumes (Vehicles per Hour)

N-S Road:	2,102	N-S Road:	2,834
E-W Road:	1,127	E-W Road:	1,014

Roadway CO Contributions and Concentrations

Emissions = (A x B x C) / 100,000[1]

	A_1	A_2	A_3	B	C			
	Reference CO Concentrations			Traffic	Emission	Estimated CO Concentrations		
Roadway	25 Feet	50 Feet	100 Feet	Volume	Factors[1]	25 Feet	50 Feet	100 Feet
A.M. Peak Traffic Hour								
North-South Road	7.0	5.4	3.8	2,102	5.52	0.81	0.63	0.44
East-West Road	2.7	2.2	1.7	1,127	5.52	0.17	0.14	0.11
P.M. Peak Traffic Hour								
North-South Road	7.0	5.4	3.8	2,834	5.52	1.10	0.84	0.59
East-West Road	2.7	2.2	1.7	1,014	5.52	0.15	0.12	0.10

[1] Methodology and emission factors from Bay Area Air Quality Management District *BAAQMD CEQA Guidelines* (1996).

Total Roadway CO Concentrations

Peak Hour Emissions = North-South Concentration + East-West Concentration + Background 1-hour Concentration[2]

8-Hour Emissions = ((Highest Peak Hour Concentration - Background 1-hour Concentration) x Persistence Factor) + Background 8-hour Concentration[2]

	A.M. Peak Hour	P.M. Peak Hour	8-Hour
25 Feet from Roadway Edge	6.1	6.3	3.9
50 Feet from Roadway Edge	5.9	6.1	3.8
100 Feet from Roadway Edge	5.6	5.8	3.6

[2] Methodology from Bay Area Air Quality Management District *BAAQMD CEQA Guidelines* (1996).

SIMPLIFIED CALINE4 CARBON MONOXIDE ANALYSIS

Project Number: 10537-00
Project Title: UC Riverside LRDP

Background Information

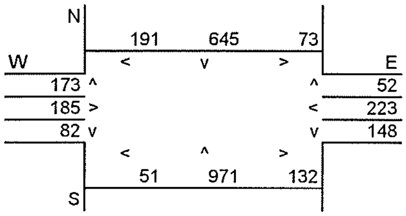
Nearest Air Monitoring Station measuring CO: Riverside-Rubidoux
Background 1-hour CO Concentration (ppm): 5.1
Background 8-hour CO Concentration (ppm): 3.2
Persistence Factor: 0.6
Analysis Year: 2010

Roadway Data

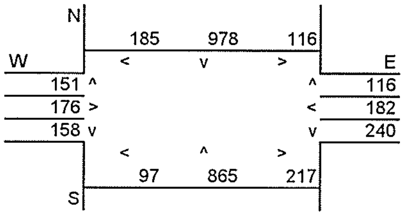
Intersection: Linden St./Iowa Ave.
Analysis Condition: Future Plus Project Traffic Volumes

		Roadway Type	No. of Lanes	Average Speed A.M.	Average Speed P.M.
North-South Roadway:	Iowa Ave.	At Grade	4	20	20
East-West Roadway:	Linden St.	At Grade	2	20	20

A.M. Peak Hour Traffic Volumes



P.M. Peak Hour Traffic Volumes



Highest Traffic Volumes (Vehicles per Hour)

A.M.		P.M.	
N-S Road:	2,105	N-S Road:	2,555
E-W Road:	905	E-W Road:	1,047

Roadway CO Contributions and Concentrations

Emissions = (A x B x C) / 100,000[1]

	A_1	A_2	A_3	B	C			
	Reference CO Concentrations			Traffic	Emission	Estimated CO Concentrations		
Roadway	25 Feet	50 Feet	100 Feet	Volume	Factors[1]	25 Feet	50 Feet	100 Feet
A.M. Peak Traffic Hour								
North-South Road	7.0	5.4	3.8	2,105	5.52	0.81	0.63	0.44
East-West Road	2.7	2.2	1.7	905	5.52	0.13	0.11	0.08
P.M. Peak Traffic Hour								
North-South Road	7.0	5.4	3.8	2,555	5.52	0.99	0.76	0.54
East-West Road	2.7	2.2	1.7	1,047	5.52	0.16	0.13	0.10

[1] Methodology and emission factors from Bay Area Air Quality Management District *BAAQMD CEQA Guidelines* (1996).

Total Roadway CO Concentrations

Peak Hour Emissions = North-South Concentration + East-West Concentration + Background 1-hour Concentration[2]
8-Hour Emissions = ((Highest Peak Hour Concentration - Background 1-hour Concentration) x Persistence Factor) + Background 8-hour Concentration[2]

	A.M. Peak Hour	P.M. Peak Hour	8-Hour
25 Feet from Roadway Edge	6.0	6.2	3.9
50 Feet from Roadway Edge	5.8	6.0	3.7
100 Feet from Roadway Edge	5.6	5.7	3.6

[2] Methodology from Bay Area Air Quality Management District *BAAQMD CEQA Guidelines* (1996).

SIMPLIFIED CALINE4 CARBON MONOXIDE ANALYSIS

Project Number: 10537-00
Project Title: UC Riverside LRDP

Background Information

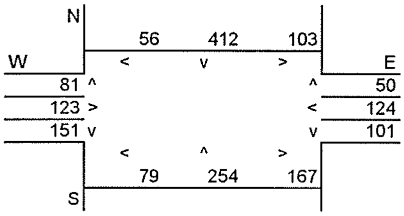
Nearest Air Monitoring Station measuring CO: Riverside-Rubidoux
Background 1-hour CO Concentration (ppm): 5.1
Background 8-hour CO Concentration (ppm): 3.2
Persistence Factor: 0.6
Analysis Year: 2010

Roadway Data

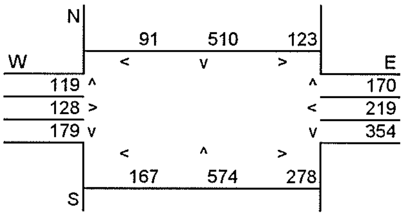
Intersection: Linden St./Canyon Crest Dr.
Analysis Condition: Future Plus Project Traffic Volumes (2-Lane Iowa Avenue Scenario)

		Roadway Type	No. of Lanes	Average Speed A.M.	Average Speed P.M.
North-South Roadway:	Canyon Crest Dr.	At Grade	4	20	20
East-West Roadway:	Linden St.	At Grade	2	20	20

A.M. Peak Hour Traffic Volumes



P.M. Peak Hour Traffic Volumes



Highest Traffic Volumes (Vehicles per Hour)

	A.M.		P.M.
N-S Road:	1,164	N-S Road:	2,062
E-W Road:	668	E-W Road:	1,272

Roadway CO Contributions and Concentrations

Emissions = (A x B x C) / 100,000[1]

	A_1	A_2	A_3	B	C			
	Reference CO Concentrations			Traffic	Emission	Estimated CO Concentrations		
Roadway	25 Feet	50 Feet	100 Feet	Volume	Factors[1]	25 Feet	50 Feet	100 Feet
A.M. Peak Traffic Hour								
North-South Road	7.0	5.4	3.8	1,164	5.52	0.45	0.35	0.24
East-West Road	2.7	2.2	1.7	668	5.52	0.10	0.08	0.06
P.M. Peak Traffic Hour								
North-South Road	7.0	5.4	3.8	2,062	5.52	0.80	0.61	0.43
East-West Road	2.7	2.2	1.7	1,272	5.52	0.19	0.15	0.12

[1] Methodology and emission factors from Bay Area Air Quality Management District *BAAQMD CEQA Guidelines* (1996).

Total Roadway CO Concentrations

Peak Hour Emissions = North-South Concentration + East-West Concentration + Background 1-hour Concentration[2]
8-Hour Emissions = ((Highest Peak Hour Concentration - Background 1-hour Concentration) x Persistence Factor) + Background 8-hour Concentration[2]

	A.M. Peak Hour	P.M. Peak Hour	8-Hour
25 Feet from Roadway Edge	5.6	6.1	3.8
50 Feet from Roadway Edge	5.5	5.9	3.7
100 Feet from Roadway Edge	5.4	5.7	3.5

[2] Methodology from Bay Area Air Quality Management District *BAAQMD CEQA Guidelines* (1996).

SIMPLIFIED CALINE4 CARBON MONOXIDE ANALYSIS

Project Number: 10537-00
Project Title: UC Riverside LRDP

Background Information

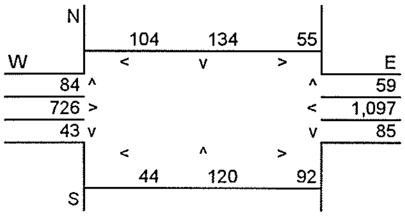
Nearest Air Monitoring Station measuring CO: Riverside-Rubidoux
Background 1-hour CO Concentration (ppm): 5.1
Background 8-hour CO Concentration (ppm): 3.2
Persistence Factor: 0.6
Analysis Year: 2010

Roadway Data

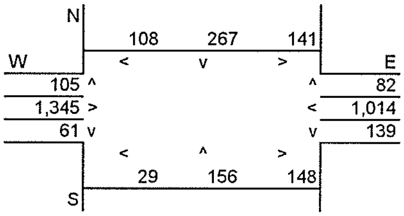
Intersection: University Ave./Kansas Ave.
Analysis Condition: Future Plus Project Traffic Volumes (2-Lane Iowa Avenue Scenario)

			No. of	Average Speed	
		Roadway Type	Lanes	A.M.	P.M.
North-South Roadway:	Kansas Ave.	At Grade	2	20	20
East-West Roadway:	University Ave.	At Grade	4	20	20

A.M. Peak Hour Traffic Volumes



P.M. Peak Hour Traffic Volumes



Highest Traffic Volumes (Vehicles per Hour)

N-S Road:	556	N-S Road:	859
E-W Road:	2,114	E-W Road:	2,869

Roadway CO Contributions and Concentrations

Emissions = (A x B x C) / 100,000[1]

	A_1	A_2	A_3	B	C			
	Reference CO Concentrations			Traffic	Emission	Estimated CO Concentrations		
Roadway	25 Feet	50 Feet	100 Feet	Volume	Factors[1]	25 Feet	50 Feet	100 Feet
A.M. Peak Traffic Hour								
North-South Road	2.7	2.2	1.7	556	5.52	0.08	0.07	0.05
East-West Road	7.0	5.4	3.8	2,114	5.52	0.82	0.63	0.44
P.M. Peak Traffic Hour								
North-South Road	2.7	2.2	1.7	859	5.52	0.13	0.10	0.08
East-West Road	7.0	5.4	3.8	2,869	5.52	1.11	0.86	0.60

[1] Methodology and emission factors from Bay Area Air Quality Management District *BAAQMD CEQA Guidelines* (1996).

Total Roadway CO Concentrations

Peak Hour Emissions = North-South Concentration + East-West Concentration + Background 1-hour Concentration[2]
8-Hour Emissions = ((Highest Peak Hour Concentration - Background 1-hour Concentration) x Persistence Factor) + Background 8-hour Concentration[2]

	A.M. Peak Hour	P.M. Peak Hour	8-Hour
25 Feet from Roadway Edge	6.0	6.3	3.9
50 Feet from Roadway Edge	5.8	6.1	3.8
100 Feet from Roadway Edge	5.6	5.8	3.6

[2] Methodology from Bay Area Air Quality Management District *BAAQMD CEQA Guidelines* (1996).

SIMPLIFIED CALINE4 CARBON MONOXIDE ANALYSIS

Project Number: 10537-00
Project Title: UC Riverside LRDP

Background Information

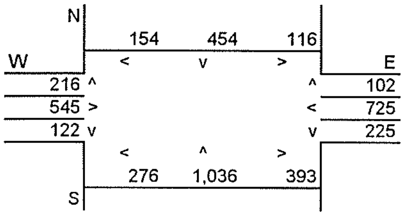
Nearest Air Monitoring Station measuring CO:	Riverside-Rubidoux
Background 1-hour CO Concentration (ppm):	5.1
Background 8-hour CO Concentration (ppm):	3.2
Persistence Factor:	0.6
Analysis Year:	2010

Roadway Data

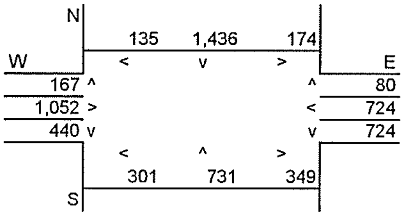
Intersection:	University Ave./Chicago Ave.
Analysis Condition:	Future Plus Project Traffic Volumes (2-Lane Iowa Avenue Scenario)

		Roadway Type	No. of Lanes	Average Speed A.M.	Average Speed P.M.
North-South Roadway:	Chicago Ave.	At Grade	4	20	10
East-West Roadway:	University Ave.	At Grade	4	20	10

A.M. Peak Hour Traffic Volumes



P.M. Peak Hour Traffic Volumes



Highest Traffic Volumes (Vehicles per Hour)

	A.M.		P.M.
N-S Road:	2,506	N-S Road:	3,981
E-W Road:	2,106	E-W Road:	3,103

Roadway CO Contributions and Concentrations

Emissions = (A x B x C) / 100,000[1]

	A_1	A_2	A_3	B	C			
	Reference CO Concentrations			Traffic	Emission	Estimated CO Concentrations		
Roadway	25 Feet	50 Feet	100 Feet	Volume	Factors[1]	25 Feet	50 Feet	100 Feet
A.M. Peak Traffic Hour								
North-South Road	7.0	5.4	3.8	2,506	5.52	0.97	0.75	0.53
East-West Road	2.6	2.2	1.7	2,106	5.52	0.30	0.26	0.20
P.M. Peak Traffic Hour								
North-South Road	7.0	5.4	3.8	3,981	10.78	3.00	2.32	1.63
East-West Road	2.6	2.2	1.7	3,103	10.78	0.87	0.74	0.57

[1] Methodology and emission factors from Bay Area Air Quality Management District *BAAQMD CEQA Guidelines* (1996).

Total Roadway CO Concentrations

Peak Hour Emissions = North-South Concentration + East-West Concentration + Background 1-hour Concentration[2]

8-Hour Emissions = ((Highest Peak Hour Concentration - Background 1-hour Concentration) x Persistence Factor) + Background 8-hour Concentration[2]

	A.M. Peak Hour	P.M. Peak Hour	8-Hour
25 Feet from Roadway Edge	6.4	9.0	5.5
50 Feet from Roadway Edge	6.1	8.2	5.0
100 Feet from Roadway Edge	5.8	7.3	4.5

[2] Methodology from Bay Area Air Quality Management District *BAAQMD CEQA Guidelines* (1996).

SIMPLIFIED CALINE4 CARBON MONOXIDE ANALYSIS

Project Number: 10537-00
Project Title: UC Riverside LRDP

Background Information

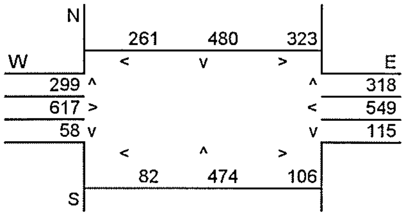
Nearest Air Monitoring Station measuring CO:	Riverside-Rubidoux
Background 1-hour CO Concentration (ppm):	5.1
Background 8-hour CO Concentration (ppm):	3.2
Persistence Factor:	0.6
Analysis Year:	2010

Roadway Data

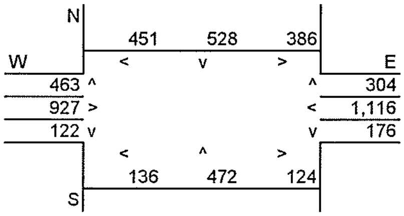
Intersection:	University Ave./Iowa Ave.
Analysis Condition:	Future Plus Project Traffic Volumes (2-Lane Iowa Avenue Scenario)

			No. of	Average Speed	
		Roadway Type	Lanes	A.M.	P.M.
North-South Roadway:	Iowa Ave.	At Grade	4	15	10
East-West Roadway:	University Ave.	At Grade	4	15	10

A.M. Peak Hour Traffic Volumes



P.M. Peak Hour Traffic Volumes



Highest Traffic Volumes (Vehicles per Hour)

	A.M.		P.M.
N-S Road:	2,155	N-S Road:	2,604
E-W Road:	2,028	E-W Road:	3,215

Roadway CO Contributions and Concentrations

Emissions = (A x B x C) / 100,000[1]

	A_1	A_2	A_3	B	C			
	Reference CO Concentrations			Traffic	Emission	Estimated CO Concentrations		
Roadway	25 Feet	50 Feet	100 Feet	Volume	Factors[1]	25 Feet	50 Feet	100 Feet
A.M. Peak Traffic Hour								
North-South Road	7.0	5.4	3.8	2,155	7.30	1.10	0.85	0.60
East-West Road	2.6	2.2	1.7	2,028	7.30	0.38	0.33	0.25
P.M. Peak Traffic Hour								
North-South Road	2.6	2.2	1.7	2,604	10.78	0.73	0.62	0.48
East-West Road	7.0	5.4	3.8	3,215	10.78	2.43	1.87	1.32

[1] Methodology and emission factors from Bay Area Air Quality Management District *BAAQMD CEQA Guidelines* (1996).

Total Roadway CO Concentrations

Peak Hour Emissions = North-South Concentration + East-West Concentration + Background 1-hour Concentration[2]

8-Hour Emissions = ((Highest Peak Hour Concentration - Background 1-hour Concentration) x Persistence Factor) + Background 8-hour Concentration[2]

	A.M. Peak Hour	P.M. Peak Hour	8-Hour
25 Feet from Roadway Edge	6.6	8.3	5.1
50 Feet from Roadway Edge	6.3	7.6	4.7
100 Feet from Roadway Edge	5.9	6.9	4.3

[2] Methodology from Bay Area Air Quality Management District *BAAQMD CEQA Guidelines* (1996).

SIMPLIFIED CALINE4 CARBON MONOXIDE ANALYSIS

Project Number: 10537-00
Project Title: UC Riverside LRDP

Background Information

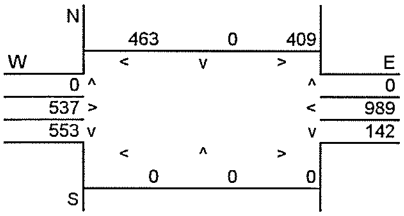
Nearest Air Monitoring Station measuring CO:	Riverside-Rubidoux
Background 1-hour CO Concentration (ppm):	5.1
Background 8-hour CO Concentration (ppm):	3.2
Persistence Factor:	0.6
Analysis Year:	2010

Roadway Data

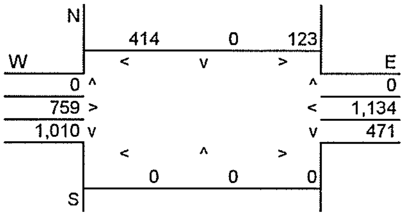
Intersection: University Ave./SR-60 SBR
Analysis Condition: Future Plus Project Traffic Volumes (2-Lane Iowa Avenue Scenario)

		Roadway Type	No. of Lanes	Average Speed A.M.	Average Speed P.M.
North-South Roadway:	SR-60 SBR	At Grade	2	20	15
East-West Roadway:	University Ave.	At Grade	4	20	15

A.M. Peak Hour Traffic Volumes



P.M. Peak Hour Traffic Volumes



Highest Traffic Volumes (Vehicles per Hour)

	A.M.		P.M.
N-S Road:	872	N-S Road:	1,481
E-W Road:	2,542	E-W Road:	3,317

Roadway CO Contributions and Concentrations

Emissions = (A x B x C) / 100,000[1]

	A_1	A_2	A_3	B	C			
	Reference CO Concentrations			Traffic	Emission	Estimated CO Concentrations		
Roadway	25 Feet	50 Feet	100 Feet	Volume	Factors[1]	25 Feet	50 Feet	100 Feet
A.M. Peak Traffic Hour								
North-South Road	2.7	2.2	1.7	872	5.52	0.13	0.11	0.08
East-West Road	7.0	5.4	3.8	2,542	5.52	0.98	0.76	0.53
P.M. Peak Traffic Hour								
North-South Road	2.7	2.2	1.7	1,481	7.30	0.29	0.24	0.18
East-West Road	7.0	5.4	3.8	3,317	7.30	1.69	1.31	0.92

[1] Methodology and emission factors from Bay Area Air Quality Management District *BAAQMD CEQA Guidelines* (1996).

Total Roadway CO Concentrations

Peak Hour Emissions = North-South Concentration + East-West Concentration + Background 1-hour Concentration[2]

8-Hour Emissions = ((Highest Peak Hour Concentration - Background 1-hour Concentration) x Persistence Factor) + Background 8-hour Concentration[2]

	A.M. Peak Hour	P.M. Peak Hour	8-Hour
25 Feet from Roadway Edge	6.2	7.1	4.4
50 Feet from Roadway Edge	6.0	6.6	4.1
100 Feet from Roadway Edge	5.7	6.2	3.9

[2] Methodology from Bay Area Air Quality Management District *BAAQMD CEQA Guidelines* (1996).

SIMPLIFIED CALINE4 CARBON MONOXIDE ANALYSIS

Project Number: 10537-00
Project Title: UC Riverside LRDP

Background Information

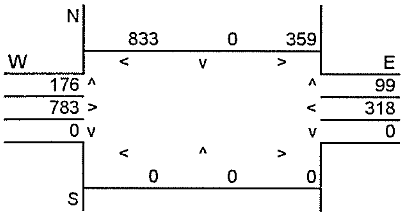
Nearest Air Monitoring Station measuring CO:	Riverside-Rubidoux
Background 1-hour CO Concentration (ppm):	5.1
Background 8-hour CO Concentration (ppm):	3.2
Persistence Factor:	0.6
Analysis Year:	2010

Roadway Data

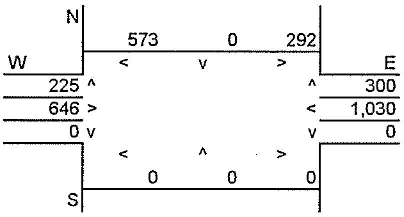
Intersection:	University Ave./SR-60 NBR
Analysis Condition:	Future Plus Project Traffic Volumes (2-Lane Iowa Avenue Scenario)

		Roadway Type	No. of Lanes	Average Speed A.M.	Average Speed P.M.
North-South Roadway:	SR-60 NBR	At Grade	2	20	15
East-West Roadway:	University Ave.	At Grade	4	20	15

A.M. Peak Hour Traffic Volumes



P.M. Peak Hour Traffic Volumes



Highest Traffic Volumes (Vehicles per Hour)

N-S Road:	1,467	N-S Road:	1,390
E-W Road:	2,110	E-W Road:	2,474

Roadway CO Contributions and Concentrations

Emissions = (A x B x C) / 100,000[1]

	A_1	A_2	A_3	B	C			
	Reference CO Concentrations			Traffic	Emission	Estimated CO Concentrations		
Roadway	25 Feet	50 Feet	100 Feet	Volume	Factors[1]	25 Feet	50 Feet	100 Feet
A.M. Peak Traffic Hour								
North-South Road	2.7	2.2	1.7	1,467	5.52	0.22	0.18	0.14
East-West Road	7.0	5.4	3.8	2,110	5.52	0.82	0.63	0.44
P.M. Peak Traffic Hour								
North-South Road	2.7	2.2	1.7	1,390	7.30	0.27	0.22	0.17
East-West Road	7.0	5.4	3.8	2,474	7.30	1.26	0.98	0.69

[1] Methodology and emission factors from Bay Area Air Quality Management District *BAAQMD CEQA Guidelines* (1996).

Total Roadway CO Concentrations

Peak Hour Emissions = North-South Concentration + East-West Concentration + Background 1-hour Concentration[2]

8-Hour Emissions = ((Highest Peak Hour Concentration - Background 1-hour Concentration) x Persistence Factor) + Background 8-hour Concentration[2]

	A.M. Peak Hour	P.M. Peak Hour	8-Hour
25 Feet from Roadway Edge	6.1	6.6	4.1
50 Feet from Roadway Edge	5.9	6.3	3.9
100 Feet from Roadway Edge	5.7	6.0	3.7

[2] Methodology from Bay Area Air Quality Management District *BAAQMD CEQA Guidelines* (1996).

SIMPLIFIED CALINE4 CARBON MONOXIDE ANALYSIS

Project Number: 10537-00
Project Title: UC Riverside LRDP

Background Information

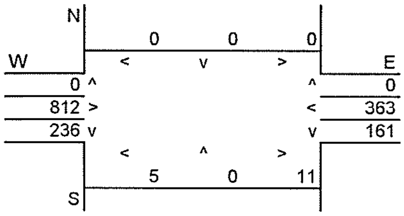
Nearest Air Monitoring Station measuring CO: Riverside-Rubidoux
Background 1-hour CO Concentration (ppm): 9.0
Background 8-hour CO Concentration (ppm): 4.3
Persistence Factor: 0.6
Analysis Year: 2010

Roadway Data

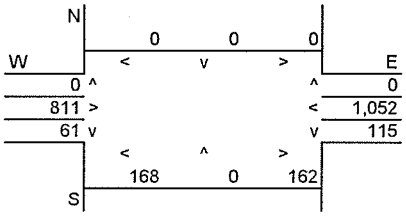
Intersection: University Ave./Campus Dr.
Analysis Condition: Future Plus Project Traffic Volumes (2-Lane Iowa Avenue Scenario)

		Roadway Type	No. of Lanes	Average Speed A.M.	Average Speed P.M.
North-South Roadway:	Campus Dr.	At Grade	2	10	10
East-West Roadway:	University Ave.	At Grade	4	20	20

A.M. Peak Hour Traffic Volumes



P.M. Peak Hour Traffic Volumes



Highest Traffic Volumes (Vehicles per Hour)

	A.M.		P.M.
N-S Road:	413	N-S Road:	506
E-W Road:	1,416	E-W Road:	2,140

Roadway CO Contributions and Concentrations

Emissions = (A x B x C) / 100,000[1]

	A_1	A_2	A_3	B	C			
	Reference CO Concentrations			Traffic	Emission	Estimated CO Concentrations		
Roadway	25 Feet	50 Feet	100 Feet	Volume	Factors[1]	25 Feet	50 Feet	100 Feet
A.M. Peak Traffic Hour								
North-South Road	2.7	2.2	1.7	413	10.78	0.12	0.10	0.08
East-West Road	7.0	5.4	3.8	1,416	5.52	0.55	0.42	0.30
P.M. Peak Traffic Hour								
North-South Road	2.7	2.2	1.7	506	10.78	0.15	0.12	0.09
East-West Road	7.0	5.4	3.8	2,140	5.52	0.83	0.64	0.45

[1] Methodology and emission factors from Bay Area Air Quality Management District *BAAQMD CEQA Guidelines* (1996).

Total Roadway CO Concentrations

Peak Hour Emissions = North-South Concentration + East-West Concentration + Background 1-hour Concentration[2]
8-Hour Emissions = ((Highest Peak Hour Concentration - Background 1-hour Concentration) x Persistence Factor) + Background 8-hour Concentration[2]

	A.M. Peak Hour	P.M. Peak Hour	8-Hour
25 Feet from Roadway Edge	9.7	10.0	4.9
50 Feet from Roadway Edge	9.5	9.8	4.8
100 Feet from Roadway Edge	9.4	9.5	4.6

[2] Methodology from Bay Area Air Quality Management District *BAAQMD CEQA Guidelines* (1996).

SIMPLIFIED CALINE4 CARBON MONOXIDE ANALYSIS

Project Number: 10537-00
Project Title: UC Riverside LRDP

Background Information

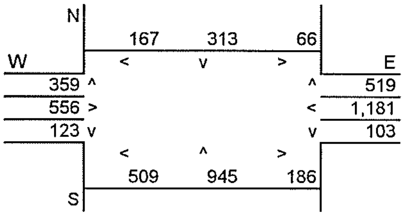
Nearest Air Monitoring Station measuring CO:	Riverside-Rubidoux
Background 1-hour CO Concentration (ppm):	9.0
Background 8-hour CO Concentration (ppm):	4.3
Persistence Factor:	0.6
Analysis Year:	2010

Roadway Data

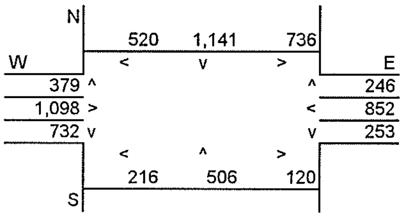
Intersection: Martin Luther King Blvd./Chicago Ave.
Analysis Condition: Future Plus Project Traffic Volumes (2-Lane Iowa Avenue Scenario)

			No. of	Average Speed	
		Roadway Type	Lanes	A.M.	P.M.
North-South Roadway:	Chicago Ave.	At Grade	4	10	10
East-West Roadway:	Martin Luther King Blvd.	At Grade	4	10	10

A.M. Peak Hour Traffic Volumes



P.M. Peak Hour Traffic Volumes



Highest Traffic Volumes (Vehicles per Hour)

	A.M.		P.M.
N-S Road:	2,369	N-S Road:	3,528
E-W Road:	2,895	E-W Road:	3,797

Roadway CO Contributions and Concentrations

Emissions = (A x B x C) / 100,000[1]

	A_1	A_2	A_3	B	C			
	Reference CO Concentrations			Traffic	Emission	Estimated CO Concentrations		
Roadway	25 Feet	50 Feet	100 Feet	Volume	Factors[1]	25 Feet	50 Feet	100 Feet
A.M. Peak Traffic Hour								
North-South Road	2.6	2.2	1.7	2,369	10.78	0.66	0.56	0.43
East-West Road	7.0	5.4	3.8	2,895	10.78	2.18	1.69	1.19
P.M. Peak Traffic Hour								
North-South Road	2.6	2.2	1.7	3,528	10.78	0.99	0.84	0.65
East-West Road	7.0	5.4	3.8	3,797	10.78	2.87	2.21	1.56

[1] Methodology and emission factors from Bay Area Air Quality Management District *BAAQMD CEQA Guidelines* (1996).

Total Roadway CO Concentrations

Peak Hour Emissions = North-South Concentration + East-West Concentration + Background 1-hour Concentration[2]
8-Hour Emissions = ((Highest Peak Hour Concentration - Background 1-hour Concentration) x Persistence Factor) + Background 8-hour Concentration[2]

	A.M. Peak Hour	P.M. Peak Hour	8-Hour
25 Feet from Roadway Edge	11.8	12.9	6.6
50 Feet from Roadway Edge	11.2	12.0	6.1
100 Feet from Roadway Edge	10.6	11.2	5.6

[2] Methodology from Bay Area Air Quality Management District *BAAQMD CEQA Guidelines* (1996).

SIMPLIFIED CALINE4 CARBON MONOXIDE ANALYSIS

Project Number: 10537-00
Project Title: UC Riverside LRDP

Background Information

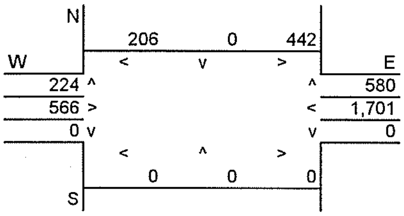
Nearest Air Monitoring Station measuring CO: Riverside-Rubidoux
Background 1-hour CO Concentration (ppm): 5.1
Background 8-hour CO Concentration (ppm): 3.2
Persistence Factor: 0.6
Analysis Year: 2010

Roadway Data

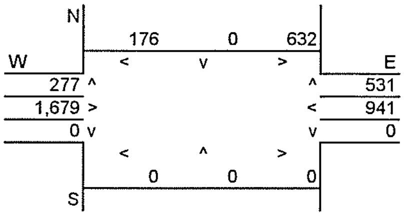
Intersection: Martin Luther King Blvd./Iowa Ave.
Analysis Condition: Future Plus Project Traffic Volumes (2-Lane Iowa Avenue Scenario)

		Roadway Type	No. of Lanes	Average Speed A.M.	Average Speed P.M.
North-South Roadway:	Iowa Ave.	At Grade	2	20	20
East-West Roadway:	Martin Luther King Blvd.	At Grade	4	25	25

A.M. Peak Hour Traffic Volumes



P.M. Peak Hour Traffic Volumes



Highest Traffic Volumes (Vehicles per Hour)

	A.M.		P.M.
N-S Road:	1,452	N-S Road:	1,616
E-W Road:	3,289	E-W Road:	3,783

Roadway CO Contributions and Concentrations

Emissions = (A x B x C) / 100,000[1]

Roadway	A_1 Reference CO Concentrations 25 Feet	A_2 50 Feet	A_3 100 Feet	B Traffic Volume	C Emission Factors[1]	Estimated CO Concentrations 25 Feet	50 Feet	100 Feet
A.M. Peak Traffic Hour								
North-South Road	2.7	2.2	1.7	1,452	5.52	0.22	0.18	0.14
East-West Road	7.0	5.4	3.8	3,289	4.46	1.03	0.79	0.56
P.M. Peak Traffic Hour								
North-South Road	2.7	2.2	1.7	1,616	5.52	0.24	0.20	0.15
East-West Road	7.0	5.4	3.8	3,783	4.46	1.18	0.91	0.64

[1] Methodology and emission factors from Bay Area Air Quality Management District *BAAQMD CEQA Guidelines* (1996).

Total Roadway CO Concentrations

Peak Hour Emissions = North-South Concentration + East-West Concentration + Background 1-hour Concentration[2]

8-Hour Emissions = ((Highest Peak Hour Concentration - Background 1-hour Concentration) x Persistence Factor) + Background 8-hour Concentration[2]

	A.M. Peak Hour	P.M. Peak Hour	8-Hour
25 Feet from Roadway Edge	6.3	6.5	4.1
50 Feet from Roadway Edge	6.1	6.2	3.9
100 Feet from Roadway Edge	5.8	5.9	3.7

[2] Methodology from Bay Area Air Quality Management District *BAAQMD CEQA Guidelines* (1996).

SIMPLIFIED CALINE4 CARBON MONOXIDE ANALYSIS

Project Number: 10537-00
Project Title: UC Riverside LRDP

Background Information

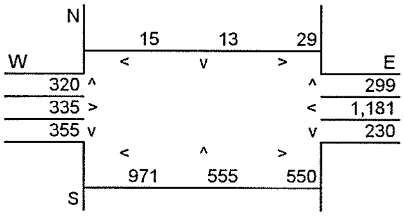
Nearest Air Monitoring Station measuring CO: Riverside-Rubidoux
Background 1-hour CO Concentration (ppm): 9.0
Background 8-hour CO Concentration (ppm): 4.3
Persistence Factor: 0.6
Analysis Year: 2010

Roadway Data

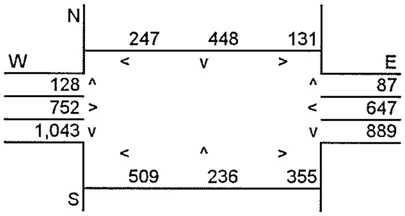
Intersection: Martin Luther King Blvd./Canyon Crest Dr.
Analysis Condition: Future Plus Project Traffic Volumes (2-Lane Iowa Avenue Scenario)

		Roadway Type	No. of Lanes	Average Speed A.M.	Average Speed P.M.
North-South Roadway:	Canyon Crest Dr.	At Grade	2	15	10
East-West Roadway:	Martin Luther King Blvd.	At Grade	4	15	10

A.M. Peak Hour Traffic Volumes



P.M. Peak Hour Traffic Volumes



Highest Traffic Volumes (Vehicles per Hour)

N-S Road: 2,674
E-W Road: 3,177

N-S Road: 3,480
E-W Road: 3,326

Roadway CO Contributions and Concentrations

Emissions = (A x B x C) / 100,000[1]

	A_1	A_2	A_3	B	C			
	Reference CO Concentrations			Traffic	Emission	Estimated CO Concentrations		
Roadway	25 Feet	50 Feet	100 Feet	Volume	Factors[1]	25 Feet	50 Feet	100 Feet
A.M. Peak Traffic Hour								
North-South Road	2.7	2.2	1.7	2,674	7.30	0.53	0.43	0.33
East-West Road	7.0	5.4	3.8	3,177	7.30	1.62	1.25	0.88
P.M. Peak Traffic Hour								
North-South Road	7.6	5.7	4.0	3,480	10.78	2.85	2.14	1.50
East-West Road	2.6	2.2	1.7	3,326	10.78	0.93	0.79	0.61

[1] Methodology and emission factors from Bay Area Air Quality Management District *BAAQMD CEQA Guidelines* (1996).

Total Roadway CO Concentrations

Peak Hour Emissions = North-South Concentration + East-West Concentration + Background 1-hour Concentration[2]

8-Hour Emissions = ((Highest Peak Hour Concentration - Background 1-hour Concentration) x Persistence Factor) + Background 8-hour Concentration[2]

	A.M. Peak Hour	P.M. Peak Hour	8-Hour
25 Feet from Roadway Edge	11.2	12.8	6.6
50 Feet from Roadway Edge	10.7	11.9	6.1
100 Feet from Roadway Edge	10.2	11.1	5.6

[2] Methodology from Bay Area Air Quality Management District *BAAQMD CEQA Guidelines* (1996).

SIMPLIFIED CALINE4 CARBON MONOXIDE ANALYSIS

Project Number: 10537-00
Project Title: UC Riverside LRDP

Background Information

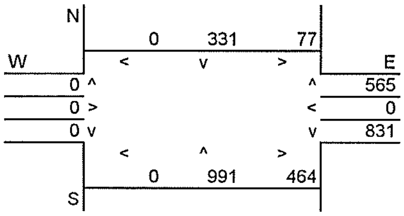
Nearest Air Monitoring Station measuring CO: Riverside-Rubidoux
Background 1-hour CO Concentration (ppm): 5.1
Background 8-hour CO Concentration (ppm): 3.2
Persistence Factor: 0.6
Analysis Year: 2010

Roadway Data

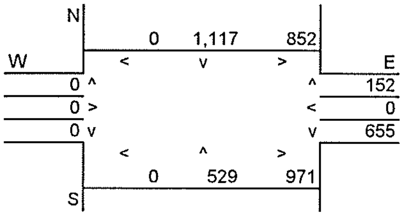
Intersection: Central Ave./Chicago Ave.
Analysis Condition: Future Plus Project Traffic Volumes (2-Lane Iowa Avenue Scenario)

		Roadway Type	No. of Lanes	Average Speed A.M.	Average Speed P.M.
North-South Roadway:	Chicago Ave.	At Grade	4	20	15
East-West Roadway:	Central Ave.	At Grade	4	25	15

A.M. Peak Hour Traffic Volumes



P.M. Peak Hour Traffic Volumes



Highest Traffic Volumes (Vehicles per Hour)

	A.M.		P.M.
N-S Road:	2,617	N-S Road:	3,272
E-W Road:	1,937	E-W Road:	2,630

Roadway CO Contributions and Concentrations

Emissions = (A x B x C) / 100,000[1]

	A_1	A_2	A_3	B	C			
	Reference CO Concentrations			Traffic	Emission	Estimated CO Concentrations		
Roadway	25 Feet	50 Feet	100 Feet	Volume	Factors[1]	25 Feet	50 Feet	100 Feet
A.M. Peak Traffic Hour								
North-South Road	7.0	5.4	3.8	2,617	5.52	1.01	0.78	0.55
East-West Road	2.6	2.2	1.7	1,937	4.46	0.22	0.19	0.15
P.M. Peak Traffic Hour								
North-South Road	7.0	5.4	3.8	3,272	7.30	1.67	1.29	0.91
East-West Road	2.6	2.2	1.7	2,630	7.30	0.50	0.42	0.33

[1] Methodology and emission factors from Bay Area Air Quality Management District *BAAQMD CEQA Guidelines* (1996).

Total Roadway CO Concentrations

Peak Hour Emissions = North-South Concentration + East-West Concentration + Background 1-hour Concentration[2]
8-Hour Emissions = ((Highest Peak Hour Concentration - Background 1-hour Concentration) x Persistence Factor) + Background 8-hour Concentration[2]

	A.M. Peak Hour	P.M. Peak Hour	8-Hour
25 Feet from Roadway Edge	6.3	7.3	4.5
50 Feet from Roadway Edge	6.1	6.8	4.2
100 Feet from Roadway Edge	5.8	6.3	3.9

[2] Methodology from Bay Area Air Quality Management District *BAAQMD CEQA Guidelines* (1996).

SIMPLIFIED CALINE4 CARBON MONOXIDE ANALYSIS

Project Number: 10537-00
Project Title: UC Riverside LRDP

Background Information

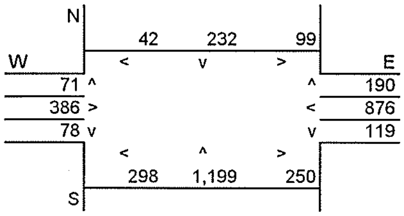
Nearest Air Monitoring Station measuring CO:	Riverside-Rubidoux
Background 1-hour CO Concentration (ppm):	5.1
Background 8-hour CO Concentration (ppm):	3.2
Persistence Factor:	0.6
Analysis Year:	2010

Roadway Data

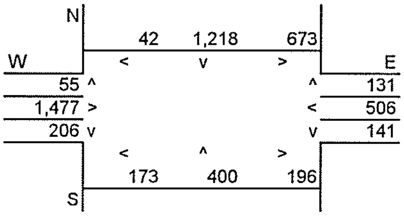
Intersection: Central Ave./Canyon Crest Dr.
Analysis Condition: Future Plus Project Traffic Volumes (2-Lane Iowa Avenue Scenario)

		Roadway Type	No. of Lanes	Average Speed A.M.	Average Speed P.M.
North-South Roadway:	Canyon Crest Dr.	At Grade	4	15	10
East-West Roadway:	Central Ave.	At Grade	4	15	10

A.M. Peak Hour Traffic Volumes



P.M. Peak Hour Traffic Volumes



Highest Traffic Volumes (Vehicles per Hour)

N-S Road:	2,176	N-S Road:	2,519
E-W Road:	1,920	E-W Road:	3,124

Roadway CO Contributions and Concentrations

Emissions = (A x B x C) / 100,000[1]

Roadway	A_1 Reference CO Concentrations 25 Feet	A_2 50 Feet	A_3 100 Feet	B Traffic Volume	C Emission Factors[1]	Estimated CO Concentrations 25 Feet	50 Feet	100 Feet
A.M. Peak Traffic Hour								
North-South Road	7.0	5.4	3.8	2,176	7.30	1.11	0.86	0.60
East-West Road	2.6	2.2	1.7	1,920	7.30	0.36	0.31	0.24
P.M. Peak Traffic Hour								
North-South Road	2.6	2.2	1.7	2,519	10.78	0.71	0.60	0.46
East-West Road	7.0	5.4	3.8	3,124	10.78	2.36	1.82	1.28

[1] Methodology and emission factors from Bay Area Air Quality Management District *BAAQMD CEQA Guidelines* (1996).

Total Roadway CO Concentrations

Peak Hour Emissions = North-South Concentration + East-West Concentration + Background 1-hour Concentration[2]

8-Hour Emissions = ((Highest Peak Hour Concentration - Background 1-hour Concentration) x Persistence Factor) + Background 8-hour Concentration[2]

	A.M. Peak Hour	P.M. Peak Hour	8-Hour
25 Feet from Roadway Edge	6.6	8.2	5.0
50 Feet from Roadway Edge	6.3	7.5	4.6
100 Feet from Roadway Edge	5.9	6.8	4.2

[2] Methodology from Bay Area Air Quality Management District *BAAQMD CEQA Guidelines* (1996).

SIMPLIFIED CALINE4 CARBON MONOXIDE ANALYSIS

Project Number: 10537-00
Project Title: UC Riverside LRDP

Background Information

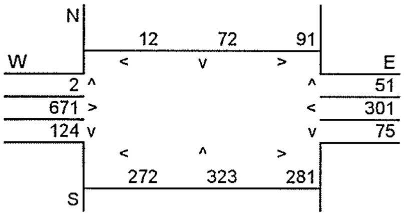
Nearest Air Monitoring Station measuring CO: Riverside-Rubidoux
Background 1-hour CO Concentration (ppm): 5.1
Background 8-hour CO Concentration (ppm): 3.2
Persistence Factor: 0.6
Analysis Year: 2010

Roadway Data

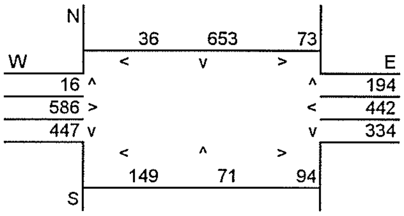
Intersection: Central Ave./Box Springs Blvd
Analysis Condition: Future Plus Project Traffic Volumes (2-Lane Iowa Avenue Scenario)

			No. of	Average Speed	
		Roadway Type	Lanes	A.M.	P.M.
North-South Roadway:	Box Springs Blvd	At Grade	2	20	10
East-West Roadway:	Central Ave.	At Grade	4	25	10

A.M. Peak Hour Traffic Volumes



P.M. Peak Hour Traffic Volumes



Highest Traffic Volumes (Vehicles per Hour)

N-S Road:	1,147	N-S Road:	1,748
E-W Road:	1,470	E-W Road:	1,723

Roadway CO Contributions and Concentrations

Emissions = (A x B x C) / 100,000[1]

	A_1	A_2	A_3	B	C			
	Reference CO Concentrations			Traffic	Emission	Estimated CO Concentrations		
Roadway	25 Feet	50 Feet	100 Feet	Volume	Factors[1]	25 Feet	50 Feet	100 Feet
A.M. Peak Traffic Hour								
North-South Road	2.7	2.2	1.7	1,147	5.52	0.17	0.14	0.11
East-West Road	7.0	5.4	3.8	1,470	4.46	0.46	0.35	0.25
P.M. Peak Traffic Hour								
North-South Road	7.6	5.7	4.0	1,748	10.78	1.43	1.07	0.75
East-West Road	2.6	2.2	1.7	1,723	10.78	0.48	0.41	0.32

[1] Methodology and emission factors from Bay Area Air Quality Management District *BAAQMD CEQA Guidelines* (1996).

Total Roadway CO Concentrations

Peak Hour Emissions = North-South Concentration + East-West Concentration + Background 1-hour Concentration[2]
8-Hour Emissions = ((Highest Peak Hour Concentration - Background 1-hour Concentration) x Persistence Factor) + Background 8-hour Concentration[2]

	A.M. Peak Hour	P.M. Peak Hour	8-Hour
25 Feet from Roadway Edge	5.7	7.0	4.3
50 Feet from Roadway Edge	5.6	6.6	4.1
100 Feet from Roadway Edge	5.5	6.2	3.8

[2] Methodology from Bay Area Air Quality Management District *BAAQMD CEQA Guidelines* (1996).

SIMPLIFIED CALINE4 CARBON MONOXIDE ANALYSIS

Project Number: 10537-00
Project Title: UC Riverside LRDP

Background Information

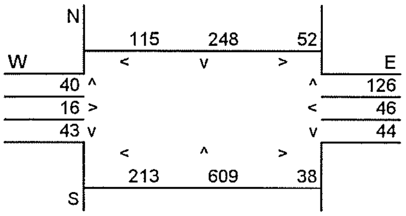
Nearest Air Monitoring Station measuring CO:	Riverside-Rubidoux
Background 1-hour CO Concentration (ppm):	5.1
Background 8-hour CO Concentration (ppm):	3.2
Persistence Factor:	0.6
Analysis Year:	2010

Roadway Data

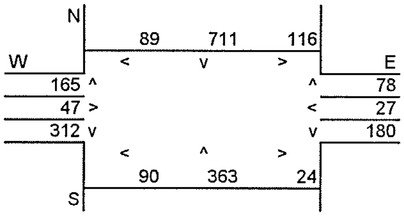
Intersection: Big Springs Rd/Watkins Dr
Analysis Condition: Future Plus Project Traffic Volumes (2-Lane Iowa Avenue Scenario)

		Roadway Type	No. of Lanes	Average Speed A.M.	Average Speed P.M.
North-South Roadway:	Watkins Dr	At Grade	2	10	10
East-West Roadway:	Big Springs Rd.	At Grade	2	10	10

A.M. Peak Hour Traffic Volumes



P.M. Peak Hour Traffic Volumes



Highest Traffic Volumes (Vehicles per Hour)

	A.M.		P.M.
N-S Road:	1,195	N-S Road:	1,680
E-W Road:	473	E-W Road:	730

Roadway CO Contributions and Concentrations

Emissions = (A x B x C) / 100,000[1]

Roadway	A_1 Reference CO Concentrations 25 Feet	A_2 50 Feet	A_3 100 Feet	B Traffic Volume	C Emission Factors[1]	Estimated CO Concentrations 25 Feet	50 Feet	100 Feet
A.M. Peak Traffic Hour								
North-South Road	7.6	5.7	4.0	1,195	10.78	0.98	0.73	0.52
East-West Road	2.7	2.2	1.7	473	10.78	0.14	0.11	0.09
P.M. Peak Traffic Hour								
North-South Road	7.6	5.7	4.0	1,680	10.78	1.38	1.03	0.72
East-West Road	2.7	2.2	1.7	730	10.78	0.21	0.17	0.13

[1] Methodology and emission factors from Bay Area Air Quality Management District *BAAQMD CEQA Guidelines* (1996).

Total Roadway CO Concentrations

Peak Hour Emissions = North-South Concentration + East-West Concentration + Background 1-hour Concentration[2]

8-Hour Emissions = ((Highest Peak Hour Concentration - Background 1-hour Concentration) x Persistence Factor) + Background 8-hour Concentration[2]

	A.M. Peak Hour	P.M. Peak Hour	8-Hour
25 Feet from Roadway Edge	6.2	6.7	4.2
50 Feet from Roadway Edge	5.9	6.3	3.9
100 Feet from Roadway Edge	5.7	6.0	3.7

[2] Methodology from Bay Area Air Quality Management District *BAAQMD CEQA Guidelines* (1996).

SIMPLIFIED CALINE4 CARBON MONOXIDE ANALYSIS

Project Number: 10537-00
Project Title: UC Riverside LRDP

Background Information

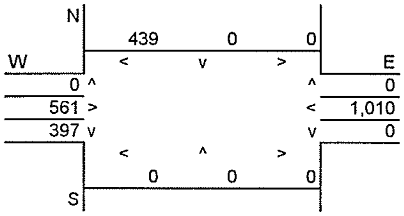
Nearest Air Monitoring Station measuring CO: Riverside-Rubidoux
Background 1-hour CO Concentration (ppm): 5.1
Background 8-hour CO Concentration (ppm): 3.2
Persistence Factor: 0.6
Analysis Year: 2010

Roadway Data

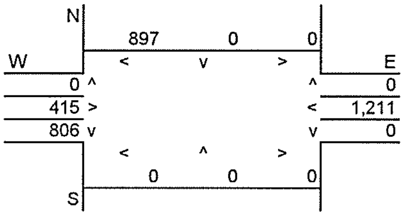
Intersection: Martin Luther King Blvd/SR-60SBR
Analysis Condition: Future Plus Project Traffic Volumes (2-Lane Iowa Avenue Scenario)

			No. of	Average Speed	
		Roadway Type	Lanes	A.M.	P.M.
North-South Roadway:	SR-60 SBR	At Grade	2	20	15
East-West Roadway:	Martin Luther King Blvd	At Grade	2	20	15

A.M. Peak Hour Traffic Volumes



P.M. Peak Hour Traffic Volumes



Highest Traffic Volumes (Vehicles per Hour)

N-S Road:	439	N-S Road:	897
E-W Road:	2,407	E-W Road:	3,329

Roadway CO Contributions and Concentrations

Emissions = (A x B x C) / 100,000[1]

	A_1	A_2	A_3	B	C			
	Reference CO Concentrations			Traffic	Emission	Estimated CO Concentrations		
Roadway	25 Feet	50 Feet	100 Feet	Volume	Factors[1]	25 Feet	50 Feet	100 Feet
A.M. Peak Traffic Hour								
North-South Road	2.7	2.2	1.7	439	5.52	0.07	0.05	0.04
East-West Road	7.6	5.7	4.0	2,407	5.52	1.01	0.76	0.53
P.M. Peak Traffic Hour								
North-South Road	2.7	2.2	1.7	897	7.30	0.18	0.14	0.11
East-West Road	7.6	5.7	4.0	3,329	7.30	1.85	1.39	0.97

[1] Methodology and emission factors from Bay Area Air Quality Management District *BAAQMD CEQA Guidelines* (1996).

Total Roadway CO Concentrations

Peak Hour Emissions = North-South Concentration + East-West Concentration + Background 1-hour Concentration[2]

8-Hour Emissions = ((Highest Peak Hour Concentration - Background 1-hour Concentration) x Persistence Factor) + Background 8-hour Concentration[2]

	A.M. Peak Hour	P.M. Peak Hour	8-Hour
25 Feet from Roadway Edge	6.2	7.1	4.4
50 Feet from Roadway Edge	5.9	6.6	4.1
100 Feet from Roadway Edge	5.7	6.2	3.9

[2] Methodology from Bay Area Air Quality Management District *BAAQMD CEQA Guidelines* (1996).

SIMPLIFIED CALINE4 CARBON MONOXIDE ANALYSIS

Project Number: 10537-00
Project Title: UC Riverside LRDP

Background Information

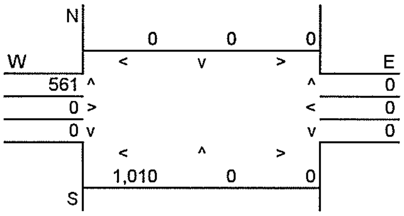
Nearest Air Monitoring Station measuring CO: Riverside-Rubidoux
Background 1-hour CO Concentration (ppm): 5.1
Background 8-hour CO Concentration (ppm): 3.2
Persistence Factor: 0.6
Analysis Year: 2010

Roadway Data

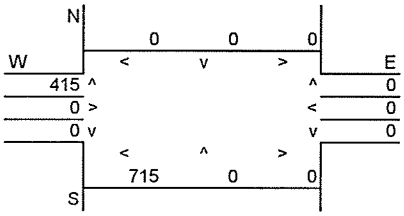
Intersection: Martin Luther King Blvd/SR-60 NBR
Analysis Condition: Future Plus Project Traffic Volumes (2-Lane Iowa Avenue Scenario)

		Roadway Type	No. of Lanes	Average Speed A.M.	P.M.
North-South Roadway:	SR-60 SBR	At Grade	2	20	20
East-West Roadway:	Martin Luther King Blvd	At Grade	2	20	20

A.M. Peak Hour Traffic Volumes



P.M. Peak Hour Traffic Volumes



Highest Traffic Volumes (Vehicles per Hour)

N-S Road: 1,010
E-W Road: 1,571

N-S Road: 715
E-W Road: 1,130

Roadway CO Contributions and Concentrations

Emissions = (A x B x C) / 100,000[1]

Roadway	A_1 Reference CO Concentrations 25 Feet	A_2 50 Feet	A_3 100 Feet	B Traffic Volume	C Emission Factors[1]	Estimated CO Concentrations 25 Feet	50 Feet	100 Feet
A.M. Peak Traffic Hour								
North-South Road	2.7	2.2	1.7	1,010	5.52	0.15	0.12	0.09
East-West Road	7.6	5.7	4.0	1,571	5.52	0.66	0.49	0.35
P.M. Peak Traffic Hour								
North-South Road	2.7	2.2	1.7	715	5.52	0.11	0.09	0.07
East-West Road	7.6	5.7	4.0	1,130	5.52	0.47	0.36	0.25

[1] Methodology and emission factors from Bay Area Air Quality Management District *BAAQMD CEQA Guidelines* (1996).

Total Roadway CO Concentrations

Peak Hour Emissions = North-South Concentration + East-West Concentration + Background 1-hour Concentration[2]

8-Hour Emissions = ((Highest Peak Hour Concentration - Background 1-hour Concentration) x Persistence Factor) + Background 8-hour Concentration[2]

	A.M. Peak Hour	P.M. Peak Hour	8-Hour
25 Feet from Roadway Edge	5.9	5.7	3.7
50 Feet from Roadway Edge	5.7	5.5	3.6
100 Feet from Roadway Edge	5.5	5.4	3.5

[2] Methodology from Bay Area Air Quality Management District *BAAQMD CEQA Guidelines* (1996).

SIMPLIFIED CALINE4 CARBON MONOXIDE ANALYSIS

Project Number: 10537-00
Project Title: UC Riverside LRDP

Background Information

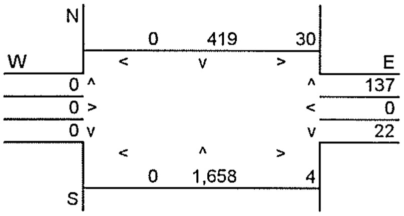
Nearest Air Monitoring Station measuring CO:	Riverside-Rubidoux
Background 1-hour CO Concentration (ppm):	5.1
Background 8-hour CO Concentration (ppm):	3.2
Persistence Factor:	0.6
Analysis Year:	2010

Roadway Data

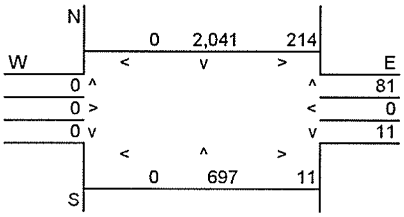
Intersection: Le Conte Dr/Chicago Ave
Analysis Condition: Future Plus Project Traffic Volumes (2-Lane Iowa Avenue Scenario)

		Roadway Type	No. of Lanes	Average Speed A.M.	Average Speed P.M.
North-South Roadway:	Chicago Ave	At Grade	4	10	15
East-West Roadway:	Le Conte Ave	At Grade	2	10	15

A.M. Peak Hour Traffic Volumes



P.M. Peak Hour Traffic Volumes



Highest Traffic Volumes (Vehicles per Hour)

	A.M.		P.M.
N-S Road:	2,244	N-S Road:	3,033
E-W Road:	193	E-W Road:	317

Roadway CO Contributions and Concentrations

Emissions = (A x B x C) / 100,000[1]

Roadway	A_1 Reference CO Concentrations 25 Feet	A_2 50 Feet	A_3 100 Feet	B Traffic Volume	C Emission Factors[1]	Estimated CO Concentrations 25 Feet	50 Feet	100 Feet
A.M. Peak Traffic Hour								
North-South Road	7.0	5.4	3.8	2,244	10.78	1.69	1.31	0.92
East-West Road	2.7	2.2	1.7	193	10.78	0.06	0.05	0.04
P.M. Peak Traffic Hour								
North-South Road	7.0	5.4	3.8	3,033	7.30	1.55	1.20	0.84
East-West Road	2.7	2.2	1.7	317	7.30	0.06	0.05	0.04

[1] Methodology and emission factors from Bay Area Air Quality Management District *BAAQMD CEQA Guidelines* (1996).

Total Roadway CO Concentrations

Peak Hour Emissions = North-South Concentration + East-West Concentration + Background 1-hour Concentration[2]

8-Hour Emissions = ((Highest Peak Hour Concentration - Background 1-hour Concentration) x Persistence Factor) + Background 8-hour Concentration[2]

	A.M. Peak Hour	P.M. Peak Hour	8-Hour
25 Feet from Roadway Edge	6.8	6.7	4.2
50 Feet from Roadway Edge	6.5	6.3	4.0
100 Feet from Roadway Edge	6.1	6.0	3.8

[2] Methodology from Bay Area Air Quality Management District *BAAQMD CEQA Guidelines* (1996).

SIMPLIFIED CALINE4 CARBON MONOXIDE ANALYSIS

Project Number: 10537-00
Project Title: UC Riverside LRDP

Background Information

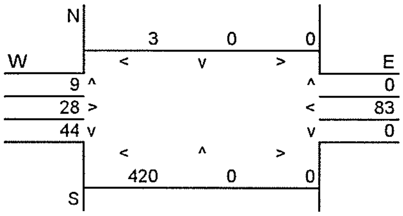
Nearest Air Monitoring Station measuring CO:	Riverside-Rubidoux
Background 1-hour CO Concentration (ppm):	5.1
Background 8-hour CO Concentration (ppm):	3.2
Persistence Factor:	0.6
Analysis Year:	2010

Roadway Data

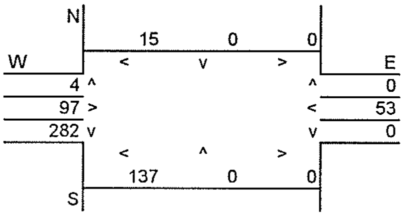
Intersection: El Cerrito Dr/Sycamore Canyon Blvd
Analysis Condition: Future Plus Project Traffic Volumes (2-Lane Iowa Avenue Scenario)

		Roadway Type	No. of Lanes	Average Speed A.M.	Average Speed P.M.
North-South Roadway:	Sycamore Canyon Blvd	At Grade	2	20	20
East-West Roadway:	El Cerrito Dr.	At Grade	2	20	20

A.M. Peak Hour Traffic Volumes



P.M. Peak Hour Traffic Volumes



Highest Traffic Volumes (Vehicles per Hour)

	A.M.	P.M.
N-S Road:	464	419
E-W Road:	587	588

Roadway CO Contributions and Concentrations

Emissions = (A x B x C) / 100,000[1]

	A_1	A_2	A_3	B	C			
	Reference CO Concentrations			Traffic	Emission	Estimated CO Concentrations		
Roadway	25 Feet	50 Feet	100 Feet	Volume	Factors[1]	25 Feet	50 Feet	100 Feet
A.M. Peak Traffic Hour								
North-South Road	2.7	2.2	1.7	464	5.52	0.07	0.06	0.04
East-West Road	7.6	5.7	4.0	587	5.52	0.25	0.18	0.13
P.M. Peak Traffic Hour								
North-South Road	2.7	2.2	1.7	419	5.52	0.06	0.05	0.04
East-West Road	7.6	5.7	4.0	588	5.52	0.25	0.19	0.13

[1] Methodology and emission factors from Bay Area Air Quality Management District *BAAQMD CEQA Guidelines* (1996).

Total Roadway CO Concentrations

Peak Hour Emissions = North-South Concentration + East-West Concentration + Background 1-hour Concentration[2]

8-Hour Emissions = ((Highest Peak Hour Concentration - Background 1-hour Concentration) x Persistence Factor) + Background 8-hour Concentration[2]

	A.M. Peak Hour	P.M. Peak Hour	8-Hour
25 Feet from Roadway Edge	5.4	5.4	3.4
50 Feet from Roadway Edge	5.3	5.3	3.3
100 Feet from Roadway Edge	5.3	5.3	3.3

[2] Methodology from Bay Area Air Quality Management District *BAAQMD CEQA Guidelines* (1996).

SIMPLIFIED CALINE4 CARBON MONOXIDE ANALYSIS

Project Number: 10537-00
Project Title: UC Riverside LRDP

Background Information

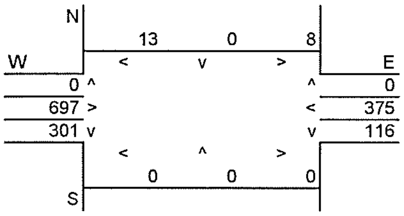
Nearest Air Monitoring Station measuring CO: Riverside-Rubidoux
Background 1-hour CO Concentration (ppm): 5.1
Background 8-hour CO Concentration (ppm): 3.2
Persistence Factor: 0.6
Analysis Year: 2010

Roadway Data

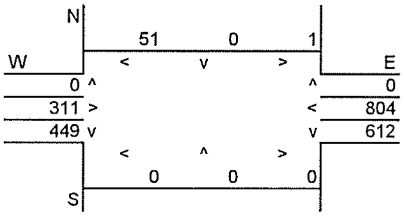
Intersection: Central Ave/SR-60 SBR
Analysis Condition: Future Plus Project Traffic Volumes (2-Lane Iowa Avenue Scenario)

		Roadway Type	No. of Lanes	Average Speed A.M.	Average Speed P.M.
North-South Roadway:	SR-60 SBR	At Grade	2	20	20
East-West Roadway:	Central Ave	At Grade	4	20	20

A.M. Peak Hour Traffic Volumes



P.M. Peak Hour Traffic Volumes



Highest Traffic Volumes (Vehicles per Hour)

N-S Road:	417	N-S Road:	1,061
E-W Road:	1,386	E-W Road:	1,728

Roadway CO Contributions and Concentrations

Emissions = (A x B x C) / 100,000[1]

Roadway	A_1 Reference CO Concentrations 25 Feet	A_2 50 Feet	A_3 100 Feet	B Traffic Volume	C Emission Factors[1]	Estimated CO Concentrations 25 Feet	50 Feet	100 Feet
A.M. Peak Traffic Hour								
North-South Road	2.7	2.2	1.7	417	5.52	0.06	0.05	0.04
East-West Road	7.0	5.4	3.8	1,386	5.52	0.54	0.41	0.29
P.M. Peak Traffic Hour								
North-South Road	2.7	2.2	1.7	1,061	5.52	0.16	0.13	0.10
East-West Road	7.0	5.4	3.8	1,728	5.52	0.67	0.52	0.36

[1] Methodology and emission factors from Bay Area Air Quality Management District *BAAQMD CEQA Guidelines* (1996).

Total Roadway CO Concentrations

Peak Hour Emissions = North-South Concentration + East-West Concentration + Background 1-hour Concentration[2]

8-Hour Emissions = ((Highest Peak Hour Concentration - Background 1-hour Concentration) x Persistence Factor) + Background 8-hour Concentration[2]

	A.M. Peak Hour	P.M. Peak Hour	8-Hour
25 Feet from Roadway Edge	5.7	5.9	3.7
50 Feet from Roadway Edge	5.6	5.7	3.6
100 Feet from Roadway Edge	5.4	5.6	3.5

[2] Methodology from Bay Area Air Quality Management District *BAAQMD CEQA Guidelines* (1996).

SIMPLIFIED CALINE4 CARBON MONOXIDE ANALYSIS

Project Number: 10537-00
Project Title: UC Riverside LRDP

Background Information

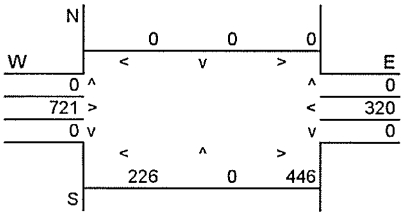
Nearest Air Monitoring Station measuring CO: Riverside-Rubidoux
Background 1-hour CO Concentration (ppm): 5.1
Background 8-hour CO Concentration (ppm): 3.2
Persistence Factor: 0.6
Analysis Year: 2010

Roadway Data

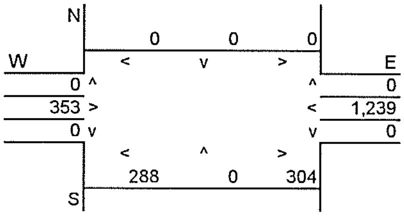
Intersection: Central Ave/SR-60 NBR
Analysis Condition: Future Plus Project Traffic Volumes (2-Lane Iowa Avene Scenario)

			No. of	Average Speed	
		Roadway Type	Lanes	A.M.	P.M.
North-South Roadway:	SR-60 NBR	At Grade	2	10	10
East-West Roadway:	Central Ave	At Grade	2	10	10

A.M. Peak Hour Traffic Volumes



P.M. Peak Hour Traffic Volumes



Highest Traffic Volumes (Vehicles per Hour)

	A.M.		P.M.
N-S Road:	672	N-S Road:	592
E-W Road:	1,487	E-W Road:	1,896

Roadway CO Contributions and Concentrations

Emissions = (A x B x C) / 100,000[1]

	A_1	A_2	A_3	B	C			
	Reference CO Concentrations			Traffic	Emission	Estimated CO Concentrations		
Roadway	25 Feet	50 Feet	100 Feet	Volume	Factors[1]	25 Feet	50 Feet	100 Feet
A.M. Peak Traffic Hour								
North-South Road	2.7	2.2	1.7	672	10.78	0.20	0.16	0.12
East-West Road	7.6	5.7	4.0	1,487	10.78	1.22	0.91	0.64
P.M. Peak Traffic Hour								
North-South Road	2.7	2.2	1.7	592	10.78	0.17	0.14	0.11
East-West Road	7.6	5.7	4.0	1,896	10.78	1.55	1.17	0.82

[1] Methodology and emission factors from Bay Area Air Quality Management District *BAAQMD CEQA Guidelines* (1996).

Total Roadway CO Concentrations

Peak Hour Emissions = North-South Concentration + East-West Concentration + Background 1-hour Concentration[2]
8-Hour Emissions = ((Highest Peak Hour Concentration - Background 1-hour Concentration) x Persistence Factor) + Background 8-hour Concentration[2]

	A.M. Peak Hour	P.M. Peak Hour	8-Hour
25 Feet from Roadway Edge	6.5	6.8	4.2
50 Feet from Roadway Edge	6.2	6.4	4.0
100 Feet from Roadway Edge	5.9	6.0	3.8

[2] Methodology from Bay Area Air Quality Management District *BAAQMD CEQA Guidelines* (1996).

SIMPLIFIED CALINE4 CARBON MONOXIDE ANALYSIS

Project Number: 10537-00
Project Title: UC Riverside LRDP

Background Information

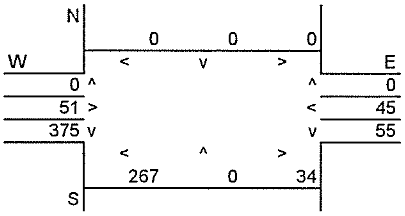
Nearest Air Monitoring Station measuring CO: Riverside-Rubidoux
Background 1-hour CO Concentration (ppm): 5.1
Background 8-hour CO Concentration (ppm): 3.2
Persistence Factor: 0.6
Analysis Year: 2010

Roadway Data

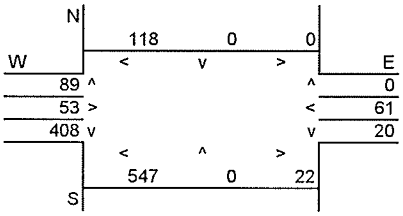
Intersection: Linden St/Aberdeen Dr
Analysis Condition: Future Plus Project Traffic Volumes (2-Lane Iowa Avenue Scenario)

		Roadway Type	No. of Lanes	Average Speed A.M.	Average Speed P.M.
North-South Roadway:	Aberdeen Dr	At Grade	2	20	10
East-West Roadway:	Linden St	At Grade	2	20	10

A.M. Peak Hour Traffic Volumes



P.M. Peak Hour Traffic Volumes



Highest Traffic Volumes (Vehicles per Hour)

N-S Road:	731	N-S Road:	997
E-W Road:	738	E-W Road:	1,276

Roadway CO Contributions and Concentrations

Emissions = (A x B x C) / 100,000[1]

	A_1	A_2	A_3	B	C			
	Reference CO Concentrations			Traffic	Emission	Estimated CO Concentrations		
Roadway	25 Feet	50 Feet	100 Feet	Volume	Factors[1]	25 Feet	50 Feet	100 Feet
A.M. Peak Traffic Hour								
North-South Road	2.7	2.2	1.7	731	5.52	0.11	0.09	0.07
East-West Road	7.6	5.7	4.0	738	5.52	0.31	0.23	0.16
P.M. Peak Traffic Hour								
North-South Road	2.7	2.2	1.7	997	10.78	0.29	0.24	0.18
East-West Road	7.6	5.7	4.0	1,276	10.78	1.05	0.78	0.55

[1] Methodology and emission factors from Bay Area Air Quality Management District *BAAQMD CEQA Guidelines* (1996).

Total Roadway CO Concentrations

Peak Hour Emissions = North-South Concentration + East-West Concentration + Background 1-hour Concentration[2]
8-Hour Emissions = ((Highest Peak Hour Concentration - Background 1-hour Concentration) x Persistence Factor) + Background 8-hour Concentration[2]

	A.M. Peak Hour	P.M. Peak Hour	8-Hour
25 Feet from Roadway Edge	5.5	6.4	4.0
50 Feet from Roadway Edge	5.4	6.1	3.8
100 Feet from Roadway Edge	5.3	5.8	3.6

[2] Methodology from Bay Area Air Quality Management District *BAAQMD CEQA Guidelines* (1996).

SIMPLIFIED CALINE4 CARBON MONOXIDE ANALYSIS

Project Number: 10537-00
Project Title: UC Riverside LRDP

Background Information

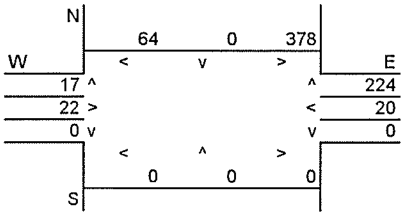
Nearest Air Monitoring Station measuring CO:	Riverside-Rubidoux
Background 1-hour CO Concentration (ppm):	5.1
Background 8-hour CO Concentration (ppm):	3.2
Persistence Factor:	0.6
Analysis Year:	2010

Roadway Data

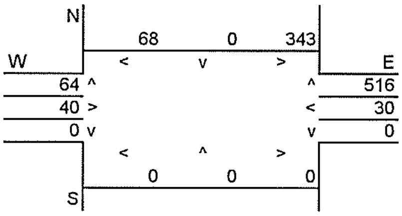
Intersection:	Campus Dr/Aberdeen Dr
Analysis Condition:	Future Plus Project Traffic Volumes (2-Lane Iowa Avenue Scenario)

		Roadway Type	No. of Lanes	Average Speed	
				A.M.	P.M.
North-South Roadway:	Aberdeen Dr	At Grade	2	10	10
East-West Roadway:	Campus Dr	At Grade	2	10	10

A.M. Peak Hour Traffic Volumes



P.M. Peak Hour Traffic Volumes



Highest Traffic Volumes (Vehicles per Hour)

N-S Road:	683	N-S Road:	991
E-W Road:	644	E-W Road:	929

Roadway CO Contributions and Concentrations

Emissions = (A x B x C) / 100,000[1]

	A_1	A_2	A_3	B	C			
	Reference CO Concentrations			Traffic	Emission	Estimated CO Concentrations		
Roadway	25 Feet	50 Feet	100 Feet	Volume	Factors[1]	25 Feet	50 Feet	100 Feet
A.M. Peak Traffic Hour								
North-South Road	7.6	5.7	4.0	683	10.78	0.56	0.42	0.29
East-West Road	2.7	2.2	1.7	644	10.78	0.19	0.15	0.12
P.M. Peak Traffic Hour								
North-South Road	7.6	5.7	4.0	991	10.78	0.81	0.61	0.43
East-West Road	2.7	2.2	1.7	929	10.78	0.27	0.22	0.17

[1] Methodology and emission factors from Bay Area Air Quality Management District *BAAQMD CEQA Guidelines* (1996).

Total Roadway CO Concentrations

Peak Hour Emissions = North-South Concentration + East-West Concentration + Background 1-hour Concentration[2]

8-Hour Emissions = ((Highest Peak Hour Concentration - Background 1-hour Concentration) x Persistence Factor) + Background 8-hour Concentration[2]

	A.M. Peak Hour	P.M. Peak Hour	8-Hour
25 Feet from Roadway Edge	5.8	6.2	3.8
50 Feet from Roadway Edge	5.7	5.9	3.7
100 Feet from Roadway Edge	5.5	5.7	3.6

[2] Methodology from Bay Area Air Quality Management District *BAAQMD CEQA Guidelines* (1996).

SIMPLIFIED CALINE4 CARBON MONOXIDE ANALYSIS

Project Number: 10537-00
Project Title: UC Riverside LRDP

Background Information

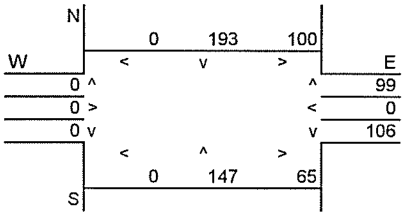
Nearest Air Monitoring Station measuring CO: Riverside-Rubidoux
Background 1-hour CO Concentration (ppm): 5.1
Background 8-hour CO Concentration (ppm): 3.2
Persistence Factor: 0.6
Analysis Year: 2010

Roadway Data

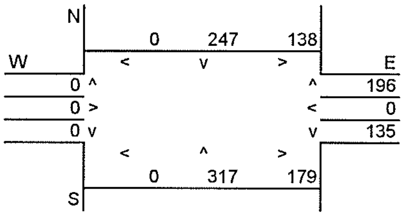
Intersection: Big Springs Rd/Campus Dr
Analysis Condition: Future Plus Project Traffic Volumes (2-Lane Iowa Avenue Scenario)

		Roadway Type	No. of Lanes	Average Speed A.M.	Average Speed P.M.
North-South Roadway:	Big Springs Rd	At Grade	2	10	10
East-West Roadway:	Campus Dr	At Grade	2	10	10

A.M. Peak Hour Traffic Volumes



P.M. Peak Hour Traffic Volumes



Highest Traffic Volumes (Vehicles per Hour)

N-S Road:	539	N-S Road:	898
E-W Road:	370	E-W Road:	648

Roadway CO Contributions and Concentrations

Emissions = (A x B x C) / 100,000[1]

Roadway	A_1 Reference CO Concentrations 25 Feet	A_2 50 Feet	A_3 100 Feet	B Traffic Volume	C Emission Factors[1]	Estimated CO Concentrations 25 Feet	50 Feet	100 Feet
A.M. Peak Traffic Hour								
North-South Road	7.6	5.7	4.0	539	10.78	0.44	0.33	0.23
East-West Road	2.7	2.2	1.7	370	10.78	0.11	0.09	0.07
P.M. Peak Traffic Hour								
North-South Road	7.6	5.7	4.0	898	10.78	0.74	0.55	0.39
East-West Road	2.7	2.2	1.7	648	10.78	0.19	0.15	0.12

[1] Methodology and emission factors from Bay Area Air Quality Management District *BAAQMD CEQA Guidelines* (1996).

Total Roadway CO Concentrations

Peak Hour Emissions = North-South Concentration + East-West Concentration + Background 1-hour Concentration[2]

8-Hour Emissions = ((Highest Peak Hour Concentration - Background 1-hour Concentration) x Persistence Factor) + Background 8-hour Concentration[2]

	A.M. Peak Hour	P.M. Peak Hour	8-Hour
25 Feet from Roadway Edge	5.6	6.0	3.8
50 Feet from Roadway Edge	5.5	5.8	3.6
100 Feet from Roadway Edge	5.4	5.6	3.5

[2] Methodology from Bay Area Air Quality Management District *BAAQMD CEQA Guidelines* (1996).

SIMPLIFIED CALINE4 CARBON MONOXIDE ANALYSIS

Project Number: 10537-00
Project Title: UC Riverside LRDP

Background Information

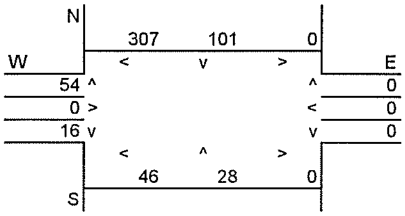
Nearest Air Monitoring Station measuring CO:	Riverside-Rubidoux
Background 1-hour CO Concentration (ppm):	5.1
Background 8-hour CO Concentration (ppm):	3.2
Persistence Factor:	0.6
Analysis Year:	2010

Roadway Data

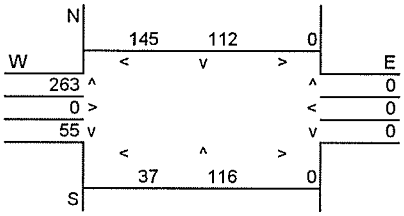
Intersection:	Parking Lot 1/campus Dr
Analysis Condition:	Future Plus Project Traffic Volumes (2-Lane Iowa Avenue Scenario)

			No. of	Average Speed	
		Roadway Type	Lanes	A.M.	P.M.
North-South Roadway:	Campus Dr.	At Grade	2	10	10
East-West Roadway:	Parking Access	At Grade	2	10	10

A.M. Peak Hour Traffic Volumes



P.M. Peak Hour Traffic Volumes



Highest Traffic Volumes (Vehicles per Hour)

N-S Road:	490	N-S Road:	636
E-W Road:	423	E-W Road:	500

Roadway CO Contributions and Concentrations

Emissions = (A x B x C) / 100,000[1]

	A_1	A_2	A_3	B	C			
	Reference CO Concentrations			Traffic	Emission	Estimated CO Concentrations		
Roadway	25 Feet	50 Feet	100 Feet	Volume	Factors[1]	25 Feet	50 Feet	100 Feet
A.M. Peak Traffic Hour								
North-South Road	7.6	5.7	4.0	490	10.78	0.40	0.30	0.21
East-West Road	2.7	2.2	1.7	423	10.78	0.12	0.10	0.08
P.M. Peak Traffic Hour								
North-South Road	7.6	5.7	4.0	636	10.78	0.52	0.39	0.27
East-West Road	2.7	2.2	1.7	500	10.78	0.15	0.12	0.09

[1] Methodology and emission factors from Bay Area Air Quality Management District *BAAQMD CEQA Guidelines* (1996).

Total Roadway CO Concentrations

Peak Hour Emissions = North-South Concentration + East-West Concentration + Background 1-hour Concentration[2]

8-Hour Emissions = ((Highest Peak Hour Concentration - Background 1-hour Concentration) x Persistence Factor) + Background 8-hour Concentration[2]

	A.M. Peak Hour	P.M. Peak Hour	8-Hour
25 Feet from Roadway Edge	5.6	5.8	3.6
50 Feet from Roadway Edge	5.5	5.6	3.5
100 Feet from Roadway Edge	5.4	5.5	3.4

[2] Methodology from Bay Area Air Quality Management District *BAAQMD CEQA Guidelines* (1996).

SIMPLIFIED CALINE4 CARBON MONOXIDE ANALYSIS

Project Number: 10537-00
Project Title: UC Riverside LRDP

Background Information

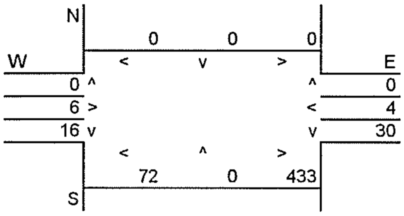
Nearest Air Monitoring Station measuring CO: Riverside-Rubidoux
Background 1-hour CO Concentration (ppm): 5.1
Background 8-hour CO Concentration (ppm): 3.2
Persistence Factor: 0.6
Analysis Year: 2010

Roadway Data

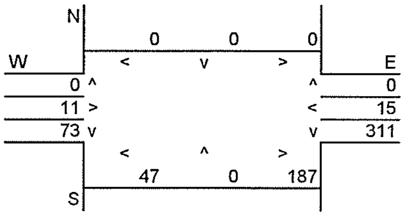
Intersection: Campus Dr/Canyon Crest Dr
Analysis Condition: Future Plus Project Traffic Volumes (2-Lane Iowa Avenue Scenario)

		Roadway Type	No. of Lanes	Average Speed A.M.	Average Speed P.M.
North-South Roadway:	Canyon Crest Dr	At Grade	2	20	20
East-West Roadway:	Campus Dr	At Grade	2	10	10

A.M. Peak Hour Traffic Volumes



P.M. Peak Hour Traffic Volumes



Highest Traffic Volumes (Vehicles per Hour)

	A.M.		P.M.
N-S Road:	551	N-S Road:	618
E-W Road:	473	E-W Road:	524

Roadway CO Contributions and Concentrations

Emissions = (A x B x C) / 100,000[1]

	A_1	A_2	A_3	B	C			
	Reference CO Concentrations			Traffic	Emission	Estimated CO Concentrations		
Roadway	25 Feet	50 Feet	100 Feet	Volume	Factors[1]	25 Feet	50 Feet	100 Feet
A.M. Peak Traffic Hour								
North-South Road	7.6	5.7	4.0	551	5.52	0.23	0.17	0.12
East-West Road	2.7	2.2	1.7	473	10.78	0.14	0.11	0.09
P.M. Peak Traffic Hour								
North-South Road	7.6	5.7	4.0	618	5.52	0.26	0.19	0.14
East-West Road	2.7	2.2	1.7	524	10.78	0.15	0.12	0.10

[1] Methodology and emission factors from Bay Area Air Quality Management District *BAAQMD CEQA Guidelines* (1996).

Total Roadway CO Concentrations

Peak Hour Emissions = North-South Concentration + East-West Concentration + Background 1-hour Concentration[2]
8-Hour Emissions = ((Highest Peak Hour Concentration - Background 1-hour Concentration) x Persistence Factor) + Background 8-hour Concentration[2]

	A.M. Peak Hour	P.M. Peak Hour	8-Hour
25 Feet from Roadway Edge	5.5	5.5	3.4
50 Feet from Roadway Edge	5.4	5.4	3.4
100 Feet from Roadway Edge	5.3	5.3	3.3

[2] Methodology from Bay Area Air Quality Management District *BAAQMD CEQA Guidelines* (1996).

SIMPLIFIED CALINE4 CARBON MONOXIDE ANALYSIS

Project Number: 10537-00
Project Title: UC Riverside LRDP

Background Information

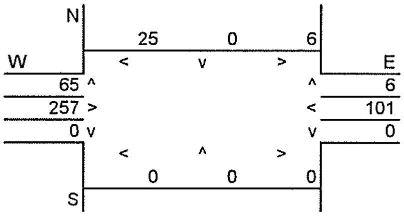
Nearest Air Monitoring Station measuring CO:	Riverside-Rubidoux
Background 1-hour CO Concentration (ppm):	5.1
Background 8-hour CO Concentration (ppm):	3.2
Persistence Factor:	0.6
Analysis Year:	2010

Roadway Data

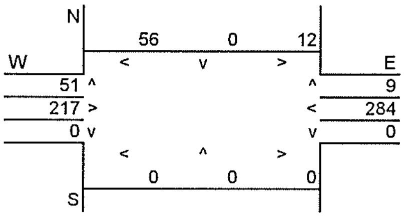
Intersection:	Campus Dr/Citrus Dr
Analysis Condition:	Future Plus Project Traffic Volumes (2-Lane Iowa Avenue Scenario)

			No. of	Average Speed	
		Roadway Type	Lanes	A.M.	P.M.
North-South Roadway:	Citrus Dr	At Grade	2	10	10
East-West Roadway:	Campus Dr	At Grade	2	20	20

A.M. Peak Hour Traffic Volumes



P.M. Peak Hour Traffic Volumes



Highest Traffic Volumes (Vehicles per Hour)

N-S Road:	102	N-S Road:	128
E-W Road:	448	E-W Road:	608

Roadway CO Contributions and Concentrations

Emissions = (A x B x C) / 100,000[1]

	A_1	A_2	A_3	B	C			
	Reference CO Concentrations			Traffic	Emission	Estimated CO Concentrations		
Roadway	25 Feet	50 Feet	100 Feet	Volume	Factors[1]	25 Feet	50 Feet	100 Feet
A.M. Peak Traffic Hour								
North-South Road	2.7	2.2	1.7	102	10.78	0.03	0.02	0.02
East-West Road	7.6	5.7	4.0	448	5.52	0.19	0.14	0.10
P.M. Peak Traffic Hour								
North-South Road	2.7	2.2	1.7	128	10.78	0.04	0.03	0.02
East-West Road	7.6	5.7	4.0	608	5.52	0.26	0.19	0.13

[1] Methodology and emission factors from Bay Area Air Quality Management District *BAAQMD CEQA Guidelines* (1996).

Total Roadway CO Concentrations

Peak Hour Emissions = North-South Concentration + East-West Concentration + Background 1-hour Concentration[2]

8-Hour Emissions = ((Highest Peak Hour Concentration - Background 1-hour Concentration) x Persistence Factor) + Background 8-hour Concentration[2]

	A.M. Peak Hour	P.M. Peak Hour	8-Hour
25 Feet from Roadway Edge	5.3	5.4	3.4
50 Feet from Roadway Edge	5.3	5.3	3.3
100 Feet from Roadway Edge	5.2	5.3	3.3

[2] Methodology from Bay Area Air Quality Management District *BAAQMD CEQA Guidelines* (1996).

SIMPLIFIED CALINE4 CARBON MONOXIDE ANALYSIS

Project Number: 10537-00
Project Title: UC Riverside LRDP

Background Information

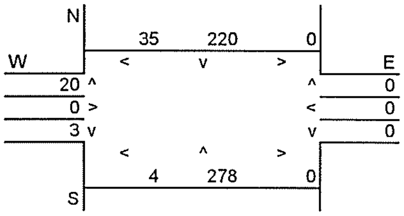
Nearest Air Monitoring Station measuring CO: Riverside-Rubidoux
Background 1-hour CO Concentration (ppm): 5.1
Background 8-hour CO Concentration (ppm): 3.2
Persistence Factor: 0.6
Analysis Year: 2010

Roadway Data

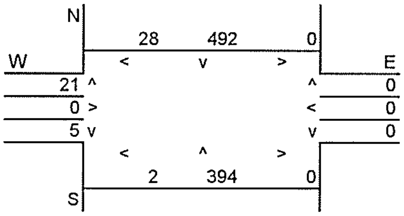
Intersection: Eucalyptus Dr/Campus Dr
Analysis Condition: Future Plus Project Traffic Volumes (2-Lane Iowa Avenue Scenario)

			No. of	Average Speed	
		Roadway Type	Lanes	A.M.	P.M.
North-South Roadway:	Campus Dr	At Grade	2	10	10
East-West Roadway:	#REF!	At Grade	2	10	10

A.M. Peak Hour Traffic Volumes



P.M. Peak Hour Traffic Volumes



Highest Traffic Volumes (Vehicles per Hour)

N-S Road: 553
E-W Road: 62

N-S Road: 935
E-W Road: 56

Roadway CO Contributions and Concentrations

Emissions = (A x B x C) / 100,000[1]

	A_1	A_2	A_3	B	C			
	Reference CO Concentrations			Traffic	Emission	Estimated CO Concentrations		
Roadway	25 Feet	50 Feet	100 Feet	Volume	Factors[1]	25 Feet	50 Feet	100 Feet
A.M. Peak Traffic Hour								
North-South Road	7.6	5.7	4.0	553	10.78	0.45	0.34	0.24
East-West Road	2.7	2.2	1.7	62	10.78	0.02	0.01	0.01
P.M. Peak Traffic Hour								
North-South Road	7.6	5.7	4.0	935	10.78	0.77	0.57	0.40
East-West Road	2.7	2.2	1.7	56	10.78	0.02	0.01	0.01

[1] Methodology and emission factors from Bay Area Air Quality Management District *BAAQMD CEQA Guidelines* (1996).

Total Roadway CO Concentrations

Peak Hour Emissions = North-South Concentration + East-West Concentration + Background 1-hour Concentration[2]
8-Hour Emissions = ((Highest Peak Hour Concentration - Background 1-hour Concentration) x Persistence Factor) + Background 8-hour Concentration[2]

	A.M. Peak Hour	P.M. Peak Hour	8-Hour
25 Feet from Roadway Edge	5.6	5.9	3.7
50 Feet from Roadway Edge	5.5	5.7	3.6
100 Feet from Roadway Edge	5.3	5.5	3.4

[2] Methodology from Bay Area Air Quality Management District *BAAQMD CEQA Guidelines* (1996).

SIMPLIFIED CALINE4 CARBON MONOXIDE ANALYSIS

Project Number: 10537-00
Project Title: UC Riverside LRDP

Background Information

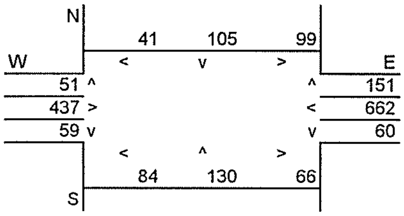
Nearest Air Monitoring Station measuring CO: Riverside-Rubidoux
Background 1-hour CO Concentration (ppm): 5.1
Background 8-hour CO Concentration (ppm): 3.2
Persistence Factor: 0.6
Analysis Year: 2010

Roadway Data

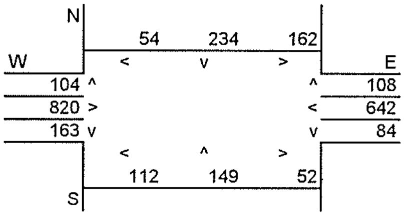
Intersection: 3rd St/Kansas Ave.
Analysis Condition: Future Plus Project Traffic Volumes 4-Lane Iowa Avenue Scenario)

			No. of	Average Speed	
		Roadway Type	Lanes	A.M.	P.M.
North-South Roadway:	Kansas Ave.	At Grade	2	20	20
East-West Roadway:	3rd Street	At Grade	4	20	20

A.M. Peak Hour Traffic Volumes



P.M. Peak Hour Traffic Volumes



Highest Traffic Volumes (Vehicles per Hour)

N-S Road:	577	N-S Road:	811
E-W Road:	1,475	E-W Road:	1,895

Roadway CO Contributions and Concentrations

Emissions = (A x B x C) / 100,000[1]

	A_1	A_2	A_3	B	C			
	Reference CO Concentrations			Traffic	Emission	Estimated CO Concentrations		
Roadway	25 Feet	50 Feet	100 Feet	Volume	Factors[1]	25 Feet	50 Feet	100 Feet
A.M. Peak Traffic Hour								
North-South Road	2.7	2.2	1.7	577	5.52	0.09	0.07	0.05
East-West Road	7.0	5.4	3.8	1,475	5.52	0.57	0.44	0.31
P.M. Peak Traffic Hour								
North-South Road	2.7	2.2	1.7	811	5.52	0.12	0.10	0.08
East-West Road	7.0	5.4	3.8	1,895	5.52	0.73	0.56	0.40

[1] Methodology and emission factors from Bay Area Air Quality Management District *BAAQMD CEQA Guidelines* (1996).

Total Roadway CO Concentrations

Peak Hour Emissions = North-South Concentration + East-West Concentration + Background 1-hour Concentration[2]
8-Hour Emissions = ((Highest Peak Hour Concentration - Background 1-hour Concentration) x Persistence Factor) + Background 8-hour Concentration[2]

	A.M. Peak Hour	P.M. Peak Hour	8-Hour
25 Feet from Roadway Edge	5.8	6.0	3.7
50 Feet from Roadway Edge	5.6	5.8	3.6
100 Feet from Roadway Edge	5.5	5.6	3.5

[2] Methodology from Bay Area Air Quality Management District *BAAQMD CEQA Guidelines* (1996).

SIMPLIFIED CALINE4 CARBON MONOXIDE ANALYSIS

Project Number: 10537-00
Project Title: UC Riverside LRDP

Background Information

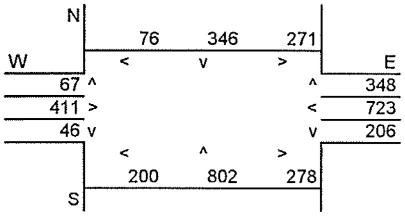
Nearest Air Monitoring Station measuring CO:	Riverside-Rubidoux
Background 1-hour CO Concentration (ppm):	5.1
Background 8-hour CO Concentration (ppm):	3.2
Persistence Factor:	0.6
Analysis Year:	2010

Roadway Data

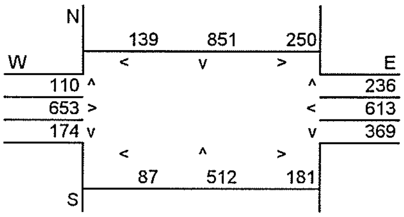
Intersection:	3rd St/Chicago Ave.
Analysis Condition:	Future Plus Project Traffic Volumes (4-Lane Iowa Avenue Scenario)

		Roadway Type	No. of Lanes	Average Speed A.M.	Average Speed P.M.
North-South Roadway:	Chicago Ave.	At Grade	4	15	15
East-West Roadway:	3rd Street	At Grade	4	15	15

A.M. Peak Hour Traffic Volumes



P.M. Peak Hour Traffic Volumes



Highest Traffic Volumes (Vehicles per Hour)

N-S Road:	1,910	N-S Road:	2,174
E-W Road:	2,237	E-W Road:	2,302

Roadway CO Contributions and Concentrations

Emissions = (A x B x C) / 100,000[1]

	A_1	A_2	A_3	B	C			
	Reference CO Concentrations			Traffic	Emission	Estimated CO Concentrations		
Roadway	25 Feet	50 Feet	100 Feet	Volume	Factors[1]	25 Feet	50 Feet	100 Feet
A.M. Peak Traffic Hour								
North-South Road	2.6	2.2	1.7	1,910	7.30	0.36	0.31	0.24
East-West Road	7.0	5.4	3.8	2,237	7.30	1.14	0.88	0.62
P.M. Peak Traffic Hour								
North-South Road	2.6	2.2	1.7	2,174	7.30	0.41	0.35	0.27
East-West Road	7.0	5.4	3.8	2,302	7.30	1.18	0.91	0.64

[1] Methodology and emission factors from Bay Area Air Quality Management District *BAAQMD CEQA Guidelines* (1996).

Total Roadway CO Concentrations

Peak Hour Emissions = North-South Concentration + East-West Concentration + Background 1-hour Concentration[2]

8-Hour Emissions = ((Highest Peak Hour Concentration - Background 1-hour Concentration) x Persistence Factor) + Background 8-hour Concentration[2]

	A.M. Peak Hour	P.M. Peak Hour	8-Hour
25 Feet from Roadway Edge	6.6	6.7	4.2
50 Feet from Roadway Edge	6.3	6.4	4.0
100 Feet from Roadway Edge	6.0	6.0	3.7

[2] Methodology from Bay Area Air Quality Management District *BAAQMD CEQA Guidelines* (1996).

SIMPLIFIED CALINE4 CARBON MONOXIDE ANALYSIS

Project Number: 10537-00
Project Title: UC Riverside LRDP

Background Information

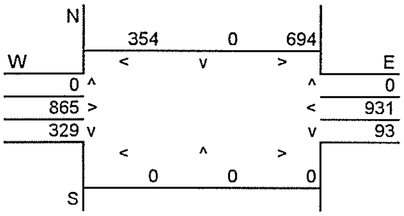
Nearest Air Monitoring Station measuring CO:	Riverside-Rubidoux
Background 1-hour CO Concentration (ppm):	5.1
Background 8-hour CO Concentration (ppm):	3.9
Persistence Factor:	0.6
Analysis Year:	2010

Roadway Data

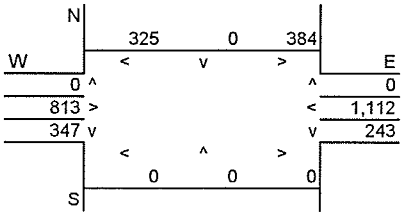
Intersection: 3rd St/SR-60 SBR
Analysis Condition: Future Plus Project Traffic Volumes 4-Lane Iowa Avenue Scenario)

			No. of	Average Speed	
		Roadway Type	Lanes	A.M.	P.M.
North-South Roadway:	SR-60 SBR	At Grade	2	20	20
East-West Roadway:	3rd Street	At Grade	4	20	20

A.M. Peak Hour Traffic Volumes



P.M. Peak Hour Traffic Volumes



Highest Traffic Volumes (Vehicles per Hour)

	A.M.		P.M.
N-S Road:	1,048	N-S Road:	709
E-W Road:	2,583	E-W Road:	2,597

Roadway CO Contributions and Concentrations

Emissions = (A x B x C) / 100,000[1]

	A_1	A_2	A_3	B	C			
	Reference CO Concentrations			Traffic	Emission	Estimated CO Concentrations		
Roadway	25 Feet	50 Feet	100 Feet	Volume	Factors[1]	25 Feet	50 Feet	100 Feet
A.M. Peak Traffic Hour								
North-South Road	2.7	2.2	1.7	1,048	5.52	0.16	0.13	0.10
East-West Road	7.0	5.4	3.8	2,583	5.52	1.00	0.77	0.54
P.M. Peak Traffic Hour								
North-South Road	2.7	2.2	1.7	709	5.52	0.11	0.09	0.07
East-West Road	7.0	5.4	3.8	2,597	5.52	1.00	0.77	0.54

[1] Methodology and emission factors from Bay Area Air Quality Management District *BAAQMD CEQA Guidelines* (1996).

Total Roadway CO Concentrations

Peak Hour Emissions = North-South Concentration + East-West Concentration + Background 1-hour Concentration[2]
8-Hour Emissions = ((Highest Peak Hour Concentration - Background 1-hour Concentration) x Persistence Factor) + Background 8-hour Concentration[2]

	A.M. Peak Hour	P.M. Peak Hour	8-Hour
25 Feet from Roadway Edge	6.3	6.2	4.6
50 Feet from Roadway Edge	6.0	6.0	4.4
100 Feet from Roadway Edge	5.7	5.7	4.3

[2] Methodology from Bay Area Air Quality Management District *BAAQMD CEQA Guidelines* (1996).

SIMPLIFIED CALINE4 CARBON MONOXIDE ANALYSIS

Project Number: 10537-00
Project Title: UC Riverside LRDP

Background Information

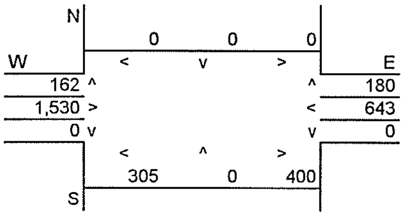
Nearest Air Monitoring Station measuring CO: Riverside-Rubidoux
Background 1-hour CO Concentration (ppm): 5.1
Background 8-hour CO Concentration (ppm): 3.2
Persistence Factor: 0.6
Analysis Year: 2010

Roadway Data

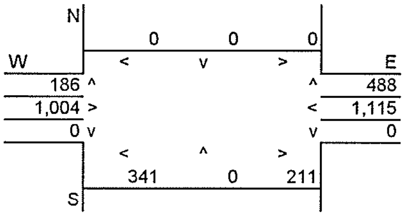
Intersection: Blaine St./SR-60 NBR
Analysis Condition: Future Plus Project Traffic Volumes (4-Lane Iowa Avenue Scenario)

			No. of	Average Speed	
		Roadway Type	Lanes	A.M.	P.M.
North-South Roadway:	SR-60 NBR	At Grade	2	20	20
East-West Roadway:	Blaine St.	At Grade	4	20	20

A.M. Peak Hour Traffic Volumes



P.M. Peak Hour Traffic Volumes



Highest Traffic Volumes (Vehicles per Hour)

	A.M.		P.M.
N-S Road:	705	N-S Road:	674
E-W Road:	2,753	E-W Road:	2,818

Roadway CO Contributions and Concentrations

Emissions = (A x B x C) / 100,000[1]

	A_1	A_2	A_3	B	C			
	Reference CO Concentrations			Traffic	Emission	Estimated CO Concentrations		
Roadway	25 Feet	50 Feet	100 Feet	Volume	Factors[1]	25 Feet	50 Feet	100 Feet
A.M. Peak Traffic Hour								
North-South Road	2.7	2.2	1.7	705	5.52	0.11	0.09	0.07
East-West Road	7.0	5.4	3.8	2,753	5.52	1.06	0.82	0.58
P.M. Peak Traffic Hour								
North-South Road	2.7	2.2	1.7	674	5.52	0.10	0.08	0.06
East-West Road	7.0	5.4	3.8	2,818	5.52	1.09	0.84	0.59

[1] Methodology and emission factors from Bay Area Air Quality Management District *BAAQMD CEQA Guidelines* (1996).

Total Roadway CO Concentrations

Peak Hour Emissions = North-South Concentration + East-West Concentration + Background 1-hour Concentration[2]

8-Hour Emissions = ((Highest Peak Hour Concentration - Background 1-hour Concentration) x Persistence Factor) + Background 8-hour Concentration[2]

	A.M. Peak Hour	P.M. Peak Hour	8-Hour
25 Feet from Roadway Edge	6.3	6.3	3.9
50 Feet from Roadway Edge	6.0	6.0	3.8
100 Feet from Roadway Edge	5.7	5.8	3.6

[2] Methodology from Bay Area Air Quality Management District *BAAQMD CEQA Guidelines* (1996).

SIMPLIFIED CALINE4 CARBON MONOXIDE ANALYSIS

Project Number: 10537-00
Project Title: UC Riverside LRDP

Background Information

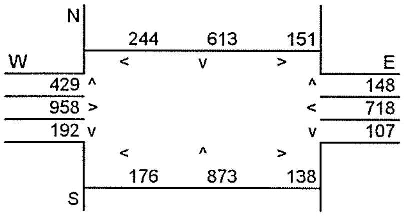
Nearest Air Monitoring Station measuring CO:	Riverside-Rubidoux
Background 1-hour CO Concentration (ppm):	5.1
Background 8-hour CO Concentration (ppm):	3.2
Persistence Factor:	0.6
Analysis Year:	2010

Roadway Data

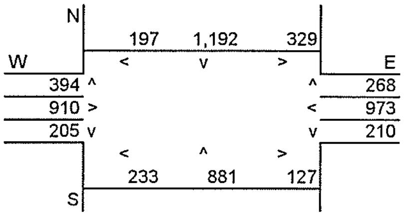
Intersection:	Blaine St./Iowa Ave.
Analysis Condition:	Future Plus Project Traffic Volumes (4-Lane Iowa Avenue Scenario)

		Roadway Type	No. of Lanes	Average Speed A.M.	Average Speed P.M.
North-South Roadway:	Iowa Ave.	At Grade	4	15	10
East-West Roadway:	Blaine St.	At Grade	4	15	10

A.M. Peak Hour Traffic Volumes



P.M. Peak Hour Traffic Volumes



Highest Traffic Volumes (Vehicles per Hour)

N-S Road:	2,458	N-S Road:	3,261
E-W Road:	2,717	E-W Road:	2,912

Roadway CO Contributions and Concentrations

Emissions = (A x B x C) / 100,000[1]

	A_1	A_2	A_3	B	C			
	Reference CO Concentrations			Traffic	Emission	Estimated CO Concentrations		
Roadway	25 Feet	50 Feet	100 Feet	Volume	Factors[1]	25 Feet	50 Feet	100 Feet
A.M. Peak Traffic Hour								
North-South Road	2.6	2.2	1.7	2,458	7.30	0.47	0.39	0.31
East-West Road	7.0	5.4	3.8	2,717	7.30	1.39	1.07	0.75
P.M. Peak Traffic Hour								
North-South Road	7.0	5.4	3.8	3,261	10.78	2.46	1.90	1.34
East-West Road	2.6	2.2	1.7	2,912	10.78	0.82	0.69	0.53

[1] Methodology and emission factors from Bay Area Air Quality Management District *BAAQMD CEQA Guidelines* (1996).

Total Roadway CO Concentrations

Peak Hour Emissions = North-South Concentration + East-West Concentration + Background 1-hour Concentration[2]

8-Hour Emissions = ((Highest Peak Hour Concentration - Background 1-hour Concentration) x Persistence Factor) + Background 8-hour Concentration[2]

	A.M. Peak Hour	P.M. Peak Hour	8-Hour
25 Feet from Roadway Edge	7.0	8.4	5.2
50 Feet from Roadway Edge	6.6	7.7	4.8
100 Feet from Roadway Edge	6.2	7.0	4.3

[2] Methodology from Bay Area Air Quality Management District *BAAQMD CEQA Guidelines* (1996).

SIMPLIFIED CALINE4 CARBON MONOXIDE ANALYSIS

Project Number: 10537-00
Project Title: UC Riverside LRDP

Background Information

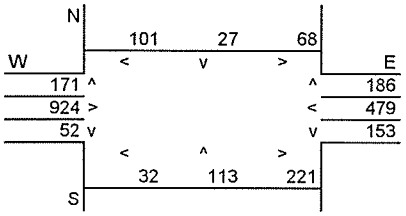
Nearest Air Monitoring Station measuring CO:	Riverside-Rubidoux
Background 1-hour CO Concentration (ppm):	5.1
Background 8-hour CO Concentration (ppm):	3.2
Persistence Factor:	0.6
Analysis Year:	2010

Roadway Data

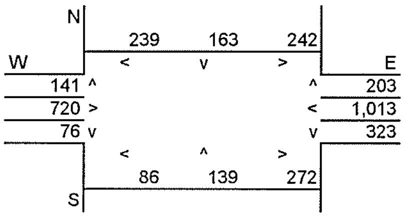
Intersection: Blaine St./Canyon Crest Dr.
Analysis Condition: Future Plus Project (4-Lane Iowa Avenue Scenario)

			No. of	Average Speed	
		Roadway Type	Lanes	A.M.	P.M.
North-South Roadway:	Canyon Crest Dr.	At Grade	2	20	15
East-West Roadway:	Blaine St.	At Grade	4	20	15

A.M. Peak Hour Traffic Volumes



P.M. Peak Hour Traffic Volumes



Highest Traffic Volumes (Vehicles per Hour)

N-S Road:	666	N-S Road:	1,127
E-W Road:	2,031	E-W Road:	2,773

Roadway CO Contributions and Concentrations

Emissions = (A x B x C) / 100,000[1]

	A_1	A_2	A_3	B	C			
	Reference CO Concentrations			Traffic	Emission	Estimated CO Concentrations		
Roadway	25 Feet	50 Feet	100 Feet	Volume	Factors[1]	25 Feet	50 Feet	100 Feet
A.M. Peak Traffic Hour								
North-South Road	2.7	2.2	1.7	666	5.52	0.10	0.08	0.06
East-West Road	7.0	5.4	3.8	2,031	5.52	0.78	0.61	0.43
P.M. Peak Traffic Hour								
North-South Road	2.7	2.2	1.7	1,127	7.30	0.22	0.18	0.14
East-West Road	7.0	5.4	3.8	2,773	7.30	1.42	1.09	0.77

[1] Methodology and emission factors from Bay Area Air Quality Management District *BAAQMD CEQA Guidelines* (1996).

Total Roadway CO Concentrations

Peak Hour Emissions = North-South Concentration + East-West Concentration + Background 1-hour Concentration[2]

8-Hour Emissions = ((Highest Peak Hour Concentration - Background 1-hour Concentration) x Persistence Factor) + Background 8-hour Concentration[2]

	A.M. Peak Hour	P.M. Peak Hour	8-Hour
25 Feet from Roadway Edge	6.0	6.7	4.2
50 Feet from Roadway Edge	5.8	6.4	4.0
100 Feet from Roadway Edge	5.6	6.0	3.7

[2] Methodology from Bay Area Air Quality Management District *BAAQMD CEQA Guidelines* (1996).

SIMPLIFIED CALINE4 CARBON MONOXIDE ANALYSIS

Project Number: 10537-00
Project Title: UC Riverside LRDP

Background Information

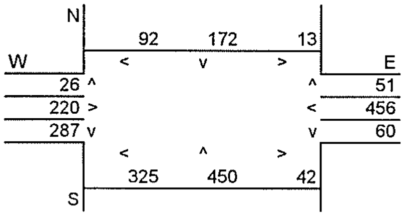
Nearest Air Monitoring Station measuring CO:	Riverside-Rubidoux
Background 1-hour CO Concentration (ppm):	5.1
Background 8-hour CO Concentration (ppm):	3.2
Persistence Factor:	0.6
Analysis Year:	2010

Roadway Data

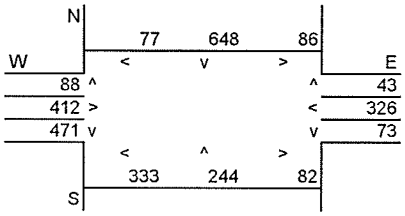
Intersection:	Blaine St./Watkins Dr.
Analysis Condition:	Future Plus Project Traffic Volumes (4-Lane Iowa Avenue Scenario)

			No. of	Average Speed	
		Roadway Type	Lanes	A.M.	P.M.
North-South Roadway:	Watkins Dr.	At Grade	2	20	15
East-West Roadway:	Blaine St.	At Grade	2	20	15

A.M. Peak Hour Traffic Volumes



P.M. Peak Hour Traffic Volumes



Highest Traffic Volumes (Vehicles per Hour)

N-S Road:	1,336	N-S Road:	1,851
E-W Road:	1,406	E-W Road:	1,707

Roadway CO Contributions and Concentrations

Emissions = (A x B x C) / 100,000[1]

	A_1	A_2	A_3	B	C			
	Reference CO Concentrations			Traffic	Emission	Estimated CO Concentrations		
Roadway	25 Feet	50 Feet	100 Feet	Volume	Factors[1]	25 Feet	50 Feet	100 Feet
A.M. Peak Traffic Hour								
North-South Road	2.7	2.2	1.7	1,336	5.52	0.20	0.16	0.13
East-West Road	7.6	5.7	4.0	1,406	5.52	0.59	0.44	0.31
P.M. Peak Traffic Hour								
North-South Road	7.6	5.7	4.0	1,851	7.30	1.03	0.77	0.54
East-West Road	2.7	2.2	1.7	1,707	7.30	0.34	0.27	0.21

[1] Methodology and emission factors from Bay Area Air Quality Management District *BAAQMD CEQA Guidelines* (1996).

Total Roadway CO Concentrations

Peak Hour Emissions = North-South Concentration + East-West Concentration + Background 1-hour Concentration[2]

8-Hour Emissions = ((Highest Peak Hour Concentration - Background 1-hour Concentration) x Persistence Factor) + Background 8-hour Concentration[2]

	A.M. Peak Hour	P.M. Peak Hour	8-Hour
25 Feet from Roadway Edge	5.9	6.5	4.0
50 Feet from Roadway Edge	5.7	6.1	3.8
100 Feet from Roadway Edge	5.5	5.9	3.7

[2] Methodology from Bay Area Air Quality Management District *BAAQMD CEQA Guidelines* (1996).

SIMPLIFIED CALINE4 CARBON MONOXIDE ANALYSIS

Project Number: 10537-00
Project Title: UC Riverside LRDP

Background Information

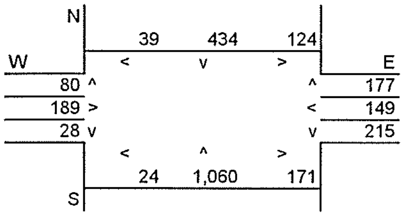
Nearest Air Monitoring Station measuring CO: Riverside-Rubidoux
Background 1-hour CO Concentration (ppm): 5.1
Background 8-hour CO Concentration (ppm): 3.2
Persistence Factor: 0.6
Analysis Year: 2010

Roadway Data

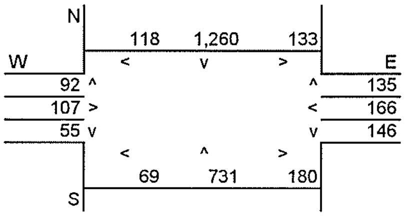
Intersection: Linden St./Chicago Ave
Analysis Condition: Future Plus Project Traffic Volumes (4-Lane Iowa Avenue Scenario)

		Roadway Type	No. of Lanes	Average Speed A.M.	Average Speed P.M.
North-South Roadway:	Chicago Ave.	At Grade	4	20	20
East-West Roadway:	Linden St.	At Grade	2	20	20

A.M. Peak Hour Traffic Volumes



P.M. Peak Hour Traffic Volumes



Highest Traffic Volumes (Vehicles per Hour)

	A.M.		P.M.
N-S Road:	1,932	N-S Road:	2,469
E-W Road:	1,025	E-W Road:	867

Roadway CO Contributions and Concentrations

Emissions = (A x B x C) / 100,000[1]

	A_1	A_2	A_3	B	C			
	Reference CO Concentrations			Traffic	Emission	Estimated CO Concentrations		
Roadway	25 Feet	50 Feet	100 Feet	Volume	Factors[1]	25 Feet	50 Feet	100 Feet
A.M. Peak Traffic Hour								
North-South Road	7.0	5.4	3.8	1,932	5.52	0.75	0.58	0.41
East-West Road	2.7	2.2	1.7	1,025	5.52	0.15	0.12	0.10
P.M. Peak Traffic Hour								
North-South Road	7.0	5.4	3.8	2,469	5.52	0.95	0.74	0.52
East-West Road	2.7	2.2	1.7	867	5.52	0.13	0.11	0.08

[1] Methodology and emission factors from Bay Area Air Quality Management District *BAAQMD CEQA Guidelines* (1996).

Total Roadway CO Concentrations

Peak Hour Emissions = North-South Concentration + East-West Concentration + Background 1-hour Concentration[2]
8-Hour Emissions = ((Highest Peak Hour Concentration - Background 1-hour Concentration) x Persistence Factor) + Background 8-hour Concentration[2]

	A.M. Peak Hour	P.M. Peak Hour	8-Hour
25 Feet from Roadway Edge	6.0	6.2	3.8
50 Feet from Roadway Edge	5.8	5.9	3.7
100 Feet from Roadway Edge	5.6	5.7	3.6

[2] Methodology from Bay Area Air Quality Management District *BAAQMD CEQA Guidelines* (1996).

SIMPLIFIED CALINE4 CARBON MONOXIDE ANALYSIS

Project Number: 10537-00
Project Title: UC Riverside LRDP

Background Information

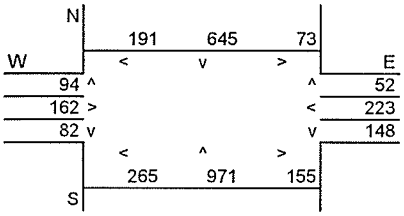
Nearest Air Monitoring Station measuring CO: Riverside-Rubidoux
Background 1-hour CO Concentration (ppm): 5.1
Background 8-hour CO Concentration (ppm): 3.2
Persistence Factor: 0.6
Analysis Year: 2010

Roadway Data

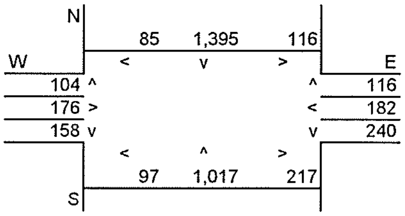
Intersection: Linden St./Iowa Ave.
Analysis Condition: Future Plus Project Traffic Volumes (4-Lane Iowa Avenue Scenario)

		Roadway Type	No. of Lanes	Average Speed A.M.	Average Speed P.M.
North-South Roadway:	Iowa Ave.	At Grade	4	20	20
East-West Roadway:	Linden St.	At Grade	2	20	20

A.M. Peak Hour Traffic Volumes



P.M. Peak Hour Traffic Volumes



Highest Traffic Volumes (Vehicles per Hour)

	A.M.		P.M.
N-S Road:	2,266	N-S Road:	3,124
E-W Road:	1,017	E-W Road:	1,047

Roadway CO Contributions and Concentrations

Emissions = (A x B x C) / 100,000[1]

Roadway	A_1 Reference CO Concentrations 25 Feet	A_2 50 Feet	A_3 100 Feet	B Traffic Volume	C Emission Factors[1]	Estimated CO Concentrations 25 Feet	50 Feet	100 Feet
A.M. Peak Traffic Hour								
North-South Road	7.0	5.4	3.8	2,266	5.52	0.88	0.68	0.48
East-West Road	2.7	2.2	1.7	1,017	5.52	0.15	0.12	0.10
P.M. Peak Traffic Hour								
North-South Road	7.0	5.4	3.8	3,124	5.52	1.21	0.93	0.66
East-West Road	2.7	2.2	1.7	1,047	5.52	0.16	0.13	0.10

[1] Methodology and emission factors from Bay Area Air Quality Management District *BAAQMD CEQA Guidelines* (1996).

Total Roadway CO Concentrations

Peak Hour Emissions = North-South Concentration + East-West Concentration + Background 1-hour Concentration[2]

8-Hour Emissions = ((Highest Peak Hour Concentration - Background 1-hour Concentration) x Persistence Factor) + Background 8-hour Concentration[2]

	A.M. Peak Hour	P.M. Peak Hour	8-Hour
25 Feet from Roadway Edge	6.1	6.5	4.0
50 Feet from Roadway Edge	5.9	6.2	3.8
100 Feet from Roadway Edge	5.7	5.9	3.7

[2] Methodology from Bay Area Air Quality Management District *BAAQMD CEQA Guidelines* (1996).

SIMPLIFIED CALINE4 CARBON MONOXIDE ANALYSIS

Project Number: 10537-00
Project Title: UC Riverside LRDP

Background Information

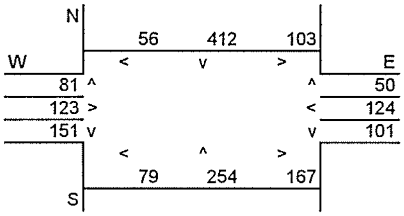
Nearest Air Monitoring Station measuring CO: Riverside-Rubidoux
Background 1-hour CO Concentration (ppm): 5.1
Background 8-hour CO Concentration (ppm): 3.2
Persistence Factor: 0.6
Analysis Year: 2010

Roadway Data

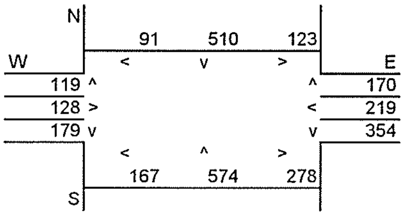
Intersection: Linden St./Canyon Crest Dr.
Analysis Condition: Future Plus Project Traffic Volumes (4-Lane Iowa Avenue Scenario)

		Roadway Type	No. of Lanes	Average Speed A.M.	Average Speed P.M.
North-South Roadway:	Canyon Crest Dr.	At Grade	4	20	20
East-West Roadway:	Linden St.	At Grade	2	20	20

A.M. Peak Hour Traffic Volumes



P.M. Peak Hour Traffic Volumes



Highest Traffic Volumes (Vehicles per Hour)

	A.M.		P.M.
N-S Road:	1,164	N-S Road:	2,062
E-W Road:	668	E-W Road:	1,272

Roadway CO Contributions and Concentrations

Emissions = (A x B x C) / 100,000[1]

	A_1	A_2	A_3	B	C			
	Reference CO Concentrations			Traffic	Emission	Estimated CO Concentrations		
Roadway	25 Feet	50 Feet	100 Feet	Volume	Factors[1]	25 Feet	50 Feet	100 Feet
A.M. Peak Traffic Hour								
North-South Road	7.0	5.4	3.8	1,164	5.52	0.45	0.35	0.24
East-West Road	2.7	2.2	1.7	668	5.52	0.10	0.08	0.06
P.M. Peak Traffic Hour								
North-South Road	7.0	5.4	3.8	2,062	5.52	0.80	0.61	0.43
East-West Road	2.7	2.2	1.7	1,272	5.52	0.19	0.15	0.12

[1] Methodology and emission factors from Bay Area Air Quality Management District *BAAQMD CEQA Guidelines* (1996).

Total Roadway CO Concentrations

Peak Hour Emissions = North-South Concentration + East-West Concentration + Background 1-hour Concentration[2]
8-Hour Emissions = ((Highest Peak Hour Concentration - Background 1-hour Concentration) x Persistence Factor) + Background 8-hour Concentration[2]

	A.M. Peak Hour	P.M. Peak Hour	8-Hour
25 Feet from Roadway Edge	5.6	6.1	3.8
50 Feet from Roadway Edge	5.5	5.9	3.7
100 Feet from Roadway Edge	5.4	5.7	3.5

[2] Methodology from Bay Area Air Quality Management District *BAAQMD CEQA Guidelines* (1996).

SIMPLIFIED CALINE4 CARBON MONOXIDE ANALYSIS

Project Number: 10537-00
Project Title: UC Riverside LRDP

Background Information

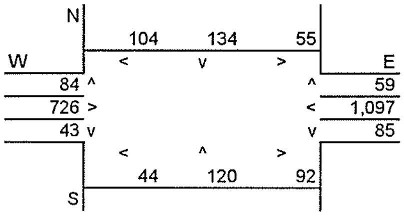
Nearest Air Monitoring Station measuring CO: Riverside-Rubidoux
Background 1-hour CO Concentration (ppm): 5.1
Background 8-hour CO Concentration (ppm): 3.2
Persistence Factor: 0.6
Analysis Year: 2010

Roadway Data

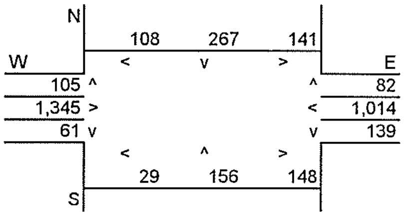
Intersection: University Ave./Kansas Ave.
Analysis Condition: Future Plus Project Traffic Volumes (4-Lane Iowa Avenue Scenario)

			No. of	Average Speed	
		Roadway Type	Lanes	A.M.	P.M.
North-South Roadway:	Kansas Ave.	At Grade	2	20	20
East-West Roadway:	University Ave.	At Grade	4	20	20

A.M. Peak Hour Traffic Volumes



P.M. Peak Hour Traffic Volumes



Highest Traffic Volumes (Vehicles per Hour)

N-S Road:	556	N-S Road:	859
E-W Road:	2,114	E-W Road:	2,869

Roadway CO Contributions and Concentrations

Emissions = (A x B x C) / 100,000[1]

	A_1	A_2	A_3	B	C			
	Reference CO Concentrations			Traffic	Emission	Estimated CO Concentrations		
Roadway	25 Feet	50 Feet	100 Feet	Volume	Factors[1]	25 Feet	50 Feet	100 Feet
A.M. Peak Traffic Hour								
North-South Road	2.7	2.2	1.7	556	5.52	0.08	0.07	0.05
East-West Road	7.0	5.4	3.8	2,114	5.52	0.82	0.63	0.44
P.M. Peak Traffic Hour								
North-South Road	2.7	2.2	1.7	859	5.52	0.13	0.10	0.08
East-West Road	7.0	5.4	3.8	2,869	5.52	1.11	0.86	0.60

[1] Methodology and emission factors from Bay Area Air Quality Management District *BAAQMD CEQA Guidelines* (1996).

Total Roadway CO Concentrations

Peak Hour Emissions = North-South Concentration + East-West Concentration + Background 1-hour Concentration[2]

8-Hour Emissions = ((Highest Peak Hour Concentration - Background 1-hour Concentration) x Persistence Factor) + Background 8-hour Concentration[2]

	A.M. Peak Hour	P.M. Peak Hour	8-Hour
25 Feet from Roadway Edge	6.0	6.3	3.9
50 Feet from Roadway Edge	5.8	6.1	3.8
100 Feet from Roadway Edge	5.6	5.8	3.6

[2] Methodology from Bay Area Air Quality Management District *BAAQMD CEQA Guidelines* (1996).

SIMPLIFIED CALINE4 CARBON MONOXIDE ANALYSIS

Project Number: 10537-00
Project Title: UC Riverside LRDP

Background Information

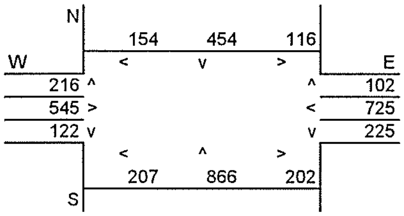
Nearest Air Monitoring Station measuring CO:	Riverside-Rubidoux
Background 1-hour CO Concentration (ppm):	5.1
Background 8-hour CO Concentration (ppm):	3.2
Persistence Factor:	0.6
Analysis Year:	2010

Roadway Data

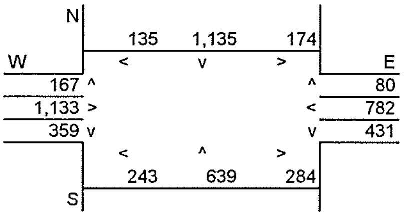
Intersection:	University Ave./Chicago Ave.
Analysis Condition:	Future Plus Project Traffic Volumes (4-Lane Iowa Avenue Scenario)

			No. of	Average Speed	
		Roadway Type	Lanes	A.M.	P.M.
North-South Roadway:	Chicago Ave.	At Grade	4	20	15
East-West Roadway:	University Ave.	At Grade	4	20	15

A.M. Peak Hour Traffic Volumes



P.M. Peak Hour Traffic Volumes



Highest Traffic Volumes (Vehicles per Hour)

N-S Road:	2,076	N-S Road:	3,091
E-W Road:	1,969	E-W Road:	2,884

Roadway CO Contributions and Concentrations

Emissions = (A x B x C) / 100,000[1]

	A_1	A_2	A_3	B	C			
	Reference CO Concentrations			Traffic	Emission	Estimated CO Concentrations		
Roadway	25 Feet	50 Feet	100 Feet	Volume	Factors[1]	25 Feet	50 Feet	100 Feet
A.M. Peak Traffic Hour								
North-South Road	7.0	5.4	3.8	2,076	5.52	0.80	0.62	0.44
East-West Road	2.6	2.2	1.7	1,969	5.52	0.28	0.24	0.18
P.M. Peak Traffic Hour								
North-South Road	7.0	5.4	3.8	3,091	7.30	1.58	1.22	0.86
East-West Road	2.6	2.2	1.7	2,884	7.30	0.55	0.46	0.36

[1] Methodology and emission factors from Bay Area Air Quality Management District *BAAQMD CEQA Guidelines* (1996).

Total Roadway CO Concentrations

Peak Hour Emissions = North-South Concentration + East-West Concentration + Background 1-hour Concentration[2]

8-Hour Emissions = ((Highest Peak Hour Concentration - Background 1-hour Concentration) x Persistence Factor) + Background 8-hour Concentration[2]

	A.M. Peak Hour	P.M. Peak Hour	8-Hour
25 Feet from Roadway Edge	6.2	7.2	4.5
50 Feet from Roadway Edge	6.0	6.8	4.2
100 Feet from Roadway Edge	5.7	6.3	3.9

[2] Methodology from Bay Area Air Quality Management District *BAAQMD CEQA Guidelines* (1996).

SIMPLIFIED CALINE4 CARBON MONOXIDE ANALYSIS

Project Number: 10537-00
Project Title: UC Riverside LRDP

Background Information

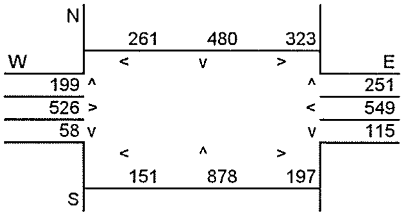
Nearest Air Monitoring Station measuring CO:	Riverside-Rubidoux
Background 1-hour CO Concentration (ppm):	5.1
Background 8-hour CO Concentration (ppm):	3.2
Persistence Factor:	0.6
Analysis Year:	2010

Roadway Data

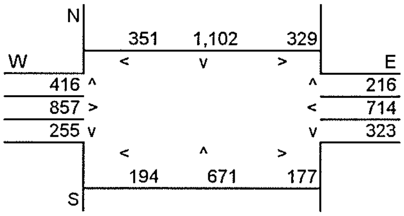
Intersection:	University Ave./Iowa Ave.
Analysis Condition:	Future Plus Project Traffic Volumes (4-Lane Iowa Avenue Scenario)

			No. of	Average Speed	
		Roadway Type	Lanes	A.M.	P.M.
North-South Roadway:	Iowa Ave.	At Grade	4	15	10
East-West Roadway:	University Ave.	At Grade	4	15	10

A.M. Peak Hour Traffic Volumes



P.M. Peak Hour Traffic Volumes



Highest Traffic Volumes (Vehicles per Hour)

N-S Road:	2,392	N-S Road:	3,085
E-W Road:	1,961	E-W Road:	2,787

Roadway CO Contributions and Concentrations

Emissions = (A x B x C) / 100,000[1]

	A_1	A_2	A_3	B	C			
	Reference CO Concentrations			Traffic	Emission	Estimated CO Concentrations		
Roadway	25 Feet	50 Feet	100 Feet	Volume	Factors[1]	25 Feet	50 Feet	100 Feet
A.M. Peak Traffic Hour								
North-South Road	7.0	5.4	3.8	2,392	7.30	1.22	0.94	0.66
East-West Road	2.6	2.2	1.7	1,961	7.30	0.37	0.31	0.24
P.M. Peak Traffic Hour								
North-South Road	7.0	5.4	3.8	3,085	10.78	2.33	1.80	1.26
East-West Road	2.6	2.2	1.7	2,787	10.78	0.78	0.66	0.51

[1] Methodology and emission factors from Bay Area Air Quality Management District *BAAQMD CEQA Guidelines* (1996).

Total Roadway CO Concentrations

Peak Hour Emissions = North-South Concentration + East-West Concentration + Background 1-hour Concentration[2]

8-Hour Emissions = ((Highest Peak Hour Concentration - Background 1-hour Concentration) x Persistence Factor) + Background 8-hour Concentration[2]

	A.M. Peak Hour	P.M. Peak Hour	8-Hour
25 Feet from Roadway Edge	6.7	8.2	5.1
50 Feet from Roadway Edge	6.4	7.6	4.7
100 Feet from Roadway Edge	6.0	6.9	4.3

[2] Methodology from Bay Area Air Quality Management District *BAAQMD CEQA Guidelines* (1996).

SIMPLIFIED CALINE4 CARBON MONOXIDE ANALYSIS

Project Number: 10537-00
Project Title: UC Riverside LRDP

Background Information

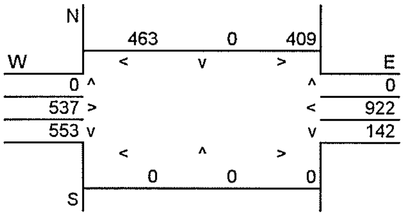
Nearest Air Monitoring Station measuring CO: Riverside-Rubidoux
Background 1-hour CO Concentration (ppm): 5.1
Background 8-hour CO Concentration (ppm): 3.2
Persistence Factor: 0.6
Analysis Year: 2010

Roadway Data

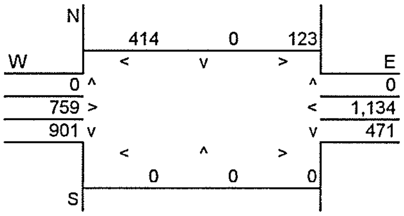
Intersection: University Ave./SR-60 SBR
Analysis Condition: Future Plus Project Traffic Volumes (4-Lane Iowa Avenue Scenario)

		Roadway Type	No. of Lanes	Average Speed A.M.	Average Speed P.M.
North-South Roadway:	SR-60 SBR	At Grade	2	20	20
East-West Roadway:	University Ave.	At Grade	4	20	20

A.M. Peak Hour Traffic Volumes



P.M. Peak Hour Traffic Volumes



Highest Traffic Volumes (Vehicles per Hour)

N-S Road:	872	N-S Road:	1,372
E-W Road:	2,475	E-W Road:	3,208

Roadway CO Contributions and Concentrations

Emissions = (A x B x C) / 100,000[1]

Roadway	A_1 Reference CO Concentrations 25 Feet	A_2 50 Feet	A_3 100 Feet	B Traffic Volume	C Emission Factors[1]	Estimated CO Concentrations 25 Feet	50 Feet	100 Feet
A.M. Peak Traffic Hour								
North-South Road	2.7	2.2	1.7	872	5.52	0.13	0.11	0.08
East-West Road	7.0	5.4	3.8	2,475	5.52	0.96	0.74	0.52
P.M. Peak Traffic Hour								
North-South Road	2.7	2.2	1.7	1,372	5.52	0.20	0.17	0.13
East-West Road	7.0	5.4	3.8	3,208	5.52	1.24	0.96	0.67

[1] Methodology and emission factors from Bay Area Air Quality Management District *BAAQMD CEQA Guidelines* (1996).

Total Roadway CO Concentrations

Peak Hour Emissions = North-South Concentration + East-West Concentration + Background 1-hour Concentration[2]
8-Hour Emissions = ((Highest Peak Hour Concentration - Background 1-hour Concentration) x Persistence Factor) + Background 8-hour Concentration[2]

	A.M. Peak Hour	P.M. Peak Hour	8-Hour
25 Feet from Roadway Edge	6.2	6.5	4.1
50 Feet from Roadway Edge	5.9	6.2	3.9
100 Feet from Roadway Edge	5.7	5.9	3.7

[2] Methodology from Bay Area Air Quality Management District *BAAQMD CEQA Guidelines* (1996).

SIMPLIFIED CALINE4 CARBON MONOXIDE ANALYSIS

Project Number: 10537-00
Project Title: UC Riverside LRDP

Background Information

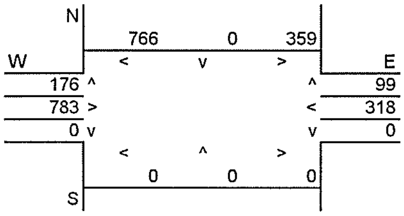
Nearest Air Monitoring Station measuring CO: Riverside-Rubidoux
Background 1-hour CO Concentration (ppm): 5.1
Background 8-hour CO Concentration (ppm): 3.2
Persistence Factor: 0.6
Analysis Year: 2010

Roadway Data

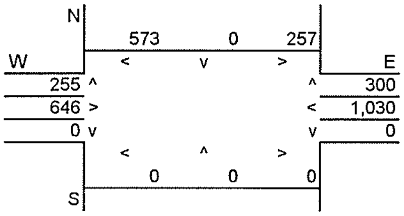
Intersection: University Ave./SR-60 NBR
Analysis Condition: Future Plus Project Traffic Volumes (4-Lane Iowa Avenue Scenario)

		Roadway Type	No. of Lanes	Average Speed A.M.	Average Speed P.M.
North-South Roadway:	SR-60 NBR	At Grade	2	20	15
East-West Roadway:	University Ave.	At Grade	4	20	15

A.M. Peak Hour Traffic Volumes



P.M. Peak Hour Traffic Volumes



Highest Traffic Volumes (Vehicles per Hour)

	A.M.		P.M.
N-S Road:	1,400	N-S Road:	1,385
E-W Road:	2,043	E-W Road:	2,504

Roadway CO Contributions and Concentrations

Emissions = (A x B x C) / 100,000[1]

	A_1	A_2	A_3	B	C			
	Reference CO Concentrations			Traffic	Emission	Estimated CO Concentrations		
Roadway	25 Feet	50 Feet	100 Feet	Volume	Factors[1]	25 Feet	50 Feet	100 Feet
A.M. Peak Traffic Hour								
North-South Road	2.7	2.2	1.7	1,400	5.52	0.21	0.17	0.13
East-West Road	7.0	5.4	3.8	2,043	5.52	0.79	0.61	0.43
P.M. Peak Traffic Hour								
North-South Road	2.7	2.2	1.7	1,385	7.30	0.27	0.22	0.17
East-West Road	7.0	5.4	3.8	2,504	7.30	1.28	0.99	0.69

[1] Methodology and emission factors from Bay Area Air Quality Management District *BAAQMD CEQA Guidelines* (1996).

Total Roadway CO Concentrations

Peak Hour Emissions = North-South Concentration + East-West Concentration + Background 1-hour Concentration[2]

8-Hour Emissions = ((Highest Peak Hour Concentration - Background 1-hour Concentration) x Persistence Factor) + Background 8-hour Concentration[2]

	A.M. Peak Hour	P.M. Peak Hour	8-Hour
25 Feet from Roadway Edge	6.1	6.7	4.1
50 Feet from Roadway Edge	5.9	6.3	3.9
100 Feet from Roadway Edge	5.7	6.0	3.7

[2] Methodology from Bay Area Air Quality Management District *BAAQMD CEQA Guidelines* (1996).

SIMPLIFIED CALINE4 CARBON MONOXIDE ANALYSIS

Project Number: 10537-00
Project Title: UC Riverside LRDP

Background Information

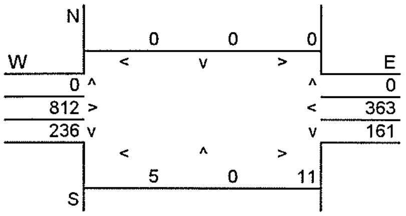
Nearest Air Monitoring Station measuring CO:	Riverside-Rubidoux
Background 1-hour CO Concentration (ppm):	9.0
Background 8-hour CO Concentration (ppm):	4.3
Persistence Factor:	0.6
Analysis Year:	2010

Roadway Data

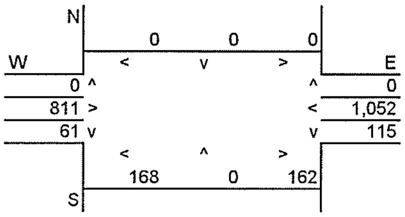
Intersection: University Ave./Campus Dr.
Analysis Condition: Future Plus Project Traffic Volumes (4-Lane Iowa Avenue Scenario)

		Roadway Type	No. of Lanes	Average Speed A.M.	Average Speed P.M.
North-South Roadway:	Campus Dr.	At Grade	2	10	10
East-West Roadway:	University Ave.	At Grade	4	20	20

A.M. Peak Hour Traffic Volumes



P.M. Peak Hour Traffic Volumes



Highest Traffic Volumes (Vehicles per Hour)

N-S Road:	413	N-S Road:	506
E-W Road:	1,416	E-W Road:	2,140

Roadway CO Contributions and Concentrations

Emissions = (A x B x C) / 100,000[1]

Roadway	A_1 Reference CO Concentrations 25 Feet	A_2 50 Feet	A_3 100 Feet	B Traffic Volume	C Emission Factors[1]	Estimated CO Concentrations 25 Feet	50 Feet	100 Feet
A.M. Peak Traffic Hour								
North-South Road	2.7	2.2	1.7	413	10.78	0.12	0.10	0.08
East-West Road	7.0	5.4	3.8	1,416	5.52	0.55	0.42	0.30
P.M. Peak Traffic Hour								
North-South Road	2.7	2.2	1.7	506	10.78	0.15	0.12	0.09
East-West Road	7.0	5.4	3.8	2,140	5.52	0.83	0.64	0.45

[1] Methodology and emission factors from Bay Area Air Quality Management District *BAAQMD CEQA Guidelines* (1996).

Total Roadway CO Concentrations

Peak Hour Emissions = North-South Concentration + East-West Concentration + Background 1-hour Concentration[2]

8-Hour Emissions = ((Highest Peak Hour Concentration - Background 1-hour Concentration) x Persistence Factor) + Background 8-hour Concentration[2]

	A.M. Peak Hour	P.M. Peak Hour	8-Hour
25 Feet from Roadway Edge	9.7	10.0	4.9
50 Feet from Roadway Edge	9.5	9.8	4.8
100 Feet from Roadway Edge	9.4	9.5	4.6

[2] Methodology from Bay Area Air Quality Management District *BAAQMD CEQA Guidelines* (1996).

SIMPLIFIED CALINE4 CARBON MONOXIDE ANALYSIS

Project Number:	10537-00
Project Title:	UC Riverside LRDP

Background Information

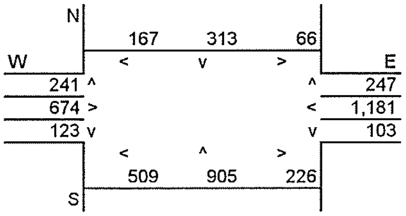
Nearest Air Monitoring Station measuring CO:	Riverside-Rubidoux
Background 1-hour CO Concentration (ppm):	9.0
Background 8-hour CO Concentration (ppm):	4.3
Persistence Factor:	0.6
Analysis Year:	2010

Roadway Data

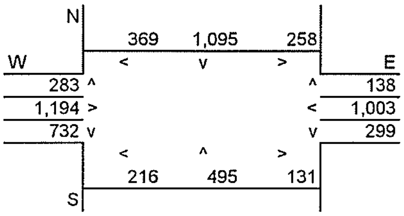
Intersection:	Martin Luther King Blvd./Chicago Ave.
Analysis Condition:	Future Plus Project Traffic Volumes (4-Lane Iowa Avenue Scenario)

			No. of	Average Speed	
		Roadway Type	Lanes	A.M.	P.M.
North-South Roadway:	Chicago Ave.	At Grade	4	15	10
East-West Roadway:	Martin Luther King Blvd.	At Grade	4	15	10

A.M. Peak Hour Traffic Volumes



P.M. Peak Hour Traffic Volumes



Highest Traffic Volumes (Vehicles per Hour)

N-S Road:	2,179	N-S Road:	2,968
E-W Road:	2,895	E-W Road:	3,797

Roadway CO Contributions and Concentrations

Emissions = (A x B x C) / 100,000[1]

	A_1	A_2	A_3	B	C			
	Reference CO Concentrations			Traffic	Emission	Estimated CO Concentrations		
Roadway	25 Feet	50 Feet	100 Feet	Volume	Factors[1]	25 Feet	50 Feet	100 Feet
A.M. Peak Traffic Hour								
North-South Road	2.6	2.2	1.7	2,179	7.30	0.41	0.35	0.27
East-West Road	7.0	5.4	3.8	2,895	7.30	1.48	1.14	0.80
P.M. Peak Traffic Hour								
North-South Road	2.6	2.2	1.7	2,968	10.78	0.83	0.70	0.54
East-West Road	7.0	5.4	3.8	3,797	10.78	2.87	2.21	1.56

[1] Methodology and emission factors from Bay Area Air Quality Management District *BAAQMD CEQA Guidelines* (1996).

Total Roadway CO Concentrations

Peak Hour Emissions = North-South Concentration + East-West Concentration + Background 1-hour Concentration[2]

8-Hour Emissions = ((Highest Peak Hour Concentration - Background 1-hour Concentration) x Persistence Factor) + Background 8-hour Concentration[2]

	A.M. Peak Hour	P.M. Peak Hour	8-Hour
25 Feet from Roadway Edge	10.9	12.7	6.5
50 Feet from Roadway Edge	10.5	11.9	6.0
100 Feet from Roadway Edge	10.1	11.1	5.6

[2] Methodology from Bay Area Air Quality Management District *BAAQMD CEQA Guidelines* (1996).

SIMPLIFIED CALINE4 CARBON MONOXIDE ANALYSIS

Project Number: 10537-00
Project Title: UC Riverside LRDP

Background Information

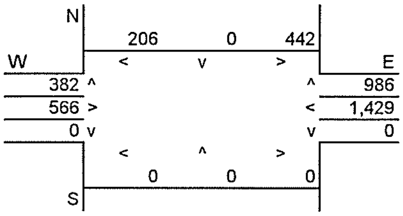
Nearest Air Monitoring Station measuring CO: Riverside-Rubidoux
Background 1-hour CO Concentration (ppm): 5.1
Background 8-hour CO Concentration (ppm): 3.2
Persistence Factor: 0.6
Analysis Year: 2010

Roadway Data

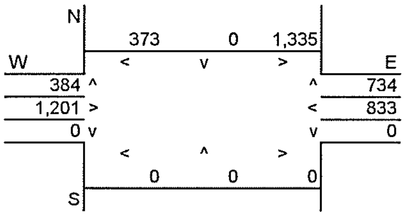
Intersection: Martin Luther King Blvd./Iowa Ave.
Analysis Condition: Future Plus Project Traffic Volumes (4-Lane Iowa Avenue Scenario)

		Roadway Type	No. of Lanes	Average Speed A.M.	Average Speed P.M.
North-South Roadway:	Iowa Ave.	At Grade	4	20	20
East-West Roadway:	Martin Luther King Blvd.	At Grade	4	25	15

A.M. Peak Hour Traffic Volumes



P.M. Peak Hour Traffic Volumes



Highest Traffic Volumes (Vehicles per Hour)

	A.M.		P.M.
N-S Road:	2,016	N-S Road:	2,826
E-W Road:	3,423	E-W Road:	4,103

Roadway CO Contributions and Concentrations

Emissions = (A x B x C) / 100,000[1]

	A_1	A_2	A_3	B	C			
	Reference CO Concentrations			Traffic	Emission	Estimated CO Concentrations		
Roadway	25 Feet	50 Feet	100 Feet	Volume	Factors[1]	25 Feet	50 Feet	100 Feet
A.M. Peak Traffic Hour								
North-South Road	2.6	2.2	1.7	2,016	5.52	0.29	0.24	0.19
East-West Road	7.0	5.4	3.8	3,423	4.46	1.07	0.82	0.58
P.M. Peak Traffic Hour								
North-South Road	2.6	2.2	1.7	2,826	5.52	0.41	0.34	0.27
East-West Road	7.0	5.4	3.8	4,103	7.30	2.10	1.62	1.14

[1] Methodology and emission factors from Bay Area Air Quality Management District *BAAQMD CEQA Guidelines* (1996).

Total Roadway CO Concentrations

Peak Hour Emissions = North-South Concentration + East-West Concentration + Background 1-hour Concentration[2]

8-Hour Emissions = ((Highest Peak Hour Concentration - Background 1-hour Concentration) x Persistence Factor) + Background 8-hour Concentration[2]

	A.M. Peak Hour	P.M. Peak Hour	8-Hour
25 Feet from Roadway Edge	6.5	7.6	4.7
50 Feet from Roadway Edge	6.2	7.1	4.4
100 Feet from Roadway Edge	5.9	6.5	4.0

[2] Methodology from Bay Area Air Quality Management District *BAAQMD CEQA Guidelines* (1996).

SIMPLIFIED CALINE4 CARBON MONOXIDE ANALYSIS

Project Number: 10537-00
Project Title: UC Riverside LRDP

Background Information

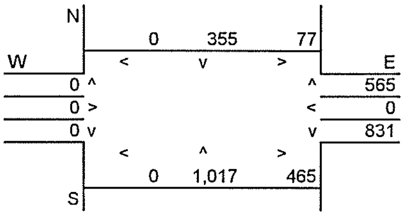
Nearest Air Monitoring Station measuring CO:	Riverside-Rubidoux
Background 1-hour CO Concentration (ppm):	5.1
Background 8-hour CO Concentration (ppm):	3.2
Persistence Factor:	0.6
Analysis Year:	2010

Roadway Data

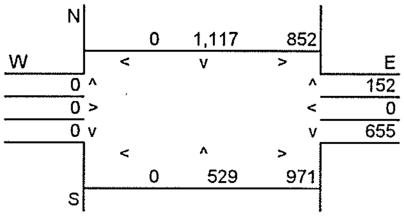
Intersection: Central Ave./Chicago Ave.
Analysis Condition: Future Plus Project Traffic Volumes (4-Lane Iowa Avenue Scenario)

		Roadway Type	No. of Lanes	Average Speed A.M.	Average Speed P.M.
North-South Roadway:	Chicago Ave.	At Grade	4	20	15
East-West Roadway:	Central Ave.	At Grade	4	25	15

A.M. Peak Hour Traffic Volumes



P.M. Peak Hour Traffic Volumes



Highest Traffic Volumes (Vehicles per Hour)

	A.M.		P.M.
N-S Road:	2,668	N-S Road:	3,272
E-W Road:	1,938	E-W Road:	2,630

Roadway CO Contributions and Concentrations

Emissions = (A x B x C) / 100,000[1]

Roadway	A_1 Reference CO Concentrations 25 Feet	A_2 50 Feet	A_3 100 Feet	B Traffic Volume	C Emission Factors[1]	Estimated CO Concentrations 25 Feet	50 Feet	100 Feet
A.M. Peak Traffic Hour								
North-South Road	7.0	5.4	3.8	2,668	5.52	1.03	0.80	0.56
East-West Road	2.6	2.2	1.7	1,938	4.46	0.22	0.19	0.15
P.M. Peak Traffic Hour								
North-South Road	7.0	5.4	3.8	3,272	7.30	1.67	1.29	0.91
East-West Road	2.6	2.2	1.7	2,630	7.30	0.50	0.42	0.33

[1] Methodology and emission factors from Bay Area Air Quality Management District *BAAQMD CEQA Guidelines* (1996).

Total Roadway CO Concentrations

Peak Hour Emissions = North-South Concentration + East-West Concentration + Background 1-hour Concentration[2]

8-Hour Emissions = ((Highest Peak Hour Concentration - Background 1-hour Concentration) x Persistence Factor) + Background 8-hour Concentration[2]

	A.M. Peak Hour	P.M. Peak Hour	8-Hour
25 Feet from Roadway Edge	6.4	7.3	4.5
50 Feet from Roadway Edge	6.1	6.8	4.2
100 Feet from Roadway Edge	5.8	6.3	3.9

[2] Methodology from Bay Area Air Quality Management District *BAAQMD CEQA Guidelines* (1996).

SIMPLIFIED CALINE4 CARBON MONOXIDE ANALYSIS

Project Number: 10537-00
Project Title: UC Riverside LRDP

Background Information

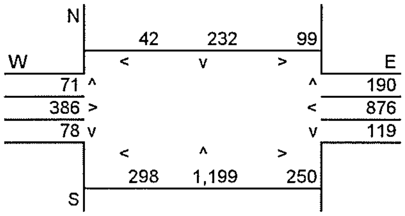
Nearest Air Monitoring Station measuring CO:	Riverside-Rubidoux
Background 1-hour CO Concentration (ppm):	5.1
Background 8-hour CO Concentration (ppm):	3.2
Persistence Factor:	0.6
Analysis Year:	2010

Roadway Data

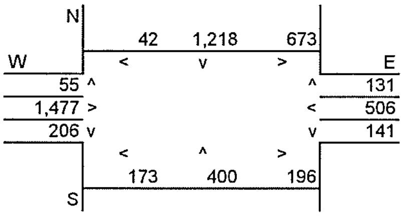
Intersection: Central Ave./Canyon Crest Dr.
Analysis Condition: Future Plus Project Traffic Volumes (4-Lane Iowa Avenue Scenario)

			No. of	Average Speed	
		Roadway Type	Lanes	A.M.	P.M.
North-South Roadway:	Canyon Crest Dr.	At Grade	4	15	10
East-West Roadway:	Central Ave.	At Grade	4	15	10

A.M. Peak Hour Traffic Volumes



P.M. Peak Hour Traffic Volumes



Highest Traffic Volumes (Vehicles per Hour)

N-S Road:	2,176	N-S Road:	2,519
E-W Road:	1,920	E-W Road:	3,124

Roadway CO Contributions and Concentrations

Emissions = (A x B x C) / 100,000[1]

	A_1	A_2	A_3	B	C			
	Reference CO Concentrations			Traffic	Emission	Estimated CO Concentrations		
Roadway	25 Feet	50 Feet	100 Feet	Volume	Factors[1]	25 Feet	50 Feet	100 Feet
A.M. Peak Traffic Hour								
North-South Road	7.0	5.4	3.8	2,176	7.30	1.11	0.86	0.60
East-West Road	2.6	2.2	1.7	1,920	7.30	0.36	0.31	0.24
P.M. Peak Traffic Hour								
North-South Road	2.6	2.2	1.7	2,519	10.78	0.71	0.60	0.46
East-West Road	7.0	5.4	3.8	3,124	10.78	2.36	1.82	1.28

[1] Methodology and emission factors from Bay Area Air Quality Management District *BAAQMD CEQA Guidelines* (1996).

Total Roadway CO Concentrations

Peak Hour Emissions = North-South Concentration + East-West Concentration + Background 1-hour Concentration[2]

8-Hour Emissions = ((Highest Peak Hour Concentration - Background 1-hour Concentration) x Persistence Factor) + Background 8-hour Concentration[2]

	A.M. Peak Hour	P.M. Peak Hour	8-Hour
25 Feet from Roadway Edge	6.6	8.2	5.0
50 Feet from Roadway Edge	6.3	7.5	4.6
100 Feet from Roadway Edge	5.9	6.8	4.2

[2] Methodology from Bay Area Air Quality Management District *BAAQMD CEQA Guidelines* (1996).

SIMPLIFIED CALINE4 CARBON MONOXIDE ANALYSIS

Project Number: 10537-00
Project Title: UC Riverside LRDP

Background Information

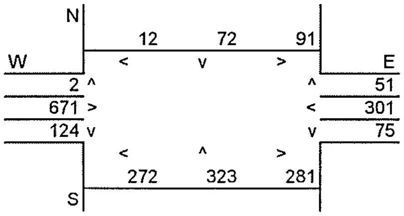
Nearest Air Monitoring Station measuring CO:	Riverside-Rubidoux
Background 1-hour CO Concentration (ppm):	5.1
Background 8-hour CO Concentration (ppm):	3.2
Persistence Factor:	0.6
Analysis Year:	2010

Roadway Data

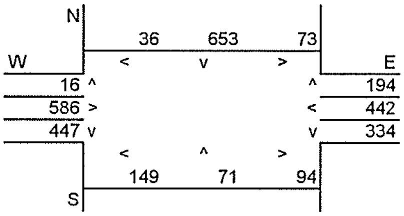
Intersection:	Central Ave./Box Springs Blvd
Analysis Condition:	Future Plus Project Traffic Volumes (4-Lane Iowa Avenue Scenario)

		Roadway Type	No. of Lanes	Average Speed A.M.	Average Speed P.M.
North-South Roadway:	Box Springs Blvd	At Grade	2	20	10
East-West Roadway:	Central Ave.	At Grade	4	25	10

A.M. Peak Hour Traffic Volumes



P.M. Peak Hour Traffic Volumes



Highest Traffic Volumes (Vehicles per Hour)

N-S Road:	1,147	N-S Road:	1,748
E-W Road:	1,470	E-W Road:	1,723

Roadway CO Contributions and Concentrations

Emissions = (A x B x C) / 100,000[1]

Roadway	A_1 Reference CO Concentrations 25 Feet	A_2 50 Feet	A_3 100 Feet	B Traffic Volume	C Emission Factors[1]	Estimated CO Concentrations 25 Feet	50 Feet	100 Feet
A.M. Peak Traffic Hour								
North-South Road	2.7	2.2	1.7	1,147	5.52	0.17	0.14	0.11
East-West Road	7.0	5.4	3.8	1,470	4.46	0.46	0.35	0.25
P.M. Peak Traffic Hour								
North-South Road	7.6	5.7	4.0	1,748	10.78	1.43	1.07	0.75
East-West Road	2.6	2.2	1.7	1,723	10.78	0.48	0.41	0.32

[1] Methodology and emission factors from Bay Area Air Quality Management District *BAAQMD CEQA Guidelines* (1996).

Total Roadway CO Concentrations

Peak Hour Emissions = North-South Concentration + East-West Concentration + Background 1-hour Concentration[2]

8-Hour Emissions = ((Highest Peak Hour Concentration - Background 1-hour Concentration) x Persistence Factor) + Background 8-hour Concentration[2]

	A.M. Peak Hour	P.M. Peak Hour	8-Hour
25 Feet from Roadway Edge	5.7	7.0	4.3
50 Feet from Roadway Edge	5.6	6.6	4.1
100 Feet from Roadway Edge	5.5	6.2	3.8

[2] Methodology from Bay Area Air Quality Management District *BAAQMD CEQA Guidelines* (1996).

SIMPLIFIED CALINE4 CARBON MONOXIDE ANALYSIS

Project Number: 10537-00
Project Title: UC Riverside LRDP

Background Information

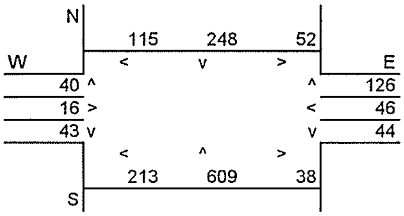
Nearest Air Monitoring Station measuring CO: Riverside-Rubidoux
Background 1-hour CO Concentration (ppm): 5.1
Background 8-hour CO Concentration (ppm): 3.2
Persistence Factor: 0.6
Analysis Year: 2010

Roadway Data

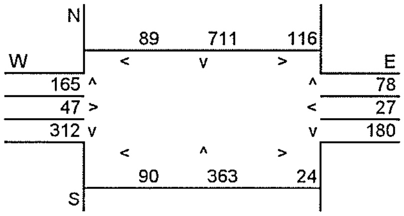
Intersection: Big Springs Rd/Watkins Dr
Analysis Condition: Future Plus Project Traffic Volumes (4-Lane Iowa Avenue Scenario)

		Roadway Type	No. of Lanes	Average Speed A.M.	Average Speed P.M.
North-South Roadway:	Watkins Dr	At Grade	2	10	10
East-West Roadway:	Big Springs Rd.	At Grade	2	10	10

A.M. Peak Hour Traffic Volumes



P.M. Peak Hour Traffic Volumes



Highest Traffic Volumes (Vehicles per Hour)

	A.M.		P.M.
N-S Road:	1,195	N-S Road:	1,680
E-W Road:	473	E-W Road:	730

Roadway CO Contributions and Concentrations

Emissions = (A x B x C) / 100,000[1]

	A_1	A_2	A_3	B	C			
	Reference CO Concentrations			Traffic	Emission	Estimated CO Concentrations		
Roadway	25 Feet	50 Feet	100 Feet	Volume	Factors[1]	25 Feet	50 Feet	100 Feet
A.M. Peak Traffic Hour								
North-South Road	7.6	5.7	4.0	1,195	10.78	0.98	0.73	0.52
East-West Road	2.7	2.2	1.7	473	10.78	0.14	0.11	0.09
P.M. Peak Traffic Hour								
North-South Road	7.6	5.7	4.0	1,680	10.78	1.38	1.03	0.72
East-West Road	2.7	2.2	1.7	730	10.78	0.21	0.17	0.13

[1] Methodology and emission factors from Bay Area Air Quality Management District *BAAQMD CEQA Guidelines* (1996).

Total Roadway CO Concentrations

Peak Hour Emissions = North-South Concentration + East-West Concentration + Background 1-hour Concentration[2]

8-Hour Emissions = ((Highest Peak Hour Concentration - Background 1-hour Concentration) x Persistence Factor) + Background 8-hour Concentration[2]

	A.M. Peak Hour	P.M. Peak Hour	8-Hour
25 Feet from Roadway Edge	6.2	6.7	4.2
50 Feet from Roadway Edge	5.9	6.3	3.9
100 Feet from Roadway Edge	5.7	6.0	3.7

[2] Methodology from Bay Area Air Quality Management District *BAAQMD CEQA Guidelines* (1996).

SIMPLIFIED CALINE4 CARBON MONOXIDE ANALYSIS

Project Number: 10537-00
Project Title: UC Riverside LRDP

Background Information

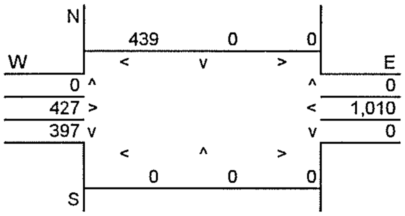
Nearest Air Monitoring Station measuring CO: Riverside-Rubidoux
Background 1-hour CO Concentration (ppm): 5.1
Background 8-hour CO Concentration (ppm): 3.2
Persistence Factor: 0.6
Analysis Year: 2010

Roadway Data

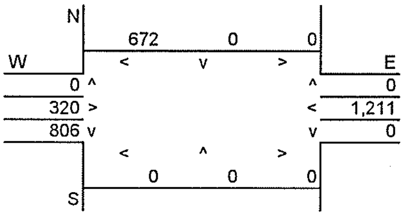
Intersection: Martin Luther King Blvd/SR-60SBR
Analysis Condition: Future Plus Project Traffic Volumes (4-Lane Iowa Avenue Scenario)

		Roadway Type	No. of Lanes	Average Speed A.M.	Average Speed P.M.
North-South Roadway:	SR-60 SBR	At Grade	2	20	20
East-West Roadway:	Martin Luther King Blvd	At Grade	2	20	20

A.M. Peak Hour Traffic Volumes



P.M. Peak Hour Traffic Volumes



Highest Traffic Volumes (Vehicles per Hour)

N-S Road: 439
E-W Road: 2,273

N-S Road: 806
E-W Road: 3,009

Roadway CO Contributions and Concentrations

Emissions = (A x B x C) / 100,000[1]

Roadway	A_1 Reference CO Concentrations 25 Feet	A_2 50 Feet	A_3 100 Feet	B Traffic Volume	C Emission Factors[1]	Estimated CO Concentrations 25 Feet	50 Feet	100 Feet
A.M. Peak Traffic Hour								
North-South Road	2.7	2.2	1.7	439	5.52	0.07	0.05	0.04
East-West Road	7.6	5.7	4.0	2,273	5.52	0.95	0.72	0.50
P.M. Peak Traffic Hour								
North-South Road	2.7	2.2	1.7	806	5.52	0.12	0.10	0.08
East-West Road	7.6	5.7	4.0	3,009	5.52	1.26	0.95	0.66

[1] Methodology and emission factors from Bay Area Air Quality Management District *BAAQMD CEQA Guidelines* (1996).

Total Roadway CO Concentrations

Peak Hour Emissions = North-South Concentration + East-West Concentration + Background 1-hour Concentration[2]
8-Hour Emissions = ((Highest Peak Hour Concentration - Background 1-hour Concentration) x Persistence Factor) + Background 8-hour Concentration[2]

	A.M. Peak Hour	P.M. Peak Hour	8-Hour
25 Feet from Roadway Edge	6.1	6.5	4.0
50 Feet from Roadway Edge	5.9	6.1	3.8
100 Feet from Roadway Edge	5.6	5.8	3.6

[2] Methodology from Bay Area Air Quality Management District *BAAQMD CEQA Guidelines* (1996).

SIMPLIFIED CALINE4 CARBON MONOXIDE ANALYSIS

Project Number: 10537-00
Project Title: UC Riverside LRDP

Background Information

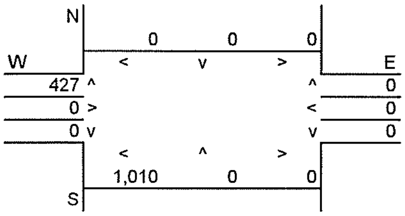
Nearest Air Monitoring Station measuring CO: Riverside-Rubidoux
Background 1-hour CO Concentration (ppm): 5.1
Background 8-hour CO Concentration (ppm): 3.2
Persistence Factor: 0.6
Analysis Year: 2010

Roadway Data

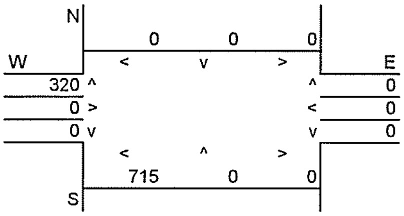
Intersection: Martin Luther King Blvd/SR-60 NBR
Analysis Condition: Future Plus Project Traffic Volumes (4-Lane Iowa Avenue Scenario)

		Roadway Type	No. of Lanes	Average Speed A.M.	Average Speed P.M.
North-South Roadway:	SR-60 SBR	At Grade	2	20	20
East-West Roadway:	Martin Luther King Blvd	At Grade	2	20	20

A.M. Peak Hour Traffic Volumes



P.M. Peak Hour Traffic Volumes



Highest Traffic Volumes (Vehicles per Hour)

	A.M.		P.M.
N-S Road:	1,010	N-S Road:	715
E-W Road:	1,437	E-W Road:	1,035

Roadway CO Contributions and Concentrations

Emissions = (A x B x C) / 100,000[1]

Roadway	A_1 Reference CO Concentrations 25 Feet	A_2 50 Feet	A_3 100 Feet	B Traffic Volume	C Emission Factors[1]	Estimated CO Concentrations 25 Feet	50 Feet	100 Feet
A.M. Peak Traffic Hour								
North-South Road	2.7	2.2	1.7	1,010	5.52	0.15	0.12	0.09
East-West Road	7.6	5.7	4.0	1,437	5.52	0.60	0.45	0.32
P.M. Peak Traffic Hour								
North-South Road	2.7	2.2	1.7	715	5.52	0.11	0.09	0.07
East-West Road	7.6	5.7	4.0	1,035	5.52	0.43	0.33	0.23

[1] Methodology and emission factors from Bay Area Air Quality Management District *BAAQMD CEQA Guidelines* (1996).

Total Roadway CO Concentrations

Peak Hour Emissions = North-South Concentration + East-West Concentration + Background 1-hour Concentration[2]

8-Hour Emissions = ((Highest Peak Hour Concentration - Background 1-hour Concentration) x Persistence Factor) + Background 8-hour Concentration[2]

	A.M. Peak Hour	P.M. Peak Hour	8-Hour
25 Feet from Roadway Edge	5.9	5.6	3.7
50 Feet from Roadway Edge	5.7	5.5	3.5
100 Feet from Roadway Edge	5.5	5.4	3.4

[2] Methodology from Bay Area Air Quality Management District *BAAQMD CEQA Guidelines* (1996).

SIMPLIFIED CALINE4 CARBON MONOXIDE ANALYSIS

Project Number: 10537-00
Project Title: UC Riverside LRDP

Background Information

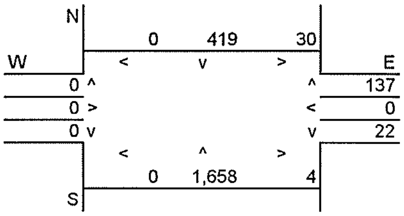
Nearest Air Monitoring Station measuring CO:	Riverside-Rubidoux
Background 1-hour CO Concentration (ppm):	5.1
Background 8-hour CO Concentration (ppm):	3.2
Persistence Factor:	0.6
Analysis Year:	2010

Roadway Data

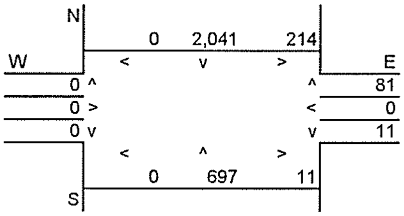
Intersection: Le Conte Dr/Chicago Ave
Analysis Condition: Future Plus Project Traffic Volumes (4-Lane Iowa Avenue Scenario)

			No. of	Average Speed	
		Roadway Type	Lanes	A.M.	P.M.
North-South Roadway:	Chicago Ave	At Grade	4	10	15
East-West Roadway:	Le Conte Ave	At Grade	2	10	15

A.M. Peak Hour Traffic Volumes



P.M. Peak Hour Traffic Volumes



Highest Traffic Volumes (Vehicles per Hour)

N-S Road:	2,244	N-S Road:	3,033
E-W Road:	193	E-W Road:	317

Roadway CO Contributions and Concentrations

Emissions = (A x B x C) / 100,000[1]

	A_1	A_2	A_3	B	C			
	Reference CO Concentrations			Traffic	Emission	Estimated CO Concentrations		
Roadway	25 Feet	50 Feet	100 Feet	Volume	Factors[1]	25 Feet	50 Feet	100 Feet
A.M. Peak Traffic Hour								
North-South Road	7.0	5.4	3.8	2,244	10.78	1.69	1.31	0.92
East-West Road	2.7	2.2	1.7	193	10.78	0.06	0.05	0.04
P.M. Peak Traffic Hour								
North-South Road	7.0	5.4	3.8	3,033	7.30	1.55	1.20	0.84
East-West Road	2.7	2.2	1.7	317	7.30	0.06	0.05	0.04

[1] Methodology and emission factors from Bay Area Air Quality Management District *BAAQMD CEQA Guidelines* (1996).

Total Roadway CO Concentrations

Peak Hour Emissions = North-South Concentration + East-West Concentration + Background 1-hour Concentration[2]

8-Hour Emissions = ((Highest Peak Hour Concentration - Background 1-hour Concentration) x Persistence Factor) + Background 8-hour Concentration[2]

	A.M. Peak Hour	P.M. Peak Hour	8-Hour
25 Feet from Roadway Edge	6.8	6.7	4.2
50 Feet from Roadway Edge	6.5	6.3	4.0
100 Feet from Roadway Edge	6.1	6.0	3.8

[2] Methodology from Bay Area Air Quality Management District *BAAQMD CEQA Guidelines* (1996).

SIMPLIFIED CALINE4 CARBON MONOXIDE ANALYSIS

Project Number: 10537-00
Project Title: UC Riverside LRDP

Background Information

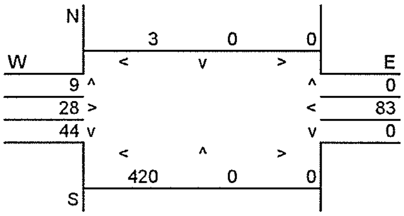
Nearest Air Monitoring Station measuring CO:	Riverside-Rubidoux
Background 1-hour CO Concentration (ppm):	5.1
Background 8-hour CO Concentration (ppm):	3.2
Persistence Factor:	0.6
Analysis Year:	2010

Roadway Data

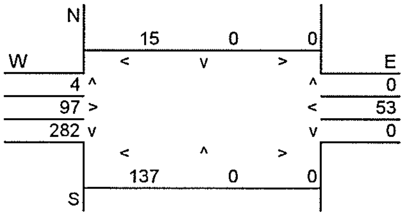
Intersection:	El Cerrito Dr/Sycamore Canyon Blvd
Analysis Condition:	Future Plus Project Traffic Volumes (4-Lane Iowa Avenue Scenario)

		Roadway Type	No. of Lanes	Average Speed A.M.	Average Speed P.M.
North-South Roadway:	Sycamore Canyon Blvd	At Grade	2	20	20
East-West Roadway:	El Cerrito Dr.	At Grade	2	20	20

A.M. Peak Hour Traffic Volumes



P.M. Peak Hour Traffic Volumes



Highest Traffic Volumes (Vehicles per Hour)

	A.M.		P.M.
N-S Road:	464	N-S Road:	419
E-W Road:	587	E-W Road:	588

Roadway CO Contributions and Concentrations

Emissions = (A x B x C) / 100,000[1]

	A_1	A_2	A_3	B	C			
	Reference CO Concentrations			Traffic	Emission	Estimated CO Concentrations		
Roadway	25 Feet	50 Feet	100 Feet	Volume	Factors[1]	25 Feet	50 Feet	100 Feet
A.M. Peak Traffic Hour								
North-South Road	2.7	2.2	1.7	464	5.52	0.07	0.06	0.04
East-West Road	7.6	5.7	4.0	587	5.52	0.25	0.18	0.13
P.M. Peak Traffic Hour								
North-South Road	2.7	2.2	1.7	419	5.52	0.06	0.05	0.04
East-West Road	7.6	5.7	4.0	588	5.52	0.25	0.19	0.13

[1] Methodology and emission factors from Bay Area Air Quality Management District *BAAQMD CEQA Guidelines* (1996).

Total Roadway CO Concentrations

Peak Hour Emissions = North-South Concentration + East-West Concentration + Background 1-hour Concentration[2]

8-Hour Emissions = ((Highest Peak Hour Concentration - Background 1-hour Concentration) x Persistence Factor) + Background 8-hour Concentration[2]

	A.M. Peak Hour	P.M. Peak Hour	8-Hour
25 Feet from Roadway Edge	5.4	5.4	3.4
50 Feet from Roadway Edge	5.3	5.3	3.3
100 Feet from Roadway Edge	5.3	5.3	3.3

[2] Methodology from Bay Area Air Quality Management District *BAAQMD CEQA Guidelines* (1996).

SIMPLIFIED CALINE4 CARBON MONOXIDE ANALYSIS

Project Number: 10537-00
Project Title: UC Riverside LRDP

Background Information

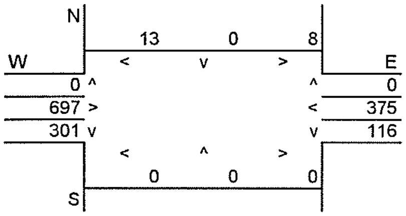
Nearest Air Monitoring Station measuring CO: Riverside-Rubidoux
Background 1-hour CO Concentration (ppm): 5.1
Background 8-hour CO Concentration (ppm): 3.2
Persistence Factor: 0.6
Analysis Year: 2010

Roadway Data

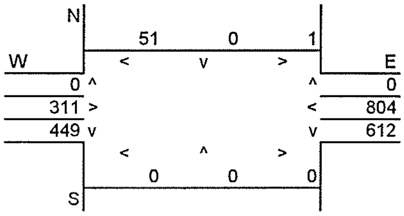
Intersection: Central Ave/SR-60 SBR
Analysis Condition: Future Plus Project Traffic Volumes (4-Lane Iowa Avenue Scenario)

		Roadway Type	No. of Lanes	Average Speed A.M.	P.M.
North-South Roadway:	SR-60 SBR	At Grade	2	20	20
East-West Roadway:	Central Ave	At Grade	4	20	20

A.M. Peak Hour Traffic Volumes



P.M. Peak Hour Traffic Volumes



Highest Traffic Volumes (Vehicles per Hour)

	A.M.		P.M.
N-S Road:	417	N-S Road:	1,061
E-W Road:	1,386	E-W Road:	1,728

Roadway CO Contributions and Concentrations

Emissions = (A x B x C) / 100,000[1]

Roadway	A_1 Reference CO Concentrations 25 Feet	A_2 50 Feet	A_3 100 Feet	B Traffic Volume	C Emission Factors[1]	Estimated CO Concentrations 25 Feet	50 Feet	100 Feet
A.M. Peak Traffic Hour								
North-South Road	2.7	2.2	1.7	417	5.52	0.06	0.05	0.04
East-West Road	7.0	5.4	3.8	1,386	5.52	0.54	0.41	0.29
P.M. Peak Traffic Hour								
North-South Road	2.7	2.2	1.7	1,061	5.52	0.16	0.13	0.10
East-West Road	7.0	5.4	3.8	1,728	5.52	0.67	0.52	0.36

[1] Methodology and emission factors from Bay Area Air Quality Management District *BAAQMD CEQA Guidelines* (1996).

Total Roadway CO Concentrations

Peak Hour Emissions = North-South Concentration + East-West Concentration + Background 1-hour Concentration[2]
8-Hour Emissions = ((Highest Peak Hour Concentration - Background 1-hour Concentration) x Persistence Factor) + Background 8-hour Concentration[2]

	A.M. Peak Hour	P.M. Peak Hour	8-Hour
25 Feet from Roadway Edge	5.7	5.9	3.7
50 Feet from Roadway Edge	5.6	5.7	3.6
100 Feet from Roadway Edge	5.4	5.6	3.5

[2] Methodology from Bay Area Air Quality Management District *BAAQMD CEQA Guidelines* (1996).

SIMPLIFIED CALINE4 CARBON MONOXIDE ANALYSIS

Project Number: 10537-00
Project Title: UC Riverside LRDP

Background Information

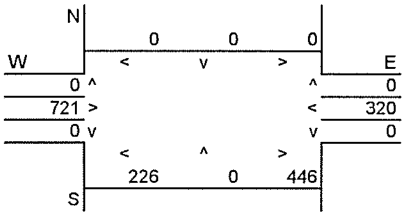
Nearest Air Monitoring Station measuring CO:	Riverside-Rubidoux
Background 1-hour CO Concentration (ppm):	5.1
Background 8-hour CO Concentration (ppm):	3.2
Persistence Factor:	0.6
Analysis Year:	2010

Roadway Data

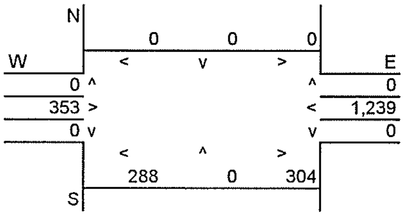
Intersection: Central Ave/SR-60 NBR
Analysis Condition: Future Plus Project Traffic Volumes (4-Lane Iowa Avene Scenario)

			No. of	Average Speed	
		Roadway Type	Lanes	A.M.	P.M.
North-South Roadway:	SR-60 NBR	At Grade	2	10	10
East-West Roadway:	Central Ave	At Grade	2	10	10

A.M. Peak Hour Traffic Volumes



P.M. Peak Hour Traffic Volumes



Highest Traffic Volumes (Vehicles per Hour)

N-S Road:	672	N-S Road:	592
E-W Road:	1,487	E-W Road:	1,896

Roadway CO Contributions and Concentrations

Emissions = (A x B x C) / 100,000[1]

	A_1	A_2	A_3	B	C			
	Reference CO Concentrations			Traffic	Emission	Estimated CO Concentrations		
Roadway	25 Feet	50 Feet	100 Feet	Volume	Factors[1]	25 Feet	50 Feet	100 Feet
A.M. Peak Traffic Hour								
North-South Road	2.7	2.2	1.7	672	10.78	0.20	0.16	0.12
East-West Road	7.6	5.7	4.0	1,487	10.78	1.22	0.91	0.64
P.M. Peak Traffic Hour								
North-South Road	2.7	2.2	1.7	592	10.78	0.17	0.14	0.11
East-West Road	7.6	5.7	4.0	1,896	10.78	1.55	1.17	0.82

[1] Methodology and emission factors from Bay Area Air Quality Management District *BAAQMD CEQA Guidelines* (1996).

Total Roadway CO Concentrations

Peak Hour Emissions = North-South Concentration + East-West Concentration + Background 1-hour Concentration[2]

8-Hour Emissions = ((Highest Peak Hour Concentration - Background 1-hour Concentration) x Persistence Factor) + Background 8-hour Concentration[2]

	A.M. Peak Hour	P.M. Peak Hour	8-Hour
25 Feet from Roadway Edge	6.5	6.8	4.2
50 Feet from Roadway Edge	6.2	6.4	4.0
100 Feet from Roadway Edge	5.9	6.0	3.8

[2] Methodology from Bay Area Air Quality Management District *BAAQMD CEQA Guidelines* (1996).

SIMPLIFIED CALINE4 CARBON MONOXIDE ANALYSIS

Project Number: 10537-00
Project Title: UC Riverside LRDP

Background Information

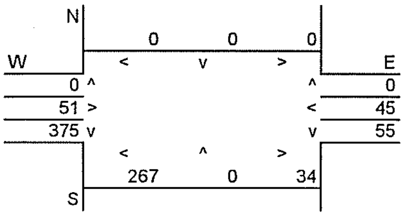
Nearest Air Monitoring Station measuring CO: Riverside-Rubidoux
Background 1-hour CO Concentration (ppm): 5.1
Background 8-hour CO Concentration (ppm): 3.2
Persistence Factor: 0.6
Analysis Year: 2010

Roadway Data

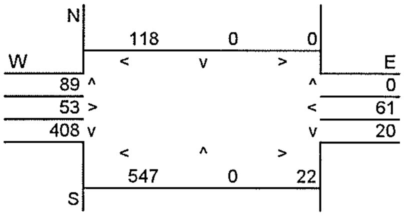
Intersection: Linden St/Aberdeen Dr
Analysis Condition: Future Plus Project Traffic Volumes (4-Lane Iowa Avenue Scenario)

		Roadway Type	No. of Lanes	Average Speed A.M.	Average Speed P.M.
North-South Roadway:	Aberdeen Dr	At Grade	2	20	10
East-West Roadway:	Linden St	At Grade	2	20	10

A.M. Peak Hour Traffic Volumes



P.M. Peak Hour Traffic Volumes



Highest Traffic Volumes (Vehicles per Hour)

	A.M.		P.M.
N-S Road:	731	N-S Road:	997
E-W Road:	738	E-W Road:	1,276

Roadway CO Contributions and Concentrations

Emissions = (A x B x C) / 100,000[1]

	A_1	A_2	A_3	B	C			
	Reference CO Concentrations			Traffic	Emission	Estimated CO Concentrations		
Roadway	25 Feet	50 Feet	100 Feet	Volume	Factors[1]	25 Feet	50 Feet	100 Feet
A.M. Peak Traffic Hour								
North-South Road	2.7	2.2	1.7	731	5.52	0.11	0.09	0.07
East-West Road	7.6	5.7	4.0	738	5.52	0.31	0.23	0.16
P.M. Peak Traffic Hour								
North-South Road	2.7	2.2	1.7	997	10.78	0.29	0.24	0.18
East-West Road	7.6	5.7	4.0	1,276	10.78	1.05	0.78	0.55

[1] Methodology and emission factors from Bay Area Air Quality Management District *BAAQMD CEQA Guidelines* (1996).

Total Roadway CO Concentrations

Peak Hour Emissions = North-South Concentration + East-West Concentration + Background 1-hour Concentration[2]
8-Hour Emissions = ((Highest Peak Hour Concentration - Background 1-hour Concentration) x Persistence Factor) + Background 8-hour Concentration[2]

	A.M. Peak Hour	P.M. Peak Hour	8-Hour
25 Feet from Roadway Edge	5.5	6.4	4.0
50 Feet from Roadway Edge	5.4	6.1	3.8
100 Feet from Roadway Edge	5.3	5.8	3.6

[2] Methodology from Bay Area Air Quality Management District *BAAQMD CEQA Guidelines* (1996).

SIMPLIFIED CALINE4 CARBON MONOXIDE ANALYSIS

Project Number: 10537-00
Project Title: UC Riverside LRDP

Background Information

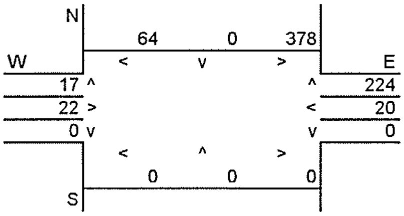
Nearest Air Monitoring Station measuring CO:	Riverside-Rubidoux
Background 1-hour CO Concentration (ppm):	5.1
Background 8-hour CO Concentration (ppm):	3.2
Persistence Factor:	0.6
Analysis Year:	2010

Roadway Data

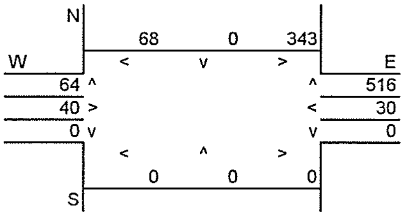
Intersection: Campus Dr/Aberdeen Dr
Analysis Condition: Future Plus Project Traffic Volumes (4-Lane Iowa Avenue Scenario)

			No. of	Average Speed	
		Roadway Type	Lanes	A.M.	P.M.
North-South Roadway:	Aberdeen Dr	At Grade	2	10	10
East-West Roadway:	Campus Dr	At Grade	2	10	10

A.M. Peak Hour Traffic Volumes



P.M. Peak Hour Traffic Volumes



Highest Traffic Volumes (Vehicles per Hour)

N-S Road:	683	N-S Road:	991
E-W Road:	644	E-W Road:	929

Roadway CO Contributions and Concentrations

Emissions = (A x B x C) / 100,000[1]

	A_1	A_2	A_3	B	C			
	Reference CO Concentrations			Traffic	Emission	Estimated CO Concentrations		
Roadway	25 Feet	50 Feet	100 Feet	Volume	Factors[1]	25 Feet	50 Feet	100 Feet
A.M. Peak Traffic Hour								
North-South Road	7.6	5.7	4.0	683	10.78	0.56	0.42	0.29
East-West Road	2.7	2.2	1.7	644	10.78	0.19	0.15	0.12
P.M. Peak Traffic Hour								
North-South Road	7.6	5.7	4.0	991	10.78	0.81	0.61	0.43
East-West Road	2.7	2.2	1.7	929	10.78	0.27	0.22	0.17

[1] Methodology and emission factors from Bay Area Air Quality Management District *BAAQMD CEQA Guidelines* (1996).

Total Roadway CO Concentrations

Peak Hour Emissions = North-South Concentration + East-West Concentration + Background 1-hour Concentration[2]

8-Hour Emissions = ((Highest Peak Hour Concentration - Background 1-hour Concentration) x Persistence Factor) + Background 8-hour Concentration[2]

	A.M. Peak Hour	P.M. Peak Hour	8-Hour
25 Feet from Roadway Edge	5.8	6.2	3.8
50 Feet from Roadway Edge	5.7	5.9	3.7
100 Feet from Roadway Edge	5.5	5.7	3.6

[2] Methodology from Bay Area Air Quality Management District *BAAQMD CEQA Guidelines* (1996).

SIMPLIFIED CALINE4 CARBON MONOXIDE ANALYSIS

Project Number: 10537-00
Project Title: UC Riverside LRDP

Background Information

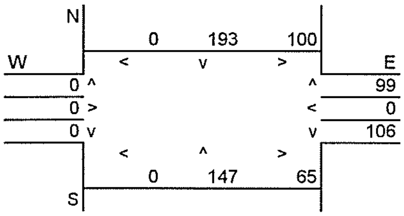
Nearest Air Monitoring Station measuring CO: Riverside-Rubidoux
Background 1-hour CO Concentration (ppm): 5.1
Background 8-hour CO Concentration (ppm): 3.2
Persistence Factor: 0.6
Analysis Year: 2010

Roadway Data

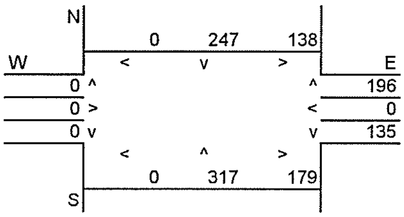
Intersection: Big Springs Rd/Campus Dr
Analysis Condition: Future Plus Project Traffic Volumes (4-Lane Iowa Avenue Scenario)

			No. of	Average Speed	
		Roadway Type	Lanes	A.M.	P.M.
North-South Roadway:	Big Springs Rd	At Grade	2	10	10
East-West Roadway:	Campus Dr	At Grade	2	10	10

A.M. Peak Hour Traffic Volumes



P.M. Peak Hour Traffic Volumes



Highest Traffic Volumes (Vehicles per Hour)

N-S Road:	539	N-S Road:	898
E-W Road:	370	E-W Road:	648

Roadway CO Contributions and Concentrations

Emissions = (A x B x C) / 100,000[1]

	A_1	A_2	A_3	B	C			
	Reference CO Concentrations			Traffic	Emission	Estimated CO Concentrations		
Roadway	25 Feet	50 Feet	100 Feet	Volume	Factors[1]	25 Feet	50 Feet	100 Feet
A.M. Peak Traffic Hour								
North-South Road	7.6	5.7	4.0	539	10.78	0.44	0.33	0.23
East-West Road	2.7	2.2	1.7	370	10.78	0.11	0.09	0.07
P.M. Peak Traffic Hour								
North-South Road	7.6	5.7	4.0	898	10.78	0.74	0.55	0.39
East-West Road	2.7	2.2	1.7	648	10.78	0.19	0.15	0.12

[1] Methodology and emission factors from Bay Area Air Quality Management District *BAAQMD CEQA Guidelines* (1996).

Total Roadway CO Concentrations

Peak Hour Emissions = North-South Concentration + East-West Concentration + Background 1-hour Concentration[2]

8-Hour Emissions = ((Highest Peak Hour Concentration - Background 1-hour Concentration) x Persistence Factor) + Background 8-hour Concentration[2]

	A.M. Peak Hour	P.M. Peak Hour	8-Hour
25 Feet from Roadway Edge	5.6	6.0	3.8
50 Feet from Roadway Edge	5.5	5.8	3.6
100 Feet from Roadway Edge	5.4	5.6	3.5

[2] Methodology from Bay Area Air Quality Management District *BAAQMD CEQA Guidelines* (1996).

SIMPLIFIED CALINE4 CARBON MONOXIDE ANALYSIS

Project Number: 10537-00
Project Title: UC Riverside LRDP

Background Information

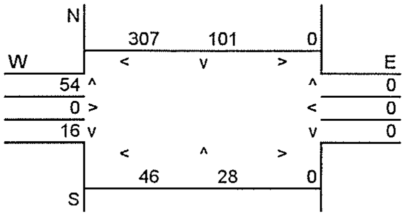
Nearest Air Monitoring Station measuring CO:	Riverside-Rubidoux
Background 1-hour CO Concentration (ppm):	5.1
Background 8-hour CO Concentration (ppm):	3.2
Persistence Factor:	0.6
Analysis Year:	2010

Roadway Data

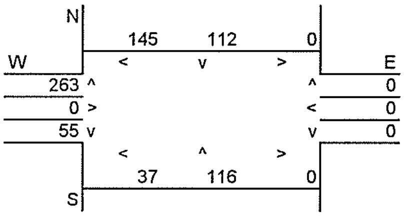
Intersection: Parking Lot 1/campus Dr
Analysis Condition: Future Plus Project Traffic Volumes (4-Lane Iowa Avenue Scenario)

		Roadway Type	No. of Lanes	Average Speed A.M.	Average Speed P.M.
North-South Roadway:	Campus Dr.	At Grade	2	10	10
East-West Roadway:	Parking Access	At Grade	2	10	10

A.M. Peak Hour Traffic Volumes



P.M. Peak Hour Traffic Volumes



Highest Traffic Volumes (Vehicles per Hour)

N-S Road:	490	N-S Road:	636
E-W Road:	423	E-W Road:	500

Roadway CO Contributions and Concentrations

Emissions = (A x B x C) / 100,000[1]

Roadway	A_1 Reference CO Concentrations 25 Feet	A_2 50 Feet	A_3 100 Feet	B Traffic Volume	C Emission Factors[1]	Estimated CO Concentrations 25 Feet	50 Feet	100 Feet
A.M. Peak Traffic Hour								
North-South Road	7.6	5.7	4.0	490	10.78	0.40	0.30	0.21
East-West Road	2.7	2.2	1.7	423	10.78	0.12	0.10	0.08
P.M. Peak Traffic Hour								
North-South Road	7.6	5.7	4.0	636	10.78	0.52	0.39	0.27
East-West Road	2.7	2.2	1.7	500	10.78	0.15	0.12	0.09

[1] Methodology and emission factors from Bay Area Air Quality Management District *BAAQMD CEQA Guidelines* (1996).

Total Roadway CO Concentrations

Peak Hour Emissions = North-South Concentration + East-West Concentration + Background 1-hour Concentration[2]

8-Hour Emissions = ((Highest Peak Hour Concentration - Background 1-hour Concentration) x Persistence Factor) + Background 8-hour Concentration[2]

	A.M. Peak Hour	P.M. Peak Hour	8-Hour
25 Feet from Roadway Edge	5.6	5.8	3.6
50 Feet from Roadway Edge	5.5	5.6	3.5
100 Feet from Roadway Edge	5.4	5.5	3.4

[2] Methodology from Bay Area Air Quality Management District *BAAQMD CEQA Guidelines* (1996).

SIMPLIFIED CALINE4 CARBON MONOXIDE ANALYSIS

Project Number: 10537-00
Project Title: UC Riverside LRDP

Background Information

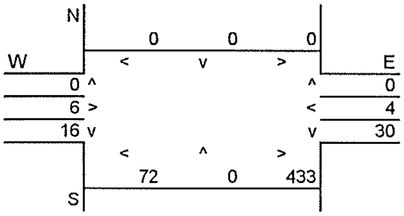
Nearest Air Monitoring Station measuring CO: Riverside-Rubidoux
Background 1-hour CO Concentration (ppm): 5.1
Background 8-hour CO Concentration (ppm): 3.2
Persistence Factor: 0.6
Analysis Year: 2010

Roadway Data

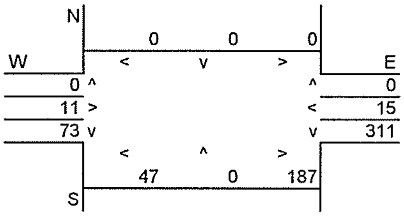
Intersection: Campus Dr/Canyon Crest Dr
Analysis Condition: Future Plus Project Traffic Volumes (4-Lane Iowa Avenue Scenario)

		Roadway Type	No. of Lanes	Average Speed A.M.	Average Speed P.M.
North-South Roadway:	Canyon Crest Dr	At Grade	2	20	20
East-West Roadway:	Campus Dr	At Grade	2	10	10

A.M. Peak Hour Traffic Volumes



P.M. Peak Hour Traffic Volumes



Highest Traffic Volumes (Vehicles per Hour)

N-S Road: 551
E-W Road: 473

N-S Road: 618
E-W Road: 524

Roadway CO Contributions and Concentrations

Emissions = (A x B x C) / 100,000[1]

	A_1	A_2	A_3	B	C			
	Reference CO Concentrations			Traffic	Emission	Estimated CO Concentrations		
Roadway	25 Feet	50 Feet	100 Feet	Volume	Factors[1]	25 Feet	50 Feet	100 Feet
A.M. Peak Traffic Hour								
North-South Road	7.6	5.7	4.0	551	5.52	0.23	0.17	0.12
East-West Road	2.7	2.2	1.7	473	10.78	0.14	0.11	0.09
P.M. Peak Traffic Hour								
North-South Road	7.6	5.7	4.0	618	5.52	0.26	0.19	0.14
East-West Road	2.7	2.2	1.7	524	10.78	0.15	0.12	0.10

[1] Methodology and emission factors from Bay Area Air Quality Management District *BAAQMD CEQA Guidelines* (1996).

Total Roadway CO Concentrations

Peak Hour Emissions = North-South Concentration + East-West Concentration + Background 1-hour Concentration[2]
8-Hour Emissions = ((Highest Peak Hour Concentration - Background 1-hour Concentration) x Persistence Factor) + Background 8-hour Concentration[2]

	A.M. Peak Hour	P.M. Peak Hour	8-Hour
25 Feet from Roadway Edge	5.5	5.5	3.4
50 Feet from Roadway Edge	5.4	5.4	3.4
100 Feet from Roadway Edge	5.3	5.3	3.3

[2] Methodology from Bay Area Air Quality Management District *BAAQMD CEQA Guidelines* (1996).

SIMPLIFIED CALINE4 CARBON MONOXIDE ANALYSIS

Project Number: 10537-00
Project Title: UC Riverside LRDP

Background Information

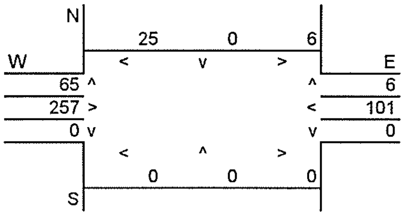
Nearest Air Monitoring Station measuring CO:	Riverside-Rubidoux
Background 1-hour CO Concentration (ppm):	5.1
Background 8-hour CO Concentration (ppm):	3.2
Persistence Factor:	0.6
Analysis Year:	2010

Roadway Data

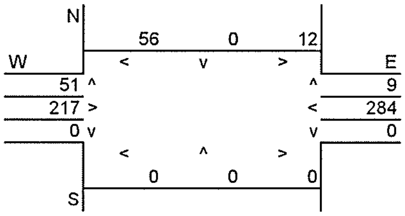
Intersection: Campus Dr/Citrus Dr
Analysis Condition: Future Plus Project Traffic Volumes (4-Lane Iowa Avenue Scenario)

		Roadway Type	No. of Lanes	Average Speed A.M.	Average Speed P.M.
North-South Roadway:	Citrus Dr	At Grade	2	10	10
East-West Roadway:	Campus Dr	At Grade	2	20	20

A.M. Peak Hour Traffic Volumes



P.M. Peak Hour Traffic Volumes



Highest Traffic Volumes (Vehicles per Hour)

	A.M.		P.M.
N-S Road:	102	N-S Road:	128
E-W Road:	448	E-W Road:	608

Roadway CO Contributions and Concentrations

Emissions = (A x B x C) / 100,000[1]

	A_1	A_2	A_3	B	C			
	Reference CO Concentrations			Traffic	Emission	Estimated CO Concentrations		
Roadway	25 Feet	50 Feet	100 Feet	Volume	Factors[1]	25 Feet	50 Feet	100 Feet
A.M. Peak Traffic Hour								
North-South Road	2.7	2.2	1.7	102	10.78	0.03	0.02	0.02
East-West Road	7.6	5.7	4.0	448	5.52	0.19	0.14	0.10
P.M. Peak Traffic Hour								
North-South Road	2.7	2.2	1.7	128	10.78	0.04	0.03	0.02
East-West Road	7.6	5.7	4.0	608	5.52	0.26	0.19	0.13

[1] Methodology and emission factors from Bay Area Air Quality Management District *BAAQMD CEQA Guidelines* (1996).

Total Roadway CO Concentrations

Peak Hour Emissions = North-South Concentration + East-West Concentration + Background 1-hour Concentration[2]

8-Hour Emissions = ((Highest Peak Hour Concentration - Background 1-hour Concentration) x Persistence Factor) + Background 8-hour Concentration[2]

	A.M. Peak Hour	P.M. Peak Hour	8-Hour
25 Feet from Roadway Edge	5.3	5.4	3.4
50 Feet from Roadway Edge	5.3	5.3	3.3
100 Feet from Roadway Edge	5.2	5.3	3.3

[2] Methodology from Bay Area Air Quality Management District *BAAQMD CEQA Guidelines* (1996).

SIMPLIFIED CALINE4 CARBON MONOXIDE ANALYSIS

Project Number: 10537-00
Project Title: UC Riverside LRDP

Background Information

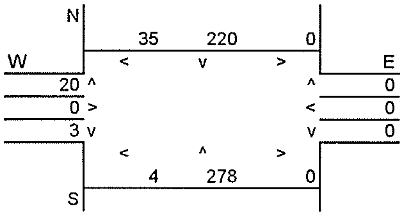
Nearest Air Monitoring Station measuring CO:	Riverside-Rubidoux
Background 1-hour CO Concentration (ppm):	5.1
Background 8-hour CO Concentration (ppm):	3.2
Persistence Factor:	0.6
Analysis Year:	2010

Roadway Data

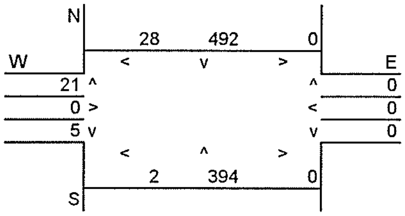
Intersection: Eucalyptus Dr/Campus Dr
Analysis Condition: Future Plus Project Traffic Volumes (4-Lane Iowa Avenue Scenario)

		Roadway Type	No. of Lanes	Average Speed A.M.	Average Speed P.M.
North-South Roadway:	Campus Dr	At Grade	2	10	10
East-West Roadway:	#REF!	At Grade	2	10	10

A.M. Peak Hour Traffic Volumes



P.M. Peak Hour Traffic Volumes



Highest Traffic Volumes (Vehicles per Hour)

	A.M.		P.M.
N-S Road:	553	N-S Road:	935
E-W Road:	62	E-W Road:	56

Roadway CO Contributions and Concentrations

Emissions = (A x B x C) / 100,000[1]

	A_1	A_2	A_3	B	C			
	Reference CO Concentrations			Traffic	Emission	Estimated CO Concentrations		
Roadway	25 Feet	50 Feet	100 Feet	Volume	Factors[1]	25 Feet	50 Feet	100 Feet
A.M. Peak Traffic Hour								
North-South Road	7.6	5.7	4.0	553	10.78	0.45	0.34	0.24
East-West Road	2.7	2.2	1.7	62	10.78	0.02	0.01	0.01
P.M. Peak Traffic Hour								
North-South Road	7.6	5.7	4.0	935	10.78	0.77	0.57	0.40
East-West Road	2.7	2.2	1.7	56	10.78	0.02	0.01	0.01

[1] Methodology and emission factors from Bay Area Air Quality Management District *BAAQMD CEQA Guidelines* (1996).

Total Roadway CO Concentrations

Peak Hour Emissions = North-South Concentration + East-West Concentration + Background 1-hour Concentration[2]

8-Hour Emissions = ((Highest Peak Hour Concentration - Background 1-hour Concentration) x Persistence Factor) + Background 8-hour Concentration[2]

	A.M. Peak Hour	P.M. Peak Hour	8-Hour
25 Feet from Roadway Edge	5.6	5.9	3.7
50 Feet from Roadway Edge	5.5	5.7	3.6
100 Feet from Roadway Edge	5.3	5.5	3.4

[2] Methodology from Bay Area Air Quality Management District *BAAQMD CEQA Guidelines* (1996).

SIMPLIFIED CALINE4 CARBON MONOXIDE ANALYSIS

Project Number: 10537-00
Project Title: UC Riverside LRDP

Background Information

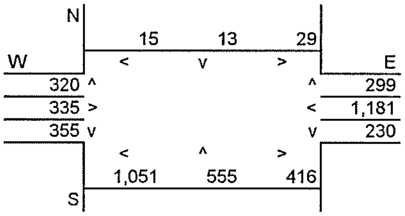
Nearest Air Monitoring Station measuring CO:	Riverside-Rubidoux
Background 1-hour CO Concentration (ppm):	9.0
Background 8-hour CO Concentration (ppm):	4.3
Persistence Factor:	0.6
Analysis Year:	2010

Roadway Data

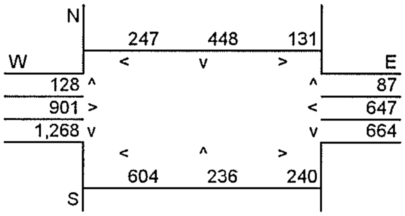
Intersection: Martin Luther King Blvd./Canyon Crest Dr.
Analysis Condition: Future Plus Project Traffic Volumes (4-Lane Iowa Avenue Scenario)

		Roadway Type	No. of Lanes	Average Speed A.M.	Average Speed P.M.
North-South Roadway:	Canyon Crest Dr.	At Grade	2	15	10
East-West Roadway:	Martin Luther King Blvd.	At Grade	4	15	10

A.M. Peak Hour Traffic Volumes



P.M. Peak Hour Traffic Volumes



Highest Traffic Volumes (Vehicles per Hour)

	A.M.		P.M.
N-S Road:	2,620	N-S Road:	3,460
E-W Road:	3,257	E-W Road:	3,795

Roadway CO Contributions and Concentrations

Emissions = (A x B x C) / 100,000[1]

Roadway	A_1 Reference CO Concentrations 25 Feet	A_2 50 Feet	A_3 100 Feet	B Traffic Volume	C Emission Factors[1]	Estimated CO Concentrations 25 Feet	50 Feet	100 Feet
A.M. Peak Traffic Hour								
North-South Road	2.7	2.2	1.7	2,620	7.30	0.52	0.42	0.33
East-West Road	7.0	5.4	3.8	3,257	7.30	1.66	1.28	0.90
P.M. Peak Traffic Hour								
North-South Road	2.7	2.2	1.7	3,460	10.78	1.01	0.82	0.63
East-West Road	7.0	5.4	3.8	3,795	10.78	2.86	2.21	1.55

[1] Methodology and emission factors from Bay Area Air Quality Management District *BAAQMD CEQA Guidelines* (1996).

Total Roadway CO Concentrations

Peak Hour Emissions = North-South Concentration + East-West Concentration + Background 1-hour Concentration[2]

8-Hour Emissions = ((Highest Peak Hour Concentration - Background 1-hour Concentration) x Persistence Factor) + Background 8-hour Concentration[2]

	A.M. Peak Hour	P.M. Peak Hour	8-Hour
25 Feet from Roadway Edge	11.2	12.9	6.6
50 Feet from Roadway Edge	10.7	12.0	6.1
100 Feet from Roadway Edge	10.2	11.2	5.6

[2] Methodology from Bay Area Air Quality Management District *BAAQMD CEQA Guidelines* (1996).

Appendix D Health Risk Assessment

FINAL

HEALTH RISK ASSESSMENT IN SUPPORT OF THE 2005 LONG RANGE DEVELOPMENT PLAN FOR THE UNIVERSITY OF CALIFORNIA, RIVERSIDE

Prepared for

University of California, Riverside
Office of Academic Planning and Budget
Capital and Physical Planning
3637 Canyon Crest Drive, F-101
Riverside, CA 92507

April 8, 2005

URS

2020 East First Street, Suite 400
Santa Ana, California 92705

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bhp	brake horsepower
BPIP	Building Profile Input Program
CARB	California Air Resources Board
CNS	Central Nervous System
CV	Cardiovascular System
DEM	Digital Elevation Model
DEV	Developmental System
DPM	diesel particulate matter
ENDO	Endocrine System
EPA	U.S. Environmental Protection Agency
ft^2	square feet
gal/hr	gallons per hour
HI	hazard index
HQ	hazard quotient
hr/yr	hours per year
HRA	Health Risk Assessment
ICEs	internal combustion engines
IMMUN	Immune System
ISCST3	Industrial Source Complex Short Term
KIDN	Kidney
lb/hr	pounds per hour
lb/yr	pounds per year
LMS	linearized multi-stage
LRDP	Long Range Development Plan
$\mu g/m^3$	micrograms per cubic meter
MEI	maximally exposed individual
mg/kg-d	milligrams per kilogram per day
MSDS	Material Safety Data Sheet
MMBTU/hr	million British thermal units per hour
MMcf	million cubic feet
OEHHA	Office of Environmental Health Hazard Assessment
OSHA	Occupational Safety and Health Administration
REL	reference exposure level
REPRO	Reproductive System
RESP	Respiratory System
SCAQMD	South Coast Air Quality Management District
TAC	Toxic Air Contaminant
UCR	University of California, Riverside
URF	unit risk factor
UTM	Universal Transverse Mercator
ZOI	zone of impact

EXECUTIVE SUMMARY

URS Corporation (URS) was contracted by the University of California, Riverside (UCR), Office of Academic Planning and Budget, Capital and Physical Planning to prepare a Health Risk Assessment (HRA) in support of the preparation of the 2005 Long Range Development Plan (LRDP) Environmental Impact Report (EIR) for UCR. The LRDP addresses the anticipated growth in student enrollment to 25,000 students at the campus through a horizon year 2015. The HRA evaluates the potential health risks posed by current and projected campus-wide operations at off- and on-campus locations. Results are presented for two scenarios:

1. Existing Scenario; and
2. LRDP Scenario.

The results presented for the Existing Scenario represent the potential health risks posed by campus-wide operations in academic year 2004-05. The results presented for the proposed LRDP Scenario represent the potential health risks posed by campus-wide operations under the Existing Scenario combined with potential new development considered in the 2005 LRDP.

Description of the UCR Campus and Operations

The campus is located in Riverside, California. The campus provides numerous teaching and research facilities to faculty, staff and students in the University of California system. The campus conducts routine operations that generate emissions regulated by the State of California. The sources of emissions include natural gas combustion sources such as a pathological incinerator, boilers and kitchen equipment, gasoline dispensing operations, emergency generators driven by internal combustion engines, painting operations, and laboratory fume hoods (chemical usage). The HRA evaluated potential health risk impacts associated with toxic air contaminant (TAC) emissions from these sources based on current and projected future fuel, material, and chemical usage considered representative of the current and projected future routine campus-wide operations through a horizon year 2015. The HRA also evaluated the potential health risks associated with TAC emissions from diesel-fueled delivery trucks traveling on campus roads to make deliveries.

HRA Procedures

The HRA was prepared in accordance with the most recent risk assessment guidelines published by the California Environmental Protection Agency, Office of Environmental Health Hazard Assessment (OEHHA) (OEHHA, 2003). In addition, the HRA incorporated the most recent toxicological values published by OEHHA. Use of the OEHHA guidelines, which have been adopted by the South Coast Air Quality Management District, results in a worst-case analysis of risk. For example, the theoretical incremental cancer risk estimated in this HRA is based on an individual being continuously exposed to emissions from routine campus-wide operations for 24 hours per day, 365 days per year, for 70 years at the same specific location. Actual risks are likely to be substantially lower than those estimated using the OEHHA guidelines and could even approach zero.

Summary of HRA Results from the Existing Scenario

Cancer Health Effects

Results of the cancer health effects assessment for the existing scenario indicate that all of the cancer risks are less than 10 in one million (1.0×10^{-5}). Cancer risks less than 10 in one million are considered acceptable and do not require public notification in accordance with state and local guidelines. The theoretical incremental cancer risk as a result of a lifetime exposure to emissions from the routine campus-wide operation of all sources in the Existing Scenario was estimated to be 4.99 in one million (4.99×10^{-6}) at the *off-campus* maximally exposed individual (MEI) and 0.66 in one million (6.64×10^{-7}) at the *on-campus* MEI. The *off-campus* MEI was located on the fenceline east of the campus along the Teaching and Research Fields south of Parking Lot 13. The *on-campus* MEI was located at the student housing receptor near Lothian Residence Hall.

Primary Source Contribution

- Off campus - The primary source type contributions to the estimated cancer risk at the off-campus MEI were from the incinerator, diesel-fueled delivery trucks, and emissions from fume hoods. Of the sources modeled, the Life Sciences incinerator contributed 19.9% of the cancer risk followed by fume hoods in the Physical Science Building with 11.2% of the cancer risk.
- On campus - The primary source type contributions to the estimated cancer risk at the on-campus MEI were from emissions from fume hoods and boilers. Of the sources modeled, the fume hoods in the Physical Science Building contributed 13.2% of the cancer risk followed by a Pentland boiler with 4.8% of the cancer risk.

Primary Chemical Contribution

- Off campus - The primary chemical contribution to the estimated cancer risk at the off-campus MEI was diesel particulate matter with approximately 42.9% of the risk, followed by polycyclic aromatic hydrocarbons (PAHs) with approximately 35.5% of the risk.
- On campus - The primary chemical contribution to the estimated cancer risk at the on-campus MEI was PAHs with approximately 64.7% of the risk, followed by diesel particulate matter with approximately 29.4% of the risk.

Chronic Noncancer Health Effects

Results of the chronic noncancer health effects assessment indicate that all of the hazard index (HI) values for each organ system are less than 1.0. Chronic HI values less than 1.0 indicate that noncancer effects from chronic exposure to emissions from routine campus-wide operations are unlikely.

- Off campus - The maximum chronic HI for an organ system was 0.004 at the off-campus MEI. The off-campus MEI was located on the fenceline near College Place south of College Building South.
- On campus - The maximum chronic HI for an organ system was 0.003 at the on-campus MEI The on-campus MEI was located at the student housing receptor near Lothian Residence Hall.

Acute Noncancer Health Effects

Results of the acute noncancer health effects assessment indicate that all of the HI values for each organ system are less than 1.0. Acute HI values less than 1.0 indicate that noncancer effects from acute exposure to emissions from routine campus-wide operations are unlikely.

- Off campus - The maximum acute HI for an organ system was 0.07 at the off-campus MEI. The off-campus MEI was located on the fenceline north of the campus along Watkins Drive.
- On campus - The maximum acute HI for an organ system was 0.03 at the on-campus MEI. The on-campus MEI was located at the Child Development Center.

The cancer, chronic, and acute noncancer results for the off- and on-campus MEIs in the Existing Scenario are presented in Table 1. The locations of the cancer, chronic noncancer, and acute noncancer off- and on-campus MEIs in the Existing Scenario are presented in Figure ES-1.

Summary of HRA Results from the LRDP Scenario

Cancer Health Effects

Results of the cancer health effects assessment for the LRDP Scenario indicate that all of the cancer risks are less than 10 in one million (1.0×10^{-5}). The theoretical incremental cancer risk as a result of a lifetime exposure to emissions from the routine campus-wide operation of all sources in the LRDP Scenario was estimated to be 7.43 in one million (7.43×10^{-6}) at the *off-campus* MEI and 1.48 in one million (1.48×10^{-6}) at the *on-campus* MEI. The *off-campus* MEI was located on the fenceline east of the campus on Valencia Hill Drive north of Parking Lot 14. The *on-campus* MEI was located at the student housing receptor near Lothian Residence Hall.

Primary Source Contribution

- Off campus - The primary source type contributions to the estimated cancer risk at the off-campus MEI were from boilers, fume hoods, and diesel-fueled delivery trucks. Of the sources modeled, a Pentland boiler contributed 7.2% of the cancer risk, followed by another Pentland boiler with 6.3% of the cancer risk.
- On campus - The primary source type contributions to the estimated cancer risk at the on-campus MEI were from boilers and laboratory fume hoods. Of the sources modeled, the fume hoods in the Physical Science Building contributed 9.9% of the cancer risk, followed by a Pentland boiler with 8% of the cancer risk.

Primary Chemical Contribution

- Off campus - The primary chemical contribution to the estimated cancer risk at the off-campus MEI was PAHs with approximately 80.2% of the risk, followed by diesel particulate matter with approximately 15.5% of the risk.
- On campus - The primary chemical contribution to the estimated cancer risk at the on-campus MEI was PAHs with approximately 85.5% of the risk, followed by diesel particulate matter at 11.2% of the cancer risk.

Chronic Noncancer Health Effects

Results of the chronic noncancer health effects assessment indicate that all of the HI values for each organ system are less than 1.0. Chronic HI values less than 1.0 indicate that noncancer effects from chronic exposure to emissions from routine campus-wide operations are unlikely.

- Off campus - The maximum chronic HI for an organ system was 0.007 at the off-campus MEI. The off-campus MEI was located on the fenceline north of the campus on Watkins Drive.
- On campus - The maximum chronic HI for an organ system was 0.008 at the on-campus MEI. The on-campus MEI was located at the student housing receptor near Lothian Residence Hall.

Acute Noncancer Health Effects

Results of the acute noncancer health effects assessment indicate that all of the HI values for each organ system are less than 1.0. Acute HI values less than 1.0 indicate that noncancer effects from acute exposure to emissions from routine campus-wide operations are unlikely.

- Off campus - The maximum acute HI for an organ system was 0.18 at the off-campus MEI. The off-campus MEI was located on the Fenceline north of the campus on Watkins Drive.
- On campus - The maximum acute HI for an organ system was 0.09 at the on-campus MEI. The on-campus MEI was located at the Child Development Center.

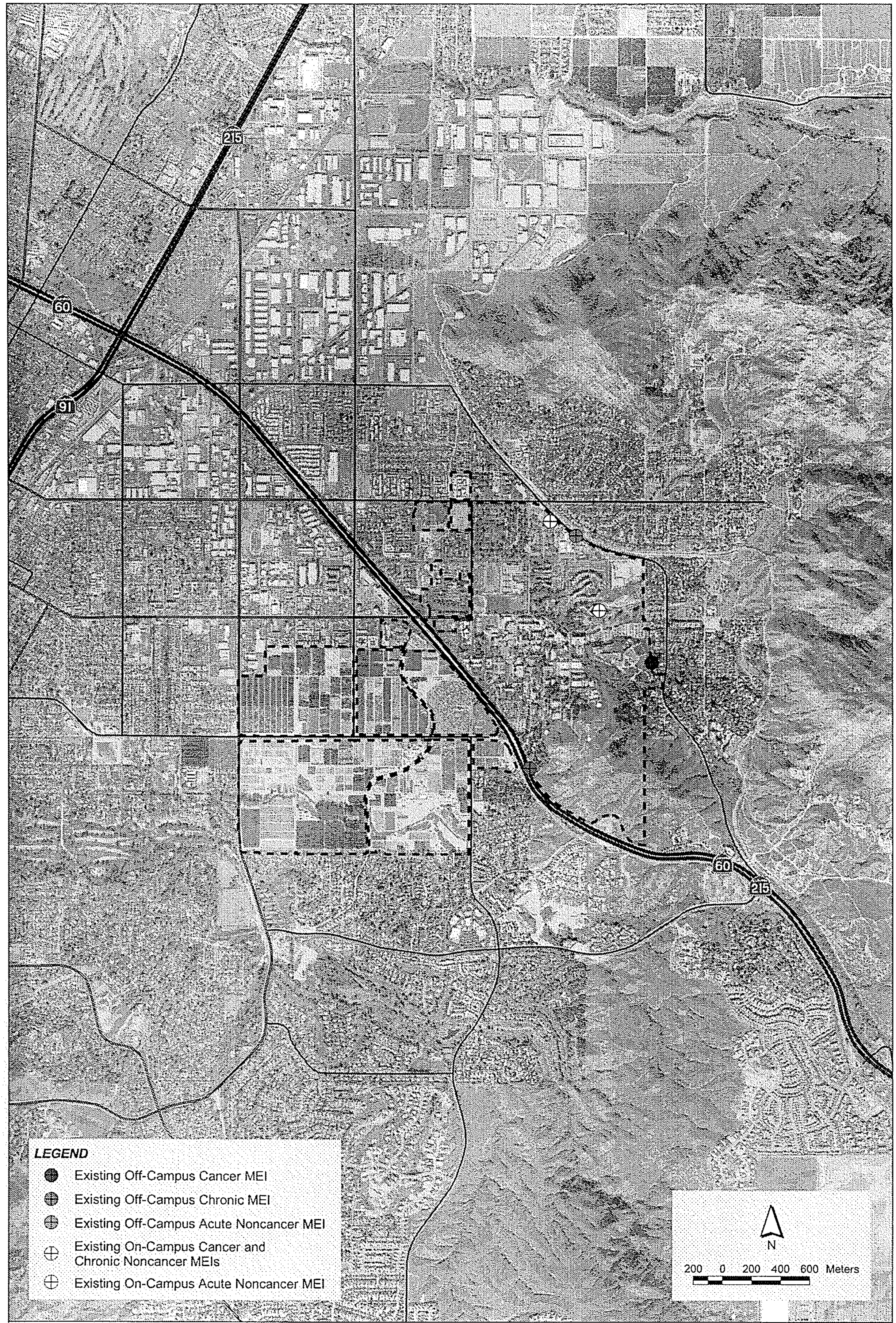
The cancer, chronic, and acute noncancer results for the off- and on-campus MEIs in the LRDP Scenario are presented in Table 2. The locations of the cancer, chronic noncancer, and acute noncancer off- and on-campus MEIs in the LRDP Scenario are presented in Figure ES-2.

Table 1. Summary of HRA Results for the Off- and On-campus MEIs in the Existing Scenario

	Result	Universal Transverse Mercator Coordinates		Location
		East (m)	North (m)	
Off-campus MEI				
Cancer Risk	4.99 x 10^{-6}	470660	3759199	Fenceline east of campus along the Teaching and Research Fields south of Parking Lot 13
Chronic HI	0.004	469818	3758466	Fenceline near College Place south of College Building South
Acute HI	0.07	470139	3760079	Fenceline north of campus along Watkins Drive
On-campus MEI				
Cancer Risk	6.64 x 10^{-7}	470300	3759560	Student housing receptor near Lothian Residence Hall
Chronic HI	0.003	470300	3759560	Student housing receptor near Lothian Residence Hall
Acute HI	0.03	469962	3760179	Child Development Center receptor

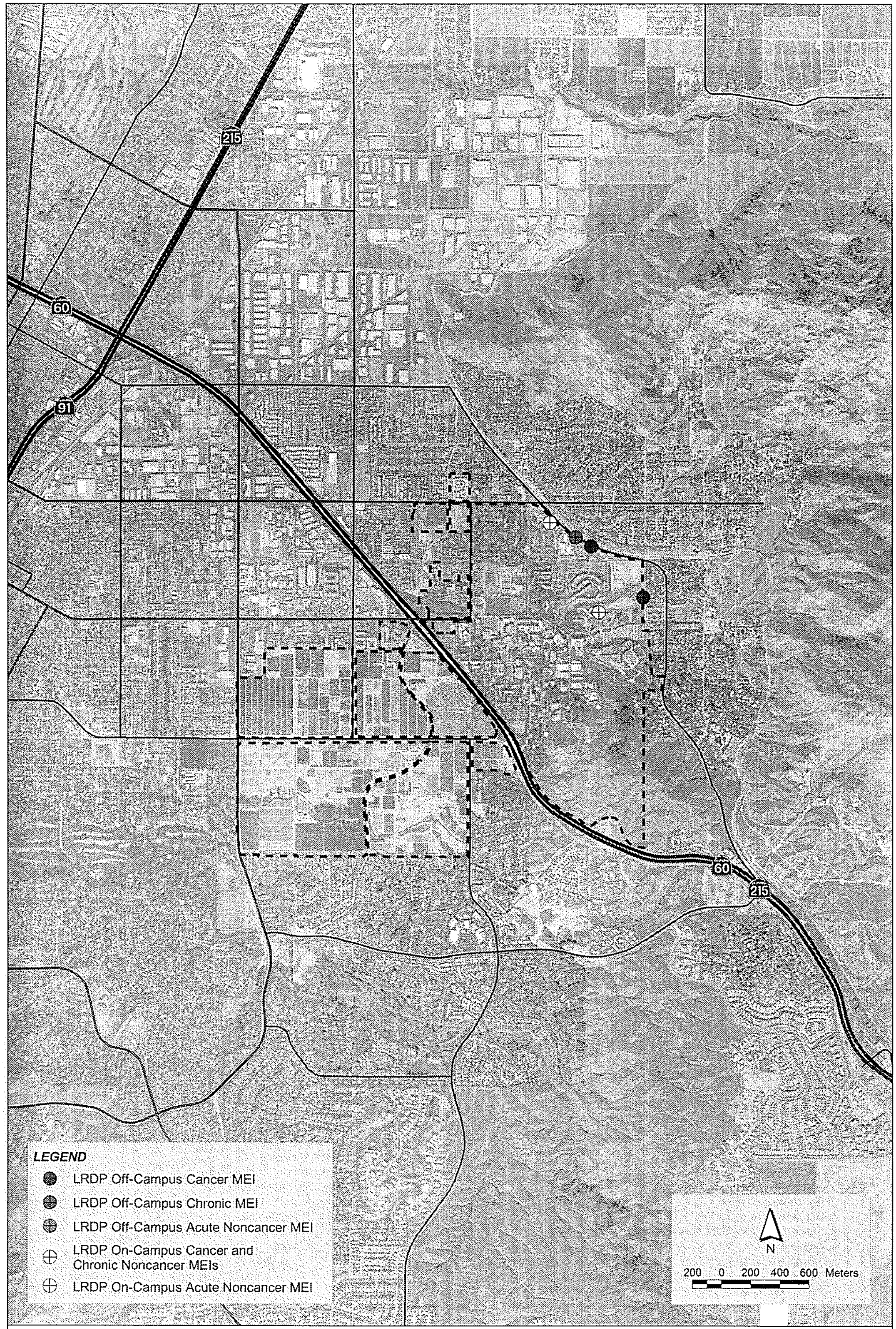
Table 2. Summary of HRA Results for the Off- and On-campus MEIs in the LRDP Scenario

	Result	UTM Coordinates		Location
		East (m)	North (m)	
Off-campus MEI				
Cancer Risk	7.43 x 10^{-6}	470606	3759669	Fenceline east of campus on Valencia Hills Drive north of Parking Lot 14
Chronic HI	0.007	470246	3760017	Fenceline north of Campus along Watkins Drive
Acute HI	0.18	470139	3760079	Fenceline north of campus on Watkins Drive
On-campus MEI				
Cancer Risk	1.48 x 10^{-6}	470300	3759560	Student housing receptor near Lothian Residence Hall
Chronic HI	0.008	470300	3759560	Student housing receptor near Lothian Residence Hall
Acute HI	0.09	469962	3760179	Child Development Center receptor



Locations of the Cancer, Chronic Noncancer and Acute Noncancer Off- and On-campus MEIs in the Existing Scenario

URS	Project No.: 29869454	Project: UC RIVERSIDE 2004 LRDP HRA	Date: March 2005	ES-1



Locations of the Cancer, Chronic Noncancer and Acute Noncancer Off- and On-campus MEIs in the LRDP Scenario

URS | Project No.: 29869454 | Project: UC RIVERSIDE 2004 LRDP HRA | Date: March 2005 | ES-2

1.0 INTRODUCTION

1.1 PURPOSE OF ASSESSMENT

URS Corporation (URS) was contracted by the University of California, Riverside (UCR), Office of Academic Planning and Budget, Capital and Physical Planning to prepare a Health Risk Assessment (HRA) in support of the preparation of the proposed 2005 Long Range Development Plan (LRDP) Environmental Impact Report (EIR) for UCR. The LRDP addresses the anticipated growth in student enrollment to 25,000 students at the campus through the threshold year 2015. The HRA evaluates the potential health risks posed by current and projected campus-wide operations at off- and on-campus locations. Results are presented for two scenarios:

1. Existing Scenario; and
2. LRDP Scenario.

The results presented for the Existing Scenario represent the potential health risks posed by campus-wide operations in academic year 2004-05. The results presented for the LRDP Scenario represent the potential health risks posed by campus-wide operations under the Existing Scenario combined with potential new development considered in the 2005 LRDP.

1.2 OVERVIEW OF DOCUMENT

The campus conducts routine operations that generate emissions regulated by the State of California. The sources of emissions include natural gas combustion sources such as a pathological incinerator, boilers and kitchen grills, gasoline dispensing operations, emergency generators driven by internal combustion engines (ICEs), painting operations, and laboratory fume hoods (chemical usage). The HRA evaluated potential health risk impacts associated with the toxic air contaminant (TAC) emissions from these sources based on current and projected future fuel, material, and chemical usage considered representative of the current and projected future routine campus-wide operations through a horizon year 2015. The HRA also evaluated the potential health risks associated with TAC emissions from diesel-fueled delivery trucks traveling on campus roads to make deliveries.

The HRA was prepared in accordance with the most recent California Environmental Protection Agency, Office of Environmental Health Hazard Assessment (OEHHA) risk assessment guidelines. In addition, the HRA incorporated the most recent toxicological values published by the OEHHA. Use of the OEHHA guidelines, which have been adopted by the South Coast Air Quality Management District (SCAQMD), results in a worst-case analysis of risk. For example, the theoretical incremental cancer risk estimated in this HRA is based on an individual being continuously exposed to emissions from routine campus-wide operations for 24 hours per day, 365 days per year, for 70 years at the same specific location. Actual risks are likely to be substantially lower than those estimated using the OEHHA guidelines and could even approach zero.

A standard HRA, such as this, consists of four basic steps to assess potential public health risk from a particular facility:

1. Emissions of TACs from the facility are quantified and segregated according to source type;
2. Ground-level impacts resulting from the transport and dilution of these emissions through the atmosphere are assessed by air dispersion modeling;
3. Potential public exposure to these compounds resulting from this atmospheric transport are calculated; and
4. Potential cancer and non-cancer health risks resulting from the calculated exposures are estimated using dose-response relationships developed from toxicological data.

In general, there are uncertainties at every step of the process, but the cumulative assumptions of risk assessments that follow standard regulatory practices, as this one does, are more likely to cause an overprediction of health risks rather than an underestimation, probably by a substantial margin. The following factors may contribute to an overprediction of health risks:

1. A regulatory air dispersion model that tends to overpredict ground-level chemical concentrations;
2. State-approved toxicity factors developed from human and animal data thought to represent an upper bound of potential cancer potency factors and the most sensitive responses to non-carcinogens;
3. An assumption of continuous 70-year exposure at a single off-campus residential location;
4. An assumption of continuous exposure as a student over an assumed 9-year exposure period at a single on-campus location; and
5. An assumption of a continuous 9-year exposure period as a child at a daycare center location.

This document is organized as follows:

- Section 2.0 reviews background site information and the regulatory setting for air toxics locally and in California;
- Section 3.0 describes the assessment of emissions from existing activities and potential activities due to the implementation of the 2005 LRDP;
- Section 4.0 presents the methodologies used for assessing ground-level concentrations from the emission sources through air dispersion modeling and the calculation of environmental exposures as a result of the assessed dispersion of TACs;
- Section 5.0 provides the toxicity factors used to assess potential cancer and non-cancer health risks from the calculated exposures;
- Section 6.0 discusses the results of this HRA;
- Section 7.0 evaluates the uncertainties associated with the overall HRA process;
- Section 8.0 lists pertinent references used in the development of this document; and
- The appendices provide technical support information.

2.0 BACKGROUND

2.1 ENVIRONMENTAL SETTING

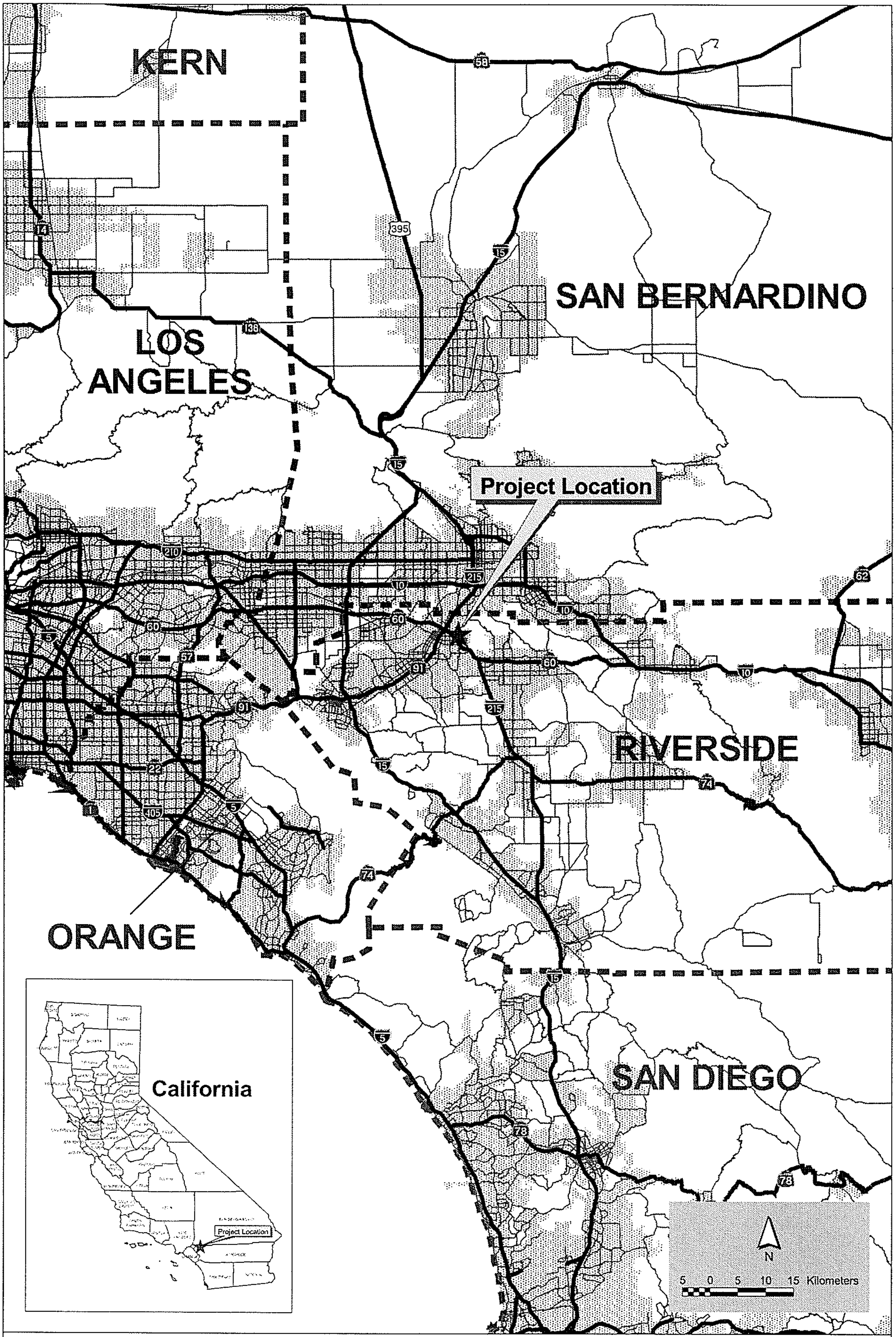
2.1.1 Site Location and Ambient Conditions

UCR is one of 10 campuses that comprise the University of California system. The UCR campus is located in the City of Riverside, three miles east of downtown Riverside and just west of the Box Spring Mountains. The City of Riverside is located within the County of Riverside, in a larger geographic area known as the Inland Empire, which is composed of western Riverside and San Bernardino Counties. The campus is generally bounded by Blaine Street on the north, Watkins Drive on the east, a line extending east from Le Conte Drive on the south, and Chicago Avenue on the west. The campus is bisected diagonally by the I-215/SR-60 freeway.

The campus consists of approximately 1,112 acres, with approximately 600.8 acres east of the freeway serving as the academic core and the location for the majority of existing academic, housing, and support facilities. The portion of the campus west of the freeway (approximately 511.3 acres) is primarily occupied by agricultural teaching and research fields, except for the University Extension (UNEX) and office facility (Highlander Hall), the International Village (student housing complex), Human Resources Office Building, and a large surface parking lot (No. 30). The campus provides a notable economic, employment, and cultural benefit to its surrounding community. A site location map and a map of the UCR campus are provided on Figures 1 and 2.

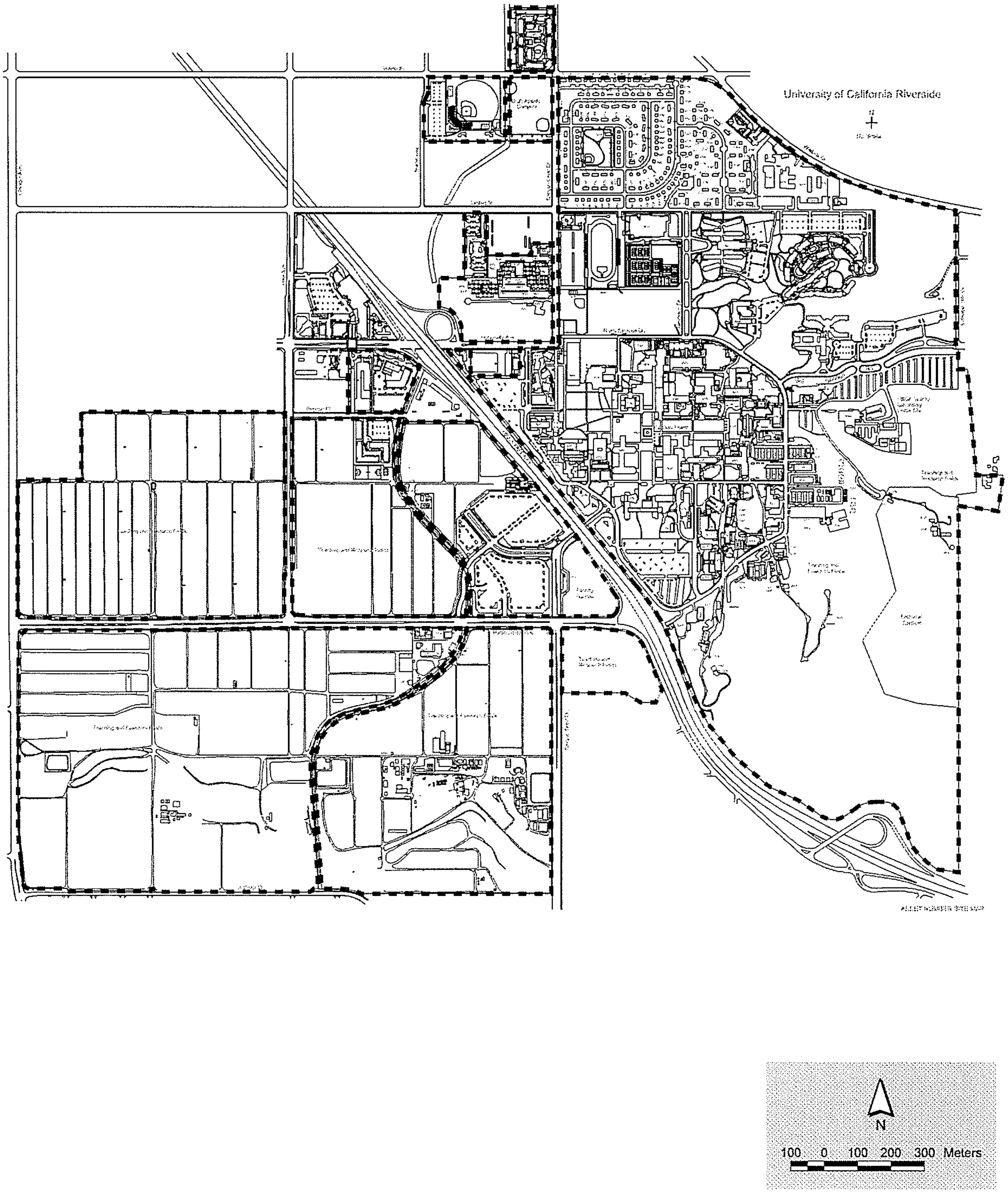
The land uses surrounding the campus in the City of Riverside are primarily residential, with some commercial uses along the major streets. To the north of the campus, the area is comprised of residential uses, open space, and some industrial uses. To the east, the adjacent land uses are primarily single-family residential, with the Box Spring Mountains further to the east. The southern border of the campus is generally defined by the I-215/SR-60 freeway and a line roughly following Le Conte Drive to the west. To the south and west, residential and commercial uses are adjacent to the campus. The western portion of the campus, primarily occupied by agricultural teaching and research fields, is generally separated from commercial uses along University Avenue by multi-family residential structures.

Riverside experiences hot, dry summers, and cool winters. During the summer months, average maximum temperatures are in the upper-80s to low-90s, with a normal high of about 94°F in July. Average maximum winter temperatures are in the mid to high-60s. Average minimum temperatures are in mid-50s in the summer and the low 40s in the winter, with a normal low of 42°F in January. Regional winds in Riverside are predominantly blowing from the west-northwest with annual average wind speed of approximately 7 miles per hour.



Site Location Map

Project No.: 29869454 | Project: UC RIVERSIDE 2004 LRDP HRA | Date: March 2005 | Figure 1



UCR Campus Map

URS	**Project No.: 29869454**	**Project: UC RIVERSIDE 2004 LRDP HRA**	**Date: March 2005**	**Figure 2**

2.1.2 Existing Toxic Air Contaminant Levels

Air toxics monitoring stations are located throughout California. These stations, maintained either by the California Air Resources Board (CARB) or the local air pollution control district (APCD), monitor and record existing levels of various organic gases and metals in air.

Several TAC air monitoring stations are located throughout the South Coast Air Basin. These air monitoring stations are located in Los Angeles, Riverside, and San Bernardino Counties. Based on the data collected, CARB has provided annual average concentrations of the top 10 air toxics and 70-year cancer health risks for each monitoring station. The data are provided in the document, *The California Almanac of Emissions and Air Quality – 2005 Edition,* produced by CARB. The TAC monitoring station located in Riverside County is known as the Riverside-Rubidoux station (Site #33144), approximately 6 miles north-northwest of UCR. The Riverside-Rubidoux station is located in an urbanized area, therefore, the data from this monitor can be considered representative of the TAC concentrations near UCR. The annual average TAC concentrations and associated estimated health risks in Riverside County and in the South Coast Basin are presented in Table 3 for selected years. In the case of diesel particulate matter (DPM), CARB states that because a routine method for monitoring ambient concentrations was not available (CARB 2005), preliminary estimates of background DPM levels were made based on the PM_{10} emissions database, PM_{10} ambient monitoring data, several studies with chemical speciation of ambient PM_{10}, and receptor modeling techniques. As such, since 1990, annual average concentrations of TACs in Riverside County have declined due to the implementation of air toxics control programs. Excluding DPM, the estimated Riverside County TAC background cancer risk was 429 in one million in 1990 and 274 in one million in 2000. In comparison, the corresponding background cancer risk within the South Coast Basin was 616 in one million (1696 in one million with DPM) in 1990 and 285 in one million (1005 in one million) in 2000. Estimated cancer risks have been reported to have further declined in 2003. These estimates are consistent with the results presented in a report published by SCAQMD at the conclusion of the Multiple Air Toxics Exposure Study (MATES-II) (SCAQMD 2000) where the Riverside-Rubidoux station was one of the 10 sites where monitoring was conducted. The SCAQMD is conducting a follow-on study, MATES-III, which will report further on Basin-wide TAC impacts.

The calculated average cancer risk values from monitored TACs can be compared against the lifetime probability of being diagnosed with cancer in the United States from all causes, which is about 40%, or 400,000 in a million (National Cancer Institute (NCI) 2000). Medical advances have improved cancer cure rates such that the lifetime probability of dying from cancer in the United States today is about 22% or 220,000 in a million (NCI 2000), or about 55% of the lifetime probability of a cancer diagnosis. It is generally believed that a large portion of these cancer cases come from lifestyle factors such as smoking and diet, as well as genetic susceptibilities, natural radiation including radon, and other factors.

Table 3. Background Concentrations and Estimated Cancer Risks Associated With Selected TAC Emissions in Riverside County

Station	TAC	Annual Average Concentration[a]			Cancer Risk[b]		
		1990	2000	2003	1990	2000	2003
Riverside – Rubidoux	Acetaldehyde	1.87	1.49	1.66	9	7	8
	Benzene	2.55	0.85	0.62	236	79	58
	1,3-Butadiene	0.34	0.19	0.12	128	72	44
	Carbon Tetrachloride	0.13	0.10	0.09	34	25	24
	Chromium (Hexavalent)	--[d]	0.35	0.35	--	52	52
	para-Dichlorobenzene	--[d]	0.14	0.17	--	9	12
	Formaldehyde	1.75	3.17	4.18	13	23	31
	Methylene Chloride		0.69	0.45	--	2	2
	Perchloroethylene	0.24	0.13	0.06	9	5	2
	DPM[c]	--[d]	--[d]	--[d]	--	--	--
Total Health Risk[f]					**429**	**274**	**233**
South Coast Air Basin	Acetaldehyde	2.46	1.26	1.47	12	6	7
	Benzene	3.42	0.97	0.75	317	90	69
	1,3-Butadiene	0.53	0.25	0.15	200	94	55
	Carbon Tetrachloride	0.14	0.10	0.09	36	25	25
	Chromium (Hexavalent)	--[d]	0.18	0.16		27	24
	para-Dichlorobenzene	--[d]	0.13	0.17		9	11
	Formaldehyde	2.92	3.13	3.83	22	23	28
	Methylene Chloride	1.86	0.83	0.59	6	3	2
	Perchloroethylene	0.58	0.21	0.11	23	8	4
	DPM	3.6	2.4	--[d]	1080	720	--
Total Health Risk[f]					**613** (1696[e])	**285** (1005[e])	**225**

[a] Concentrations for Chromium (Hexavalent) are in mg/m^3 and concentrations for DPM are in $\mu g/m^3$. All other concentrations are in parts per billion.

[b] Cancer risk represents the number of excess cancer cases per million people based on a lifetime (70-year) exposure to the annual average concentrations.

[c] DPM concentrations are estimates based on receptor modeling. Estimates are available only for selected years.

[d] No monitoring data available.

[e] Estimated cancer risk including DPM.

[f] Total Health Risk value excludes contribution of DPM.

Source: *The California Almanac of Emissions and Air Quality – 2005 Edition*, CARB 2005.

2.2 REGULATORY SETTING

The air pollutants of concern in this study are TACs (also referred to as "hazardous air pollutants"), substances for which specific air quality standards have not been established, but which are capable of causing short-term (acute) and/or long-term (chronic or carcinogenic) adverse human health effects. These TACs, however, are subject to a wide variety of federal, state, and regional regulations.

2.2.1 Federal

TACs have been regulated at the federal level since the Clean Air Act (CAA) of 1977. Following the passage of this law, regulations for seven hazardous air pollutants (HAPs) were promulgated as National Emission Standards for Hazardous Air Pollutants (NESHAPs) over a 13-year period. The federal Clean Air Act Amendments (CAAA) of 1990 revamped the NESHAPs program to offer a technology-based approach for reducing the emissions of a greater number of toxic air compounds. Under the 1990 CAAA, 189 substances were identified as HAPs and slated for regulation through the Federal Operating Permit Program.

2.2.2 State

California's air toxics control program began in 1983 with the passage of the Toxic Air Contaminant Identification and Control Act, better known as Assembly Bill (AB) 1807 or the Tanner Bill. The Tanner Bill established a regulatory process for the scientific and public review of individual toxic compounds. When a compound becomes listed as a TAC under the Tanner process, the CARB normally establishes minimum statewide emission control measures to be adopted by local APCDs.

The second major component of California's air toxics program, supplementing the Tanner process, was provided by the passage of AB 2588, the Air Toxics "Hot Spots" Information and Assessment Act of 1987. AB 2588 currently regulates over 600 compounds, including all of the Tanner-designated TACs. Under AB 2588, specified facilities must quantify emissions of regulated TACs and report them to the local APCD. If the APCD determines that a potentially significant public health risk is posed by a given facility, the facility is required to perform an HRA and notify the public in the affected area if the calculated risks exceed specified criteria.

In addition to the above, Proposition 65 was passed by California voters in 1986, Proposition 65 required that a list of carcinogenic and reproductive toxicants found in the environment be compiled, the discharge of these toxicants into drinking water be prohibited, and warnings of public exposure by air, land, or water be posted if a potential public health risk is posed. The handling, production or emission of any of these substances by a facility would require a public warning unless health risks could be demonstrated to be insignificant. For carcinogens, Proposition 65 defines the "no significant risk level" as the level of exposure that would result in an increased cancer risk of greater than 10 in one million over a 70-year lifetime. This program is currently administered by OEHHA.

CARB formally identified particulate matter emitted by diesel-fueled engines as a TAC in 1998. This action was taken at the end of a lengthy process that considered dozens of health studies, extensive analysis of health effects and exposure data, and public input collected over many years. The CARB action will lead to additional control of diesel engine emissions in coming years by the CARB. The U.S. Environmental Protection Agency (EPA) has also been evaluating both the cancer and noncancer health effects of diesel exhaust, and recently issued its final health assessment for diesel engine exhaust (EPA 2002a).

In September 2000, the CARB approved the *Risk Reduction Plan to Reduce Particulate Matter Emissions from Diesel-Fueled Engines and Vehicles* (Diesel Risk Reduction Plan) (CARB 2000a). The Diesel Risk Reduction Plan outlines a comprehensive and ambitious program that includes the development of numerous new control measures over the next several years aimed at substantially reducing emissions from new and existing on-road vehicles (e.g., heavy-duty trucks and buses), off-road equipment (e.g., graders, tractors, forklifts, sweepers, and boats), portable equipment (e.g., pumps), and stationary engines (e.g., stand-by power generators). A number of air toxics control measures (ATCMs) have been developed and others are in the process of being developed.

Many laboratory fume hoods are operated on the UCR campus. Title 8 of the California Code of Regulations contains California Occupational Safety and Health Administration requirements for these emission sources. The regulations are associated with worker health and safety requirements for the operation and use of fume hoods. In addition, the code establishes specific requirements for the use and storage of chemicals.

2.2.3 Regional

In compliance with federal law, the SCAQMD implements federal TAC regulatory requirements through the Federal Operating Permit Program. The SCAQMD has also developed various rules for specific TAC source categories. The SCAQMD's permitting program also includes a regulation that requires certain new or modified TAC emission sources to demonstrate that potential health risks are below stated thresholds.

In compliance with state law, the SCAQMD also administers the AB 2588 Air Toxics "Hot Spots" Program. Facilities must periodically report their TAC emissions and if the SCAQMD determines that the facility poses a potential public health risk, the facility must perform an HRA. If the estimated health risks exceed threshold levels, the public in the affected area must be notified. The notification threshold is a cancer risk of 10 in one million and a hazard index (HI) of 1.0. In cases where risks exceed specified action levels, steps must be taken to reduce emissions including the preparation of a risk reduction plan.

2.3 POTENTIAL EFFECTS

2.3.1 Cancer Risk

Cancer risk is defined as the lifetime probability (chance) of developing cancer from exposure to a carcinogen, typically expressed as the increased chances in a million. The cancer risk for an inhaled TAC is estimated by multiplying the exposure concentration (in micrograms per cubic meter [$\mu g/m^3$]), by its cancer "unit risk factor" (URF), which is the estimated cancer risk for a continuous exposure to 1 $\mu g/m^3$ of the substance over a specified averaging time, usually assumed as 70 years in a lifetime. Cancer toxicity factors are discussed in more detail in Section 6.1.

For particulate-bound pollutants, exposure could also come from indirect environmental pathways, such as deposition on the soil, followed by exposure through soil ingestion or absorption of the pollutant from soil adhered to the skin. Other potential ingestion pathways, such as ingestion of crops grown in soil potentially affected by deposited air pollutants may be included, if applicable. Non-inhalation cancer risk is calculated from cancer toxicity factors and exposure assumptions, as described further in Sections 5.0 and 6.0.

Cancer risks are calculated for all carcinogenic TACs and the results summed to calculate an overall cancer risk for all chemicals. The calculation procedure assumes that cancer risk is proportional to concentration at any level of exposure; that is, there is no dose that would result in a zero probability of contracting cancer. This is generally considered to be a conservative assumption at low doses, as some theories on carcinogenisis assume that certain chemicals may require a threshold level or interaction with other agents, while others say that cancer can form at any exposure level. The zero-threshold approach is consistent with the current OEHHA regulatory guidance.

2.3.2 Non-Cancer Health Risk

Acute and chronic noncancer health impacts are expressed as a hazard quotient (HQ) for individual TACs and as an HI for the accumulated value for multiple TACs. Hazard quotients are estimated for each target organ system that is impacted and the HI for multiple TACs is determined by summing the hazard quotients for all TACs that affect the same target organ system. The HQ is the ratio of the reported or calculated concentration (or dose for the non-inhalation pathway for chronic exposure) and the corresponding reference exposure level (REL) identified by OEHHA. For chronic exposure, HIs are calculated by summing the HQs for TACs that impact the same target organ system for both inhalation and non-inhalation exposure pathways. For acute exposure, HIs are calculated by summing the HQs for TACs that impact the same target organ system for only the inhalation pathway. This approach is consistent with the current OEHHA regulatory guidance. Noncancer toxicity factors are discussed in Section 5.0.

2.4 SIGNIFICANCE CRITERIA

The significance level used in this study for the maximum lifetime cancer risk associated with total campus emissions (current operations plus proposed future LRDP projects) is **10 in one million**. Under various state and local regulations, a cancer risk from an existing facility of 10 in one million or greater is generally considered to be significant enough to warrant public notification. This includes the Air Toxics "Hot Spots" (AB 2588) Program and Proposition 65.

The cumulative exposure to compounds that can cause non-cancer health effects must be below applicable RELs, as represented by HIs. The total HI must be below a value of 1.0 for the maximally impacted organ system in order for the cumulative exposure to be considered insignificant. Thus, a **total HI of 1.0** is the significance level in this study for chronic or acute non-cancer health effects, which is consistent with the SCAQMD's implementation of the State of California AB 2588 Program.

3.0 HAZARD IDENTIFICATION

Hazard identification is the step that identifies whether a substance is a potential human carcinogen or is capable of causing adverse noncancer health effects. This step also identifies the sources of TAC emissions and the emission rates of those TACs.

3.1 EMISSIONS QUANTIFICATION

The analysis evaluated TAC emissions from various sources associated with routine, campus-wide operations as well as emissions of DPM from diesel-fueled delivery trucks traveling on campus roads to make deliveries. Emissions were evaluated to account for current and future operations associated with growth to 25,000 students. The following emission source-types were included in the analysis:

- Combustion sources:
  - Pathological incinerator,
  - Kitchen equipment,
  - ICEs, and
  - Boilers;
- Gasoline dispensing operations;
- Painting operations;
- Laboratory chemical usage; and
- Diesel-fueled delivery trucks.

The TAC emission sources included in this HRA, except for the delivery trucks, were identified in a recent Screening HRA (Geomatrix, 2002) and in an Annual Emission Report (AER) for the 2003-2004 reporting year that was prepared by UCR for the SCAQMD. Diesel-fueled delivery trucks were included based on information provided by UCR staff and EIP Associates, the consultants preparing the EIR. Emission estimates for the future scenario (also referred to as the LRDP Scenario) were derived from the current scenario by applying growth factors based on either the projected increase in built-up area or student population. The emission estimates were primarily derived from usage and emission factor data presented in the 2003-2004 AER. The emission rates by TAC for the existing and future scenarios are provided in Table 4. The growth factors that were presented in the Screening HRA are described in Table 5. The emission rates by TAC by source are provided in Appendix A.

3.1.1 Combustion Sources

Combustion sources evaluated in this HRA included a pathological incinerator, grills in various on-campus kitchens, diesel-fueled ICEs that drive emergency generators at various campus locations and natural gas-fired boilers at various campus locations. TAC emission rates from the combustion sources are presented in Table 6.

3.1.1.1 Pathological Incinerator

This emission source is located at the Life Sciences Building and is fired with natural gas. The incinerator is used to treat biological waste from campus operations. The incinerator is used about 44 times per year with about 2 hours per use. According to UCR staff, use of this incinerator is not expected to increase to any significant extent with campus growth. Annual emission rates were estimated based on the annual fuel usage while the hourly emission rates were estimated from the annual fuel usage and the number of hours of usage during the year.

3.1.1.2 Kitchens

The campus operates kitchens at Lothian Residence Hall, Aberdeen-Inverness Residence Hall, University Commons, Barn Group/University Club, and UCR Extension Center. The grills at Lothian Residence Hall, Aberdeen-Inverness Residence Hall, and University Commons make up most of the natural gas usage in the kitchens on the campus. Therefore, the total natural gas usage in the kitchens is evenly distributed across these three locations. The emission estimates are based on a 13 hours/day, 5 days/week, and 52 weeks/year operating schedule. A growth factor equal to the projected increase in area of residential housing was applied to estimate emission rates for the LRDP Scenario. Annual emission rates were estimated based on the annual fuel usage while the hourly emission rates were estimated from the annual fuel usage and the number of hours of usage during the year.

3.1.1.3 Diesel-fueled Internal Combustion Engines

The campus has a large number of ICEs that are used to drive emergency generators at various locations on campus. The ICEs range in size from less than 50 brake horsepower (bhp) to over 600 bhp with most of the ICEs being less than 150 bhp. Unless there is an emergency, these engines are run only for maintenance and testing purposes. The emission estimates are based on a 1 hour/month, 12 months/year operating schedule. The maintenance and testing schedule for ICEs is not expected to change with campus growth. Annual emission rates were estimated based on the annual fuel usage while the hourly emission rates were estimated from the annual fuel usage and the number of hours of usage during the year. In the future, these generators are likely to be replaced with a smaller number of larger, lower-emitting generators that will serve groups of buildings. Therefore, emissions from ICEs are not expected to increase.

3.1.1.4 Boilers

UCR operates boilers at Pentland Hills Residence Hall, Lothian Residence Hall, Aberdeen-Inverness Residence Hall and at the Central Steam Plant. The 16 Pentland Hills Residence Hall boilers are all rated at less than 2 MMBTU/hr while the four boilers at Lothian Residence Hall and Aberdeen-Inverness Residence Hall are all rated at about 9.5 MMBTU/hr. Three boilers at the Central Steam Plant are rated at 39 MMBTU/hr while the fourth boiler is rated at about 81 MMBTU/hr. These boilers provide steam and hot water for use on the UCR campus. The emission estimates assume continuous operation throughout the year. A growth factor equal to the projected increase in area of residential housing was applied to estimate emission rates for the LRDP Scenario for the residence hall boilers. A 175% growth factor based on the projected increase in steam demand was applied to the Central Steam Plant boilers to estimate emission rates for the LRDP Scenario. Annual and hourly emission rates are the same and are derived from the annual fuel usage.

3.1.2 Gasoline Dispensing Operations

Gasoline is dispensed at three locations on the UCR campus to service university vehicles (Fleet), Landscape and Refuse Services operations (Grounds) and agricultural operations vehicles (Agricultural Operations). According to the 2003-2004 AER about 135,000 gallons were dispensed under the existing scenario at the three locations combined. Seventy percent was dispensed at Fleet while the remaining 30% was equally distributed between Grounds and Agricultural Operations. The emission estimates are based on a 13 hours/day, 5 days/week, and 52 weeks/year operating schedule. A growth factor equal to the projected increase in campus area was applied to estimate emission rates for the LRDP Scenario. Annual emission rates were estimated based on the volume of gasoline dispensed during the year while the hourly emission rates were estimated from the volume of gasoline dispensed during the year and the number of hours over which gasoline was dispensed during the year. TAC emission rates from gasoline dispensing operations are presented in Table 7. About 2000 gallons of diesel was dispensed during the year. Emissions of TACs associated with the diesel dispensing operation was considered to be negligible and were not considered to be significant contributor to potential health effects in this HRA and were, therefore, not included in the HRA.

3.1.3 Painting Operations

Painting operations at UCR are carried out in spray booths in support of housing and physical plant activities. Emissions were estimated based on data derived from the material safety data sheets (MSDSs) provided by UCR and the annual usage reported in the 2003-2004 AER. The housing spray booth is used for approximately 80 hours annually, mostly over the summer months, while the physical plant spray booth is used for approximately 1200 hours annually. A growth factor equal to the projected increase in academic and residential space was applied to estimate the emission rates for the LRDP Scenario. Annual emission rates were estimated based on the volume of materials used in the spray booths during the year while the hourly emission rates were estimated from the volume of materials used in the spray booths during the year and the number of operating hours of the spray booths over the year. TAC emission rates from painting operations are presented in Table 8.

3.1.4 Laboratory Chemical Usage

Laboratory chemicals are used in over 800 fume hoods in about 50 buildings on the UCR campus. The annual chemical usage is tracked in a campus-wide chemical inventory database that was used to report emissions in the 2003-2004 AER. Emissions estimates for this HRA were derived from the emissions reported in the 2003-2004 AER by distributing the cumulative, campus-wide emissions over the buildings with fume hoods. Emissions from fume hoods in buildings with fewer than five fume hoods were distributed over the buildings with more than 5 fume hoods for evaluation in the HRA. The distribution by building was done according to the fraction of the total campus hoods that are in each building. The emission estimates assume continuous operation throughout the year. A growth factor equal to the increase in wet lab space was applied to estimate emission rates for the LRDP Scenario. Annual and hourly emission rates are the same because the emissions occur continuously during the year. TAC emission rates from laboratory chemical usage are presented in Table 9.

3.1.5 Diesel-fueled Delivery Trucks

In support of ongoing campus operations, diesel-fueled delivery trucks owned and operated by freight-forwarding, commercial delivery and supply companies travel on campus roads. DPM emissions from these trucks were included in the evaluation conducted in this HRA. Since campus traffic studies to-date do not have specific traffic counts for these trucks, counts for the existing scenario were estimated by UCR staff and provided to URS. The estimated daily diesel-fueled delivery truck counts are as follows: Light-heavy Duty – 30 trucks/day, Medium-heavy Duty – 10 trucks/day, and Heavy-heavy Duty – 5 trucks/day. A growth factor equal to the increase in student population was applied to truck traffic counts for the LRDP Scenario.

The emission factor for DPM was assumed to be equal to the emission factor for particulate matter less than 10 microns in aerodynamic diameter (PM_{10}). PM_{10} emission factors were estimated using the latest CARB on-road vehicle emissions model, EMFAC 2002, in units of grams per mile. This model is based on fleet characteristics within a particular air basin or county. Emission factors for future years are generally lower to account for improvements in technology and fleet turnover of old equipment with new equipment.

Delivery truck traffic on campus was assumed to occur 13 hours/day, 260 days/year. The total travel distance for every truck on campus roads was estimated to be about 6.5 miles, even though it is likely that many trucks will typically travel less than that distance. The composite delivery route is assumed to be generally representative of the Existing and LRDP Scenarios. DPM emission rates from diesel-fueled delivery trucks are presented in Table 10.

3.2 HEALTH EFFECTS

Table 11 identifies the substances included in the HRA for both Scenarios and the potential health effects for which the substances were evaluated. The same substances were evaluated in both Scenarios.

Table 4. Emissions Evaluated in the HRA for the Existing and LRDP Scenarios

CAS Number	Substance	Existing Scenario		LRDP Scenario	
		(lbs/yr)	(lbs/hr)	(lbs/yr)	(lbs/hr)
1104	Fluorocarbons(Chlorinated)	1.28	0.00	2.13	0.00
1151	PAHs-w/o Individual components	0.41	0.00	0.90	0.00
9901	Diesel particulate matter	50.02	0.27	42.82	0.27
50000	Formaldehyde	16.25	0.01	28.43	0.01
56235	Carbon Tetrachloride	6.01	0.00	9.97	0.00
67561	Methanol	19.86	0.02	58.40	0.05
67630	Isopropyl Alcohol	70.48	0.42	207.22	1.23
71432	Benzene	14.33	0.00	23.22	0.00
71556	Methyl Chloroform	0.00	0.00	0.00	0.00
74873	Methyl Chloride	0.00	0.00	0.00	0.00
75014	Vinyl Chloride	0.00	0.00	0.01	0.00
75070	Acetaldehyde	1.07	0.00	2.24	0.00
75092	Methylene Chloride	203.03	0.14	546.46	0.40
75218	Ethylene Oxide	0.04	0.00	0.07	0.00
78933	Methyl Ethyl Ketone	51.08	0.25	150.18	0.73
79016	Trichloroethylene	2.65	0.00	4.40	0.00
91203	Naphthalene	0.69	0.00	1.17	0.00
100414	Ethyl Benzene	31.24	0.12	89.86	0.37
106934	Ethyl Dibromide	0.43	0.00	0.71	0.00
106990	1,3-Butadiene	0.85	0.00	1.36	0.00
107028	Acrolein	0.89	0.00	1.78	0.00
107062	Ethylene Dichloride	1.20	0.00	1.98	0.00
108883	Toluene	151.24	0.83	436.88	2.45
110543	Hexane	1.59	0.00	3.31	0.00
111762	Ethylene Glycol Monobutyl Ether	78.16	0.63	229.80	1.85
115071	Propylene	183.42	0.02	383.30	0.03
123911	1,4-Dioxane	1.93	0.00	3.20	0.00
127184	Perchloroethylene	0.00	0.00	0.00	0.00
1330207	Mixed Xylenes	119.67	0.50	346.05	1.46
1746016	2,3,7,8-Tetrachlorodibenzo-p-dioxin	0.00	0.00	0.00	0.00
7439921	Lead	0.03	0.00	0.03	0.00
7440020	Nickel	0.00	0.00	0.00	0.00
7440382	Arsenic	0.00	0.00	0.00	0.00
7440439	Cadmium	0.04	0.00	0.04	0.00
7664417	Ammonia	3323.73	0.29	7358.13	0.50
18540299	Hexavalent Chromium	0.00	0.00	0.00	0.00

Note: Values listed as 0 are values that are less than 3 significant figures.

Table 5. Growth Factors from Existing to LRDP Scenario

Emission Source Description	Growth Factor
Laboratory Fume Hoods[1]	166%
Boilers - Steam Plant[2]	175%
Incinerator[3]	0%
Lothian Boilers[4]	364%
Aberdeen Boilers[4]	364%
Pentland Boilers[4]	364%
Kitchens[4]	364%
Gasoline Dispensing[5]	118%
Paint Usage[6]	294%
Diesel Delivery Trucks[7]	147%
Emergency Diesel Generators[8]	0%

[1] Increase in "wet" laboratory space proportional to 30% of the increase in academic space.
[2] Increase in demand for steam from existing boilers on east side. Assumed to be consistent with increase demand for refrigerant for campus.
[3] No growth projected.
[4] Increase in emissions from residential areas proportional to increase in housing space.
[5] Increase in gasoline/diesel usage proportional to increase in area of campus.
[6] Increase in paint usage proportional to increase in total space (academic and residential).
[7] Growth factor is the projected growth in student population.
[8] Existing generator inventory is likely to be replaced with fewer, larger-capacity, lower-emitting generators that will serve groups of buildings.

Source: Growth factors from Screening HRA (Geomatrix, 2002)

Table 6. TAC Emission Rates from Combustion Sources

Emission Source Description	CAS Number	Substance	Existing Scenario		LRDP Scenario	
			(lbs/yr)	(lbs/hr)	(lbs/yr)	(lbs/hr)
Boilers (all) - Steam Plant						
	1151	PAHs	2.82E-02	3.22E-06	4.94E-02	5.64E-06
	50000	Formaldehyde	3.47E+00	3.96E-04	6.07E+00	6.93E-04
	71432	Benzene	1.64E+00	1.87E-04	2.86E+00	3.27E-04
	75070	Acetaldehyde	8.75E-01	9.99E-05	1.53E+00	1.75E-04
	91203	Naphthalene	8.47E-02	9.66E-06	1.48E-01	1.69E-05
	100414	Ethyl Benzene	1.95E+00	2.22E-04	3.41E+00	3.89E-04
	107028	Acrolein	7.62E-01	8.70E-05	1.33E+00	1.52E-04
	108883	Toluene	7.48E+00	8.54E-04	1.31E+01	1.49E-03
	110543	Hexane	1.30E+00	1.48E-04	2.27E+00	2.59E-04
	115071	Propylene	1.50E+02	1.71E-02	2.62E+02	2.99E-02
	1330207	Xylenes	5.56E+00	6.35E-04	9.73E+00	1.11E-03
	7664417	Ammonia	2.50E+03	2.85E-01	4.37E+03	4.99E-01
Incinerator						
	1151	PAHs	2.08E-05	2.38E-07	2.08E-05	2.38E-07
	50000	Formaldehyde	8.72E-03	9.97E-05	8.72E-03	9.97E-05
	56235	Carbon Tetrachloride	1.10E-04	1.26E-06	1.10E-04	1.26E-06
	71432	Benzene	1.24E-02	1.42E-04	1.24E-02	1.42E-04
	71556	1,1,1-Trichloroethane	2.58E-03	2.95E-05	2.58E-03	2.95E-05
	74873	Chloromethane	1.17E-03	1.33E-05	1.17E-03	1.33E-05
	75070	Acetaldehyde	8.96E-04	1.02E-05	8.96E-04	1.02E-05
	75092	Methylene Chloride	2.18E-03	2.50E-05	2.18E-03	2.50E-05
	79016	Trichloroethene	2.98E-04	3.41E-06	2.98E-04	3.41E-06
	91203	Naphthalene	5.30E-03	6.05E-05	5.30E-03	6.05E-05
	100414	Ethyl Benzene	1.98E-03	2.26E-05	1.98E-03	2.26E-05
	107028	Acrolein	5.62E-04	6.43E-06	5.62E-04	6.43E-06

Emission Source Description	CAS Number	Substance	Existing Scenario		LRDP Scenario	
			(lbs/yr)	(lbs/hr)	(lbs/yr)	(lbs/hr)
	108883	Toluene	7.62E-03	8.71E-05	7.62E-03	8.71E-05
	110543	Hexane	1.31E-03	1.50E-05	1.31E-03	1.50E-05
	115071	Propylene	1.52E-01	1.74E-03	1.52E-01	1.74E-03
	127184	Perchloroethylene	3.17E-04	3.63E-06	3.17E-04	3.63E-06
	156592	1,2-Dichloroethene	7.45E-04	8.52E-06	7.45E-04	8.52E-06
	1330207	Xylenes	5.67E-03	6.48E-05	5.67E-03	6.48E-05
	1746016	Dioxin	4.53E-05	5.18E-07	4.53E-05	5.18E-07
	7439921	Lead	2.79E-02	3.19E-04	2.79E-02	3.19E-04
	7440020	Nickel	2.85E-03	3.26E-05	2.85E-03	3.26E-05
	7440382	Arsenic	2.20E-03	2.51E-05	2.20E-03	2.51E-05
	7440439	Cadmium	3.98E-02	4.55E-04	3.98E-02	4.55E-04
	7664417	Ammonia	3.75E+00	4.29E-02	3.75E+00	4.29E-02
	18540299	Hexavalent Chromium	4.41E-03	5.04E-05	4.41E-03	5.04E-05
Boiler (each) – Lothian						
	1151	PAHs	5.84E-04	6.67E-08	2.13E-03	2.43E-07
	50000	Formaldehyde	9.93E-02	1.13E-05	3.61E-01	4.13E-05
	71432	Benzene	4.67E-02	5.33E-06	1.70E-01	1.94E-05
	75070	Acetaldehyde	2.51E-02	2.87E-06	9.14E-02	1.04E-05
	91203	Naphthalene	1.75E-03	2.00E-07	6.38E-03	7.28E-07
	100414	Ethyl Benzene	5.55E-02	6.33E-06	2.02E-01	2.31E-05
	107028	Acrolein	1.58E-02	1.80E-06	5.74E-02	6.55E-06
	108883	Toluene	2.14E-01	2.44E-05	7.78E-01	8.88E-05
	110543	Hexane	3.68E-02	4.20E-06	1.34E-01	1.53E-05
	115071	Propylene	4.27E+00	4.87E-04	1.55E+01	1.77E-03
	1330207	Xylenes	1.59E-01	1.81E-05	5.78E-01	6.60E-05
	7664417	Ammonia	1.05E+02	1.20E-02	3.83E+02	4.37E-02

Emission Source Description	CAS Number	Substance	Existing Scenario		LRDP Scenario	
			(lbs/yr)	(lbs/hr)	(lbs/yr)	(lbs/hr)
Boiler (each) – Aberdeen						
	1151	PAHs	9.39E-04	1.07E-07	3.42E-03	3.90E-07
	50000	Formaldehyde	1.60E-01	1.82E-05	5.81E-01	6.63E-05
	71432	Benzene	7.51E-02	8.58E-06	2.73E-01	3.12E-05
	75070	Acetaldehyde	4.04E-02	4.61E-06	1.47E-01	1.68E-05
	91203	Naphthalene	2.82E-03	3.22E-07	1.03E-02	1.17E-06
	100414	Ethyl Benzene	8.92E-02	1.02E-05	3.25E-01	3.71E-05
	107028	Acrolein	2.54E-02	2.89E-06	9.23E-02	1.05E-05
	108883	Toluene	3.44E-01	3.92E-05	1.25E+00	1.43E-04
	110543	Hexane	5.92E-02	6.75E-06	2.15E-01	2.46E-05
	115071	Propylene	6.86E+00	7.84E-04	2.50E+01	2.85E-03
	1330207	Xylenes	2.55E-01	2.92E-05	9.30E-01	1.06E-04
	7664417	Ammonia	1.69E+02	1.93E-02	6.15E+02	7.02E-02
Boiler (each) – Pentland						
	1151	PAHs	6.36E-03	7.26E-07	2.32E-02	2.64E-06
	50000	Formaldehyde	1.35E-02	1.54E-06	4.92E-02	5.62E-06
	71432	Benzene	7.95E-05	9.08E-09	2.89E-04	3.30E-08
	75070	Acetaldehyde	3.42E-03	3.90E-07	1.24E-02	1.42E-06
	91203	Naphthalene	2.39E-04	2.72E-08	8.68E-04	9.91E-08
	100414	Ethyl Benzene	7.55E-03	8.62E-07	2.75E-02	3.14E-06
	107028	Acrolein	2.15E-03	2.45E-07	7.81E-03	8.92E-07
	108883	Toluene	2.91E-02	3.32E-06	1.06E-01	1.21E-05
	110543	Hexane	5.01E-03	5.72E-07	1.82E-02	2.08E-06
	115071	Propylene	5.81E-01	6.63E-05	2.12E+00	2.41E-04
	1330207	Xylenes	2.16E-02	2.47E-06	7.87E-02	8.99E-06
	7664417	Ammonia	1.43E+01	1.63E-03	5.21E+01	5.95E-03

Emission Source Description	CAS Number	Substance	Existing Scenario		LRDP Scenario	
			(lbs/yr)	(lbs/hr)	(lbs/yr)	(lbs/hr)
Kitchens (each)						
	1151	PAHs	5.17E-05	1.53E-08	1.88E-04	5.56E-08
	50000	Formaldehyde	8.78E-03	2.60E-06	3.20E-02	9.46E-06
	71432	Benzene	4.13E-03	1.22E-06	1.50E-02	4.45E-06
	75070	Acetaldehyde	2.22E-03	6.57E-07	8.09E-03	2.39E-06
	91203	Naphthalene	1.55E-04	4.59E-08	5.64E-04	1.67E-07
	100414	Ethyl Benzene	4.91E-03	1.45E-06	1.79E-02	5.29E-06
	107028	Acrolein	1.40E-03	4.13E-07	5.08E-03	1.50E-06
	108883	Toluene	1.89E-02	5.59E-06	6.88E-02	2.04E-05
	110543	Hexane	3.26E-03	9.63E-07	1.18E-02	3.51E-06
	115071	Propylene	3.78E-01	1.12E-04	1.37E+00	4.07E-04
	1330207	Xylenes	1.41E-02	4.16E-06	5.12E-02	1.51E-05
	7664417	Ammonia	9.30E+00	2.75E-03	3.39E+01	1.00E-02
Emergency Generators (All)						
	1151	PAHs	1.08E-03	1.29E-02	1.08E-03	1.29E-02
	9901	Diesel PM	9.96E-01	1.20E+01	9.96E-01	1.20E+01
	50000	Formaldehyde	5.13E-02	6.16E-01	5.13E-02	6.16E-01
	71432	Benzene	5.54E-03	6.65E-02	5.54E-03	6.65E-02
	91203	Naphthalene	5.86E-04	7.03E-03	5.86E-04	7.03E-03
	106990	1,3-Butadiene	6.46E-03	7.76E-02	6.46E-03	7.76E-02
	7664417	Ammonia	8.62E-02	1.03E+00	8.62E-02	1.03E+00

Table 7. TAC Emission Rates from Gasoline Dispensing Operations

Emission Source Description	CAS Number	Substance	Existing Scenario		LRDP Scenario	
			(lbs/yr)	(lbs/hr)	(lbs/yr)	(lbs/hr)
Ground Area	71432	Benzene	3.63E-01	1.07E-04	4.28E-01	1.27E-04
Fleet Area	71432	Benzene	1.69E+00	5.01E-04	2.00E+00	5.91E-04
Agriculture	71432	Benzene	3.63E-01	1.07E-04	4.28E-01	1.27E-04

Table 8. TAC Emission Rates from Painting Operations

Emission Source Description	CAS Number	Substance	Existing Scenario		LRDP Scenario	
			(lbs/yr)	(lbs/hr)	(lbs/yr)	(lbs/hr)
Paint Booth - Physical Plant						
	108883	Toluene	7.72E+01	6.44E-02	2.27E+02	1.89E-01
	1330207	Xylenes	7.41E+01	6.17E-02	2.18E+02	1.81E-01
	78933	MEK	3.17E+01	2.64E-02	9.31E+01	7.76E-02
	67630	Isopropyl Alcohol	3.79E+01	3.16E-02	1.12E+02	9.29E-02
	100414	Ethyl Benzene	1.92E+01	1.60E-02	5.63E+01	4.70E-02
	111762	EGBE (2-Butoxyethanol)	2.92E+01	2.43E-02	8.57E+01	7.14E-02
	75092	Methylene Chloride	1.64E+02	1.36E-01	4.81E+02	4.01E-01
	67561	Methanol	1.99E+01	1.66E-02	5.84E+01	4.87E-02
Paint Booth - Housing						
	108883	Toluene	6.49E+01	8.31E-01	1.97E+02	2.44E+00
	1330207	Xylenes	3.88E+01	4.98E-01	1.14E+02	1.46E+00
	78933	MEK	1.94E+01	2.49E-01	5.71E+01	7.32E-01
	67630	Isopropyl Alcohol	3.26E+01	4.17E-01	9.57E+01	1.23E+00
	100414	Ethyl Benzene	9.70E+00	1.24E-01	2.85E+01	3.66E-01
	111762	EGBE (2-Butoxyethanol)	4.90E+01	6.28E-01	1.44E+02	1.85E+00

Table 9. TAC Emission Rates from Laboratory Chemical Usage (Fume Hoods)

Emission Source Description	CAS Number	Substance	Existing Scenario		LRDP Scenario	
			(lbs/yr)	(lbs/hr)	(lbs/yr)	(lbs/hr)
Physical Sciences Building						
	1104	Chlorofluorocarbons	2.41E-01	2.75E-05	4.00E-01	4.57E-05
	1151	PAHs	4.81E-02	5.50E-06	7.99E-02	9.12E-06
	50000	Formaldehyde	2.15E+00	2.45E-04	3.57E+00	4.07E-04
	56235	Carbon Tetrachloride	1.13E+00	1.29E-04	1.88E+00	2.14E-04
	71432	Benzene	1.87E+00	2.13E-04	3.10E+00	3.54E-04
	75014	Vinyl Chloride	8.28E-04	9.45E-08	1.37E-03	1.57E-07
	75092	Methylene Chloride	7.41E+00	8.46E-04	1.23E+01	1.40E-03
	75218	Ethylene Oxide	8.09E-03	9.23E-07	1.34E-02	1.53E-06
	79016	Trichloroethylene	4.99E-01	5.69E-05	8.28E-01	9.45E-05
	91203	Naphthalene	1.09E-01	1.24E-05	1.81E-01	2.06E-05
	106934	Ethylene Dibromide	8.06E-02	9.20E-06	1.34E-01	1.53E-05
	106990	1,3-Butadiene	1.46E-01	1.67E-05	2.42E-01	2.77E-05
	107062	Ethylene Dichloride	2.25E-01	2.57E-05	3.73E-01	4.26E-05
	123911	1,4-Dioxane	3.62E-01	4.13E-05	6.01E-01	6.86E-05
Pierce Hall						
	1104	Chlorofluorocarbons	2.10E-01	2.40E-05	3.49E-01	3.99E-05
	1151	PAHs	4.20E-02	4.80E-06	6.98E-02	7.97E-06
	50000	Formaldehyde	1.88E+00	2.14E-04	3.12E+00	3.56E-04
	56235	Carbon Tetrachloride	9.87E-01	1.13E-04	1.64E+00	1.87E-04
	71432	Benzene	1.63E+00	1.86E-04	2.71E+00	3.09E-04
	75014	Vinyl Chloride	7.23E-04	8.25E-08	1.20E-03	1.37E-07
	75092	Methylene Chloride	6.47E+00	7.39E-04	1.07E+01	1.23E-03
	75218	Ethylene Oxide	7.06E-03	8.06E-07	1.17E-02	1.34E-06
	79016	Trichloroethylene	4.36E-01	4.97E-05	7.23E-01	8.25E-05
	91203	Naphthalene	9.50E-02	1.08E-05	1.58E-01	1.80E-05
	106934	Ethylene Dibromide	7.04E-02	8.03E-06	1.17E-01	1.33E-05
	106990	1,3-Butadiene	1.27E-01	1.46E-05	2.12E-01	2.42E-05
	107062	Ethylene Dichloride	1.96E-01	2.24E-05	3.26E-01	3.72E-05
	123911	1,4-Dioxane	3.16E-01	3.61E-05	5.25E-01	5.99E-05
Laboratory Science Building						
	1104	Chlorofluorocarbons	1.19E-01	1.36E-05	1.97E-01	2.25E-05
	1151	PAHs	2.38E-02	2.71E-06	3.95E-02	4.50E-06
	50000	Formaldehyde	1.06E+00	1.21E-04	1.76E+00	2.01E-04
	56235	Carbon Tetrachloride	5.58E-01	6.37E-05	9.26E-01	1.06E-04
	71432	Benzene	9.23E-01	1.05E-04	1.53E+00	1.75E-04
	75014	Vinyl Chloride	4.09E-04	4.66E-08	6.78E-04	7.74E-08
	75092	Methylene Chloride	3.66E+00	4.18E-04	6.07E+00	6.93E-04
	75218	Ethylene Oxide	3.99E-03	4.56E-07	6.63E-03	7.57E-07

Emission Source Description	CAS Number	Substance	Existing Scenario		LRDP Scenario	
			(lbs/yr)	(lbs/hr)	(lbs/yr)	(lbs/hr)
	79016	Trichloroethylene	2.46E-01	2.81E-05	4.09E-01	4.67E-05
	91203	Naphthalene	5.37E-02	6.13E-06	8.92E-02	1.02E-05
	106934	Ethylene Dibromide	3.98E-02	4.54E-06	6.60E-02	7.54E-06
	106990	1,3-Butadiene	7.21E-02	8.23E-06	1.20E-01	1.37E-05
	107062	Ethylene Dichloride	1.11E-01	1.27E-05	1.84E-01	2.10E-05
	123911	1,4-Dioxane	1.79E-01	2.04E-05	2.97E-01	3.39E-05
Boyce Hall						
	1104	Chlorofluorocarbons	1.16E-01	1.32E-05	1.92E-01	2.20E-05
	1151	PAHs	2.32E-02	2.64E-06	3.84E-02	4.39E-06
	50000	Formaldehyde	1.03E+00	1.18E-04	1.72E+00	1.96E-04
	56235	Carbon Tetrachloride	5.44E-01	6.20E-05	9.02E-01	1.03E-04
	71432	Benzene	8.99E-01	1.03E-04	1.49E+00	1.70E-04
	75014	Vinyl Chloride	3.98E-04	4.54E-08	6.61E-04	7.54E-08
	75092	Methylene Chloride	3.56E+00	4.07E-04	5.92E+00	6.75E-04
	75218	Ethylene Oxide	3.89E-03	4.44E-07	6.46E-03	7.37E-07
	79016	Trichloroethylene	2.40E-01	2.74E-05	3.98E-01	4.55E-05
	91203	Naphthalene	5.23E-02	5.97E-06	8.69E-02	9.92E-06
	106934	Ethylene Dibromide	3.88E-02	4.42E-06	6.43E-02	7.34E-06
	106990	1,3-Butadiene	7.02E-02	8.01E-06	1.17E-01	1.33E-05
	107062	Ethylene Dichloride	1.08E-01	1.23E-05	1.80E-01	2.05E-05
	123911	1,4-Dioxane	1.74E-01	1.99E-05	2.89E-01	3.30E-05
Batchelor Hall						
	1104	Chlorofluorocarbons	1.08E-01	1.24E-05	1.80E-01	2.05E-05
	1151	PAHs	2.16E-02	2.47E-06	3.59E-02	4.10E-06
	50000	Formaldehyde	9.65E-01	1.10E-04	1.60E+00	1.83E-04
	56235	Carbon Tetrachloride	5.08E-01	5.80E-05	8.43E-01	9.62E-05
	71432	Benzene	8.40E-01	9.59E-05	1.39E+00	1.59E-04
	75014	Vinyl Chloride	3.72E-04	4.25E-08	6.17E-04	7.05E-08
	75092	Methylene Chloride	3.33E+00	3.80E-04	5.53E+00	6.31E-04
	75218	Ethylene Oxide	3.63E-03	4.15E-07	6.03E-03	6.89E-07
	79016	Trichloroethylene	2.24E-01	2.56E-05	3.72E-01	4.25E-05
	91203	Naphthalene	4.89E-02	5.58E-06	8.12E-02	9.27E-06
	106934	Ethylene Dibromide	3.62E-02	4.13E-06	6.01E-02	6.86E-06
	106990	1,3-Butadiene	6.56E-02	7.49E-06	1.09E-01	1.24E-05
	107062	Ethylene Dichloride	1.01E-01	1.15E-05	1.68E-01	1.91E-05
	123911	1,4-Dioxane	1.63E-01	1.86E-05	2.70E-01	3.08E-05
Geology						
	1104	Chlorofluorocarbons	8.08E-02	9.23E-06	1.34E-01	1.53E-05
	1151	PAHs	1.61E-02	1.84E-06	2.68E-02	3.06E-06
	50000	Formaldehyde	7.21E-01	8.23E-05	1.20E+00	1.37E-04

Emission Source Description	CAS Number	Substance	Existing Scenario		LRDP Scenario	
			(lbs/yr)	(lbs/hr)	(lbs/yr)	(lbs/hr)
	56235	Carbon Tetrachloride	3.79E-01	4.33E-05	6.29E-01	7.18E-05
	71432	Benzene	6.27E-01	7.16E-05	1.04E+00	1.19E-04
	75014	Vinyl Chloride	2.78E-04	3.17E-08	4.61E-04	5.26E-08
	75092	Methylene Chloride	2.49E+00	2.84E-04	4.13E+00	4.71E-04
	75218	Ethylene Oxide	2.71E-03	3.10E-07	4.50E-03	5.14E-07
	79016	Trichloroethylene	1.67E-01	1.91E-05	2.78E-01	3.17E-05
	91203	Naphthalene	3.65E-02	4.17E-06	6.06E-02	6.92E-06
	106934	Ethylene Dibromide	2.70E-02	3.09E-06	4.49E-02	5.12E-06
	106990	1,3-Butadiene	4.90E-02	5.59E-06	8.13E-02	9.28E-06
	107062	Ethylene Dichloride	7.54E-02	8.61E-06	1.25E-01	1.43E-05
	123911	1,4-Dioxane	1.21E-01	1.39E-05	2.02E-01	2.30E-05
Speith Building						
	1104	Chlorofluorocarbons	6.86E-02	7.83E-06	1.14E-01	1.30E-05
	1151	PAHs	1.37E-02	1.57E-06	2.28E-02	2.60E-06
	50000	Formaldehyde	6.12E-01	6.99E-05	1.02E+00	1.16E-04
	56235	Carbon Tetrachloride	3.22E-01	3.67E-05	5.34E-01	6.10E-05
	71432	Benzene	5.32E-01	6.08E-05	8.84E-01	1.01E-04
	75014	Vinyl Chloride	2.36E-04	2.69E-08	3.91E-04	4.47E-08
	75092	Methylene Chloride	2.11E+00	2.41E-04	3.50E+00	4.00E-04
	75218	Ethylene Oxide	2.30E-03	2.63E-07	3.82E-03	4.37E-07
	79016	Trichloroethylene	1.42E-01	1.62E-05	2.36E-01	2.69E-05
	91203	Naphthalene	3.10E-02	3.54E-06	5.14E-02	5.87E-06
	106934	Ethylene Dibromide	2.30E-02	2.62E-06	3.81E-02	4.35E-06
	106990	1,3-Butadiene	4.16E-02	4.75E-06	6.90E-02	7.88E-06
	107062	Ethylene Dichloride	6.40E-02	7.31E-06	1.06E-01	1.21E-05
	123911	1,4-Dioxane	1.03E-01	1.18E-05	1.71E-01	1.95E-05
Chemical Sciences Building						
	1104	Chlorofluorocarbons	6.41E-02	7.31E-06	1.06E-01	1.21E-05
	1151	PAHs	1.28E-02	1.46E-06	2.12E-02	2.43E-06
	50000	Formaldehyde	5.71E-01	6.52E-05	9.48E-01	1.08E-04
	56235	Carbon Tetrachloride	3.00E-01	3.43E-05	4.99E-01	5.69E-05
	71432	Benzene	4.97E-01	5.67E-05	8.25E-01	9.41E-05
	75014	Vinyl Chloride	2.20E-04	2.51E-08	3.65E-04	4.17E-08
	75092	Methylene Chloride	1.97E+00	2.25E-04	3.27E+00	3.73E-04
	75218	Ethylene Oxide	2.15E-03	2.45E-07	3.57E-03	4.07E-07
	79016	Trichloroethylene	1.33E-01	1.51E-05	2.20E-01	2.51E-05
	91203	Naphthalene	2.89E-02	3.30E-06	4.80E-02	5.48E-06
	106934	Ethylene Dibromide	2.14E-02	2.45E-06	3.56E-02	4.06E-06
	106990	1,3-Butadiene	3.88E-02	4.43E-06	6.44E-02	7.35E-06
	107062	Ethylene Dichloride	5.98E-02	6.82E-06	9.92E-02	1.13E-05

Emission Source Description	CAS Number	Substance	Existing Scenario		LRDP Scenario	
			(lbs/yr)	(lbs/hr)	(lbs/yr)	(lbs/hr)
	123911	1,4-Dioxane	9.63E-02	1.10E-05	1.60E-01	1.82E-05
Webber Hall						
	1104	Chlorofluorocarbons	5.19E-02	5.92E-06	8.61E-02	9.83E-06
	1151	PAHs	1.04E-02	1.18E-06	1.72E-02	1.96E-06
	50000	Formaldehyde	4.62E-01	5.28E-05	7.68E-01	8.76E-05
	56235	Carbon Tetrachloride	2.43E-01	2.78E-05	4.04E-01	4.61E-05
	71432	Benzene	4.02E-01	4.59E-05	6.68E-01	7.62E-05
	75014	Vinyl Chloride	1.78E-04	2.03E-08	2.96E-04	3.37E-08
	75092	Methylene Chloride	1.59E+00	1.82E-04	2.65E+00	3.02E-04
	75218	Ethylene Oxide	1.74E-03	1.99E-07	2.89E-03	3.30E-07
	79016	Trichloroethylene	1.07E-01	1.23E-05	1.78E-01	2.03E-05
	91203	Naphthalene	2.34E-02	2.67E-06	3.89E-02	4.44E-06
	106934	Ethylene Dibromide	1.73E-02	1.98E-06	2.88E-02	3.29E-06
	106990	1,3-Butadiene	3.14E-02	3.59E-06	5.21E-02	5.95E-06
	107062	Ethylene Dichloride	4.84E-02	5.52E-06	8.03E-02	9.17E-06
	123911	1,4-Dioxane	7.79E-02	8.90E-06	1.29E-01	1.48E-05
Bourns Hall						
	1104	Chlorofluorocarbons	4.88E-02	5.57E-06	8.10E-02	9.25E-06
	1151	PAHs	9.75E-03	1.11E-06	1.62E-02	1.85E-06
	50000	Formaldehyde	4.35E-01	4.97E-05	7.22E-01	8.25E-05
	56235	Carbon Tetrachloride	2.29E-01	2.61E-05	3.80E-01	4.34E-05
	71432	Benzene	3.78E-01	4.32E-05	6.28E-01	7.17E-05
	75014	Vinyl Chloride	1.68E-04	1.91E-08	2.78E-04	3.18E-08
	75092	Methylene Chloride	1.50E+00	1.71E-04	2.49E+00	2.84E-04
	75218	Ethylene Oxide	1.64E-03	1.87E-07	2.72E-03	3.10E-07
	79016	Trichloroethylene	1.01E-01	1.15E-05	1.68E-01	1.91E-05
	91203	Naphthalene	2.20E-02	2.52E-06	3.66E-02	4.18E-06
	106934	Ethylene Dibromide	1.63E-02	1.86E-06	2.71E-02	3.09E-06
	106990	1,3-Butadiene	2.96E-02	3.37E-06	4.91E-02	5.60E-06
	107062	Ethylene Dichloride	4.55E-02	5.20E-06	7.56E-02	8.63E-06
	123911	1,4-Dioxane	7.33E-02	8.37E-06	1.22E-01	1.39E-05
Entomology - Pest Management						
	1104	Chlorofluorocarbons	4.42E-02	5.05E-06	7.34E-02	8.38E-06
	1151	PAHs	8.84E-03	1.01E-06	1.47E-02	1.67E-06
	50000	Formaldehyde	3.94E-01	4.50E-05	6.55E-01	7.47E-05
	56235	Carbon Tetrachloride	2.07E-01	2.37E-05	3.44E-01	3.93E-05
	71432	Benzene	3.43E-01	3.92E-05	5.69E-01	6.50E-05
	75014	Vinyl Chloride	1.52E-04	1.73E-08	2.52E-04	2.88E-08
	75092	Methylene Chloride	1.36E+00	1.55E-04	2.26E+00	2.58E-04
	75218	Ethylene Oxide	1.48E-03	1.69E-07	2.46E-03	2.81E-07

Emission Source Description	CAS Number	Substance	Existing Scenario		LRDP Scenario	
			(lbs/yr)	(lbs/hr)	(lbs/yr)	(lbs/hr)
	79016	Trichloroethylene	9.15E-02	1.04E-05	1.52E-01	1.73E-05
	91203	Naphthalene	2.00E-02	2.28E-06	3.32E-02	3.78E-06
	106934	Ethylene Dibromide	1.48E-02	1.69E-06	2.46E-02	2.80E-06
	106990	1,3-Butadiene	2.68E-02	3.06E-06	4.45E-02	5.08E-06
	107062	Ethylene Dichloride	4.13E-02	4.71E-06	6.85E-02	7.82E-06
	123911	1,4-Dioxane	6.65E-02	7.59E-06	1.10E-01	1.26E-05
Physics						
	1104	Chlorofluorocarbons	4.42E-02	5.05E-06	7.34E-02	8.38E-06
	1151	PAHs	8.84E-03	1.01E-06	1.47E-02	1.67E-06
	50000	Formaldehyde	3.94E-01	4.50E-05	6.55E-01	7.47E-05
	56235	Carbon Tetrachloride	2.07E-01	2.37E-05	3.44E-01	3.93E-05
	71432	Benzene	3.43E-01	3.92E-05	5.69E-01	6.50E-05
	75014	Vinyl Chloride	1.52E-04	1.73E-08	2.52E-04	2.88E-08
	75092	Methylene Chloride	1.36E+00	1.55E-04	2.26E+00	2.58E-04
	75218	Ethylene Oxide	1.48E-03	1.69E-07	2.46E-03	2.81E-07
	79016	Trichloroethylene	9.15E-02	1.04E-05	1.52E-01	1.73E-05
	91203	Naphthalene	2.00E-02	2.28E-06	3.32E-02	3.78E-06
	106934	Ethylene Dibromide	1.48E-02	1.69E-06	2.46E-02	2.80E-06
	106990	1,3-Butadiene	2.68E-02	3.06E-06	4.45E-02	5.08E-06
	107062	Ethylene Dichloride	4.13E-02	4.71E-06	6.85E-02	7.82E-06
	123911	1,4-Dioxane	6.65E-02	7.59E-06	1.10E-01	1.26E-05
Fawcett Laboratory						
	1104	Chlorofluorocarbons	2.14E-02	2.44E-06	3.54E-02	4.05E-06
	1151	PAHs	4.27E-03	4.87E-07	7.08E-03	8.08E-07
	50000	Formaldehyde	1.90E-01	2.17E-05	3.16E-01	3.61E-05
	56235	Carbon Tetrachloride	1.00E-01	1.14E-05	1.66E-01	1.90E-05
	71432	Benzene	1.66E-01	1.89E-05	2.75E-01	3.14E-05
	75014	Vinyl Chloride	7.33E-05	8.37E-09	1.22E-04	1.39E-08
	75092	Methylene Chloride	6.57E-01	7.50E-05	1.09E+00	1.24E-04
	75218	Ethylene Oxide	7.17E-04	8.18E-08	1.19E-03	1.36E-07
	79016	Trichloroethylene	4.42E-02	5.04E-06	7.34E-02	8.37E-06
	91203	Naphthalene	9.64E-03	1.10E-06	1.60E-02	1.83E-06
	106934	Ethylene Dibromide	7.14E-03	8.15E-07	1.19E-02	1.35E-06
	106990	1,3-Butadiene	1.29E-02	1.48E-06	2.15E-02	2.45E-06
	107062	Ethylene Dichloride	1.99E-02	2.27E-06	3.31E-02	3.77E-06
	123911	1,4-Dioxane	3.21E-02	3.66E-06	5.33E-02	6.08E-06
Chapman Hall						
	1104	Chlorofluorocarbons	1.98E-02	2.26E-06	3.29E-02	3.76E-06
	1151	PAHs	3.96E-03	4.52E-07	6.58E-03	7.51E-07
	50000	Formaldehyde	1.77E-01	2.02E-05	2.93E-01	3.35E-05

Emission Source Description	CAS Number	Substance	Existing Scenario		LRDP Scenario	
			(lbs/yr)	(lbs/hr)	(lbs/yr)	(lbs/hr)
	56235	Carbon Tetrachloride	9.30E-02	1.06E-05	1.54E-01	1.76E-05
	71432	Benzene	1.54E-01	1.76E-05	2.55E-01	2.91E-05
	75014	Vinyl Chloride	6.81E-05	7.77E-09	1.13E-04	1.29E-08
	75092	Methylene Chloride	6.10E-01	6.96E-05	1.01E+00	1.16E-04
	75218	Ethylene Oxide	6.65E-04	7.60E-08	1.10E-03	1.26E-07
	79016	Trichloroethylene	4.10E-02	4.68E-06	6.81E-02	7.78E-06
	91203	Naphthalene	8.95E-03	1.02E-06	1.49E-02	1.70E-06
	106934	Ethylene Dibromide	6.63E-03	7.57E-07	1.10E-02	1.26E-06
	106990	1,3-Butadiene	1.20E-02	1.37E-06	1.99E-02	2.28E-06
	107062	Ethylene Dichloride	1.85E-02	2.11E-06	3.07E-02	3.51E-06
	123911	1,4-Dioxane	2.98E-02	3.40E-06	4.95E-02	5.65E-06
University Laboratory Bldg						
	1104	Chlorofluorocarbons	1.22E-02	1.39E-06	2.03E-02	2.31E-06
	1151	PAHs	2.44E-03	2.78E-07	4.05E-03	4.62E-07
	50000	Formaldehyde	1.09E-01	1.24E-05	1.81E-01	2.06E-05
	56235	Carbon Tetrachloride	5.72E-02	6.53E-06	9.50E-02	1.08E-05
	71432	Benzene	9.46E-02	1.08E-05	1.57E-01	1.79E-05
	75014	Vinyl Chloride	4.19E-05	4.78E-09	6.96E-05	7.94E-09
	75092	Methylene Chloride	3.75E-01	4.28E-05	6.23E-01	7.11E-05
	75218	Ethylene Oxide	4.10E-04	4.67E-08	6.80E-04	7.76E-08
	79016	Trichloroethylene	2.53E-02	2.88E-06	4.19E-02	4.79E-06
	91203	Naphthalene	5.51E-03	6.29E-07	9.14E-03	1.04E-06
	106934	Ethylene Dibromide	4.08E-03	4.66E-07	6.77E-03	7.73E-07
	106990	1,3-Butadiene	7.39E-03	8.44E-07	1.23E-02	1.40E-06
	107062	Ethylene Dichloride	1.14E-02	1.30E-06	1.89E-02	2.16E-06
	123911	1,4-Dioxane	1.83E-02	2.09E-06	3.04E-02	3.47E-06
Boyden Laboratory						
	1104	Chlorofluorocarbons	7.63E-03	8.70E-07	1.27E-02	1.44E-06
	1151	PAHs	1.52E-03	1.74E-07	2.53E-03	2.89E-07
	50000	Formaldehyde	6.80E-02	7.76E-06	1.13E-01	1.29E-05
	56235	Carbon Tetrachloride	3.58E-02	4.08E-06	5.94E-02	6.78E-06
	71432	Benzene	5.91E-02	6.75E-06	9.82E-02	1.12E-05
	75014	Vinyl Chloride	2.62E-05	2.99E-09	4.35E-05	4.96E-09
	75092	Methylene Chloride	2.34E-01	2.68E-05	3.89E-01	4.44E-05
	75218	Ethylene Oxide	2.56E-04	2.92E-08	4.25E-04	4.85E-08
	79016	Trichloroethylene	1.58E-02	1.80E-06	2.62E-02	2.99E-06
	91203	Naphthalene	3.44E-03	3.93E-07	5.72E-03	6.52E-07
	106934	Ethylene Dibromide	2.55E-03	2.91E-07	4.23E-03	4.83E-07
	106990	1,3-Butadiene	4.62E-03	5.27E-07	7.67E-03	8.75E-07
	107062	Ethylene Dichloride	7.11E-03	8.12E-07	1.18E-02	1.35E-06

Emission Source Description	CAS Number	Substance	Existing Scenario		LRDP Scenario	
			(lbs/yr)	(lbs/hr)	(lbs/yr)	(lbs/hr)
	123911	1,4-Dioxane	1.15E-02	1.31E-06	1.90E-02	2.17E-06
I&Q Building						
	1104	Chlorofluorocarbons	7.63E-03	8.70E-07	1.27E-02	1.44E-06
	1151	PAHs	1.52E-03	1.74E-07	2.53E-03	2.89E-07
	50000	Formaldehyde	6.80E-02	7.76E-06	1.13E-01	1.29E-05
	56235	Carbon Tetrachloride	3.58E-02	4.08E-06	5.94E-02	6.78E-06
	71432	Benzene	5.91E-02	6.75E-06	9.82E-02	1.12E-05
	75014	Vinyl Chloride	2.62E-05	2.99E-09	4.35E-05	4.96E-09
	75092	Methylene Chloride	2.34E-01	2.68E-05	3.89E-01	4.44E-05
	75218	Ethylene Oxide	2.56E-04	2.92E-08	4.25E-04	4.85E-08
	79016	Trichloroethylene	1.58E-02	1.80E-06	2.62E-02	2.99E-06
	91203	Naphthalene	3.44E-03	3.93E-07	5.72E-03	6.52E-07
	106934	Ethylene Dibromide	2.55E-03	2.91E-07	4.23E-03	4.83E-07
	106990	1,3-Butadiene	4.62E-03	5.27E-07	7.67E-03	8.75E-07
	107062	Ethylene Dichloride	7.11E-03	8.12E-07	1.18E-02	1.35E-06
	123911	1,4-Dioxane	1.15E-02	1.31E-06	1.90E-02	2.17E-06
EH & S						
	1104	Chlorofluorocarbons	6.10E-03	6.96E-07	1.01E-02	1.16E-06
	1151	PAHs	1.22E-03	1.39E-07	2.02E-03	2.31E-07
	50000	Formaldehyde	5.44E-02	6.21E-06	9.03E-02	1.03E-05
	56235	Carbon Tetrachloride	2.86E-02	3.27E-06	4.75E-02	5.42E-06
	71432	Benzene	4.73E-02	5.40E-06	7.85E-02	8.97E-06
	75014	Vinyl Chloride	2.10E-05	2.39E-09	3.48E-05	3.97E-09
	75092	Methylene Chloride	1.88E-01	2.14E-05	3.11E-01	3.55E-05
	75218	Ethylene Oxide	2.05E-04	2.34E-08	3.40E-04	3.88E-08
	79016	Trichloroethylene	1.26E-02	1.44E-06	2.10E-02	2.39E-06
	91203	Naphthalene	2.75E-03	3.14E-07	4.57E-03	5.22E-07
	106934	Ethylene Dibromide	2.04E-03	2.33E-07	3.39E-03	3.87E-07
	106990	1,3-Butadiene	3.70E-03	4.22E-07	6.13E-03	7.00E-07
	107062	Ethylene Dichloride	5.69E-03	6.50E-07	9.45E-03	1.08E-06
	123911	1,4-Dioxane	9.17E-03	1.05E-06	1.52E-02	1.74E-06
Entomology Research Museum						
	1104	Chlorofluorocarbons	4.58E-03	5.22E-07	7.59E-03	8.67E-07
	1151	PAHs	9.14E-04	1.04E-07	1.52E-03	1.73E-07
	50000	Formaldehyde	4.08E-02	4.66E-06	6.77E-02	7.73E-06
	56235	Carbon Tetrachloride	2.15E-02	2.45E-06	3.56E-02	4.07E-06
	71432	Benzene	3.55E-02	4.05E-06	5.89E-02	6.72E-06
	75014	Vinyl Chloride	1.57E-05	1.79E-09	2.61E-05	2.98E-09
	75092	Methylene Chloride	1.41E-01	1.61E-05	2.34E-01	2.67E-05
	75218	Ethylene Oxide	1.54E-04	1.75E-08	2.55E-04	2.91E-08

Emission Source Description	CAS Number	Substance	Existing Scenario		LRDP Scenario	
			(lbs/yr)	(lbs/hr)	(lbs/yr)	(lbs/hr)
	79016	Trichloroethylene	9.47E-03	1.08E-06	1.57E-02	1.79E-06
	91203	Naphthalene	2.07E-03	2.36E-07	3.43E-03	3.91E-07
	106934	Ethylene Dibromide	1.53E-03	1.75E-07	2.54E-03	2.90E-07
	106990	1,3-Butadiene	2.77E-03	3.16E-07	4.60E-03	5.25E-07
	107062	Ethylene Dichloride	4.27E-03	4.87E-07	7.09E-03	8.09E-07
	123911	1,4-Dioxane	6.88E-03	7.85E-07	1.14E-02	1.30E-06
Keen Hall						
	1104	Chlorofluorocarbons	4.58E-03	5.22E-07	7.59E-03	8.67E-07
	1151	PAHs	9.14E-04	1.04E-07	1.52E-03	1.73E-07
	50000	Formaldehyde	4.08E-02	4.66E-06	6.77E-02	7.73E-06
	56235	Carbon Tetrachloride	2.15E-02	2.45E-06	3.56E-02	4.07E-06
	71432	Benzene	3.55E-02	4.05E-06	5.89E-02	6.72E-06
	75014	Vinyl Chloride	1.57E-05	1.79E-09	2.61E-05	2.98E-09
	75092	Methylene Chloride	1.41E-01	1.61E-05	2.34E-01	2.67E-05
	75218	Ethylene Oxide	1.54E-04	1.75E-08	2.55E-04	2.91E-08
	79016	Trichloroethylene	9.47E-03	1.08E-06	1.57E-02	1.79E-06
	91203	Naphthalene	2.07E-03	2.36E-07	3.43E-03	3.91E-07
	106934	Ethylene Dibromide	1.53E-03	1.75E-07	2.54E-03	2.90E-07
	106990	1,3-Butadiene	2.77E-03	3.16E-07	4.60E-03	5.25E-07
	107062	Ethylene Dichloride	4.27E-03	4.87E-07	7.09E-03	8.09E-07
	123911	1,4-Dioxane	6.88E-03	7.85E-07	1.14E-02	1.30E-06

Table 10. DPM Emission Rate from Diesel-fueled Delivery Trucks

Emission Source Description	CAS Number	Substance	Existing Scenario [1]		LRDP Scenario [1]	
			(lbs/source-yr)	(lbs/source-hr)	(lbs/source-yr)	(lbs/source-hr)
Roadways	9901	Diesel PM	3.20E-01	9.45E-05	2.60E-01	7.69E-05

[1] Emissions are for each modeled segment of the overall delivery route. There are 121 segments.

Table 11. Health Effects Categories for Substances Evaluated in the HRA for Both Scenarios

Substance	CAS Number	Cancer	Noncancer	
			Acute	Chronic
Diesel particulate matter	9901	✓		✓
PAHs, total, w/o individ. Components	1151	✓		
Formaldehyde	50000	✓	✓	✓
Benzene	71432	✓	✓	✓
Naphthalene	91203	✓		✓
1,3-Butadiene	106990	✓		✓
Ammonia	7664417		✓	✓
Carbon tetrachloride	56235	✓	✓	✓
Fluorocarbons (chlorinated)	1104			✓
1,4-Dioxane	123911	✓	✓	✓
Ethylene dibromide	106934	✓		✓
Ethylene dichloride	107062	✓		✓
Ethylene oxide	75218	✓		✓
Trichloroethylene	79016	✓		✓
Vinyl chloride	75014	✓	✓	
Methylene chloride	75092	✓	✓	✓
Toluene	108883		✓	✓
Mixed xylenes	1330207		✓	✓
Methyl ethyl ketone	78933		✓	
Isopropyl alcohol	67630	✓	✓	
Ethyl benzene	100414			✓
Ethylene glycol monobutyl ether	111762		✓	
Methanol	67561		✓	✓
Lead	7439921	✓		
Nickel	7440020	✓	✓	✓
Arsenic	7440382	✓	✓	✓
Cadmium	7440439	✓		✓
Hexane	110543			✓
Acetaldehyde	75070	✓		✓
Acrolein	107028		✓	✓
Propylene	115071			✓
Methyl chloride	74873			
2,3,7,8-Tetrachlorodibenzo-p-dioxin	1746016	✓		✓
Chromium, hexavalent	18540299	✓		✓
Perchloroethylene	127184	✓	✓	✓
Methyl chloroform	71556		✓	✓

4.0 EXPOSURE ASSESSMENT

The HRA addresses inhalation exposure for all chemicals included in this study. Noninhalation exposure pathways are addressed for those substances identified in the OEHHA guidance documents as requiring multipathway analysis or for which noninhalation toxicity factors are identified. The initial analysis evaluated the OEHHA-required noninhalation pathways: soil ingestion and dermal absorption. Other noninhalation pathways were evaluated, as needed, based on the results of the initial analysis.

The exposure assessment process uses the emission estimates derived in the initial steps of the risk assessment and predicts the potential dose of each chemical to individuals in the surrounding population. The exposure assessment model, Hotspots Analysis and Reporting Program (HARP), was developed specifically for conducting risk assessments in compliance with AB 2588. The HARP model was used to estimate adverse health effects in this HRA.

4.1 AIR DISPERSION MODELING

Air dispersion modeling was conducted to determine the pollutant ground-level concentrations at off- and on-campus locations. The emissions at UCR are released into the atmosphere through point, area and volume sources. The methods used in modeling TACs from these sources are consistent with procedures outlined in the OEHHA guidelines. Additionally, the modeling methodology meets the EPA and CARB requirements for air quality modeling. The dispersion modeling files are provided in electronic format on the enclosed CD due to their volume.

4.1.1 Model Selection

The CARB-approved HARP model (version 1.0, build 21.11.02) was used in this HRA. The HARP model incorporates the Industrial Source Complex Short Term (ISCST3) model to compute downwind dispersion and the EPA-approved Building Profile Input Program (BPIP) to evaluate downwash impacts of buildings and structures.

4.1.2 Model Input

4.1.2.1 Meteorological Data

The SCAQMD has required all facilities to utilize a single year of local meteorological data from the year 1981. It is considered that weather conditions during this time represent worst-case dispersion and, hence, will result in a conservative estimate of impacts.

Data collected at the Riverside monitoring station (surface station I.D. 54139 and upper air station I.D. No. 99999) were selected as the most appropriate data set for this HRA. Riverside data include measurements of wind speed, wind direction, surface temperature, and stability. Upper air data from Ontario were used for determining mixing height. Hourly mixing heights were generated using EPA's RAMMET program. RAMMET uses an interpolation scheme that is described in detail in the Industrial Source Complex Dispersion Model User's Guide, (EPA, 1995). The same meteorological data were used in both Scenarios.

4.1.2.2 Model Options and Parameters

Table 12 shows the dispersion model input options that were used in the ISCST3 modeling. All options were selected as recommended in the SCAQMD Supplemental Guidelines for Preparing Risk Assessments to Comply with the Air Toxics "Hot Spots" Information and Assessment Act (SCAQMD, 1996). The same model options were used in both Scenarios.

4.1.2.3 Modeling Grid

Off- and on-campus receptors were used in the modeling. The off-campus receptors were represented utilizing various grid spacing based on the distance from the campus boundary. The spacing was the smallest near the campus boundary and increased moving away from the boundary with receptors placed 125 meters apart along the campus boundary. The off-campus grid spacing was as follows:

- 250-meter spacing along the campus boundary and extending out to 750 meters; and
- 500-meter spacing out to 2,000 meters.

Fenceline receptors were placed along the campus boundary. Off-campus discrete receptors were placed at a number of chosen locations at parks, golf courses, and recreation areas. Sensitive receptors were placed at school day-care centers and on-campus student housing and census tract receptors were located at census tract centroids. The location of the fenceline receptors, off-campus gridded receptors, off-campus discrete receptors, and sensitive and census block receptors are presented on Figures 3, 4, 5, and 6, respectively.

The receptors utilized the Universal Transverse Mercator (UTM) coordinate system. The receptor elevations were obtained electronically from the United States Geological Survey 7.5-minute Digital Elevation Model (DEM) data. The same receptors locations were evaluated in both Scenarios.

4.1.2.4 Modeled Sources

The sources evaluated in the HRA were modeled as point area and volume sources. The combustion sources were modeled as point sources at their respective locations. The modeled emissions by source and by TAC for each Scenario are presented in Appendix A. The modeled point source parameters for both Scenarios are presented in Table 13. The gasoline dispensing operation, painting operation, and laboratory chemical usage were modeled as area sources. The gasoline dispensing operation was modeled with an area representative of where the evaporative emissions would likely originate. The painting operations were modeled as point sources at their respective locations. The laboratory chemical usage was modeled from different areas across campus based on the location of the laboratory. The laboratories were aggregated, where appropriate, based on their geographic locations. The laboratory emissions were assumed to be released from the top of the buildings with an area equal to the rectangular cross-section of the building and a release height equal to the height of the building plus 7 feet. The modeled area source parameters are presented in Table 14. The delivery truck emissions were evenly distributed along the delivery route and the delivery route was divided into 142 segments for modeling. As recommended by SCAQMD, each segment was modeled as a volume source and the parameters are provided in Table 15. The locations of the modeled point and area sources are presented on Figure 7 and the volume source locations are presented on Figure 8.

4.1.3 Deposition

A default procedure recommended by SCAQMD and CARB was used to estimate the deposition flux of particulate-borne pollutants on ground surfaces. Under this procedure, a default settling velocity (in meters per second) is multiplied by the ground level concentration (in micrograms per cubic meter) to yield a flux term with units of mass per square meter per second. This procedure has the primary disadvantage of failing to conserve mass (i.e., pollutant mass assumed to be deposited also stays in the plume), resulting in a double counting of particulate impacts at distant receptors.

The OEHHA guidelines recommend a default settling velocity of 5 centimeters per second for uncontrolled sources and 2 centimeters per second for controlled sources. The 5-centimeter per second value was used in the modeling.

4.1.4 Aerodynamic Wake Effects

When sources are located near or on buildings or structures, the dispersion of the plume can be influenced by the buildings or structures. Under certain wind speeds, the wake produced on the lee side of the building, known as building downwash, can cause the plume to be pulled toward the ground near the building resulting in higher concentrations close to the building.

The EPA-approved BPIP that is part of the HARP model was used to provide input for the downwash analysis that is performed by ISCST3. BPIP requires the input of building corner coordinates and heights, and stack coordinates. The Universal Transverse Mercator (UTM) coordinate system was used to identify building and source locations. Because of the complexity of the stack/building relationships on the UCR campus, the analysis included all buildings that could potentially influence each point source.

4.2 MULTIPATHWAY ANALYSIS

In identifying pathways that could potentially lead to exposure, the type of pollutants emitted, land use in the area, and lifestyle (i.e., urban versus rural or agricultural) must be considered. Consistent with the OEHHA guidelines, the following pathways have been identified as potential exposure routes for the routine campus-wide emissions:

- Inhalation;
- Soil ingestion;
- Dermal exposure; and
- Plant ingestion.

The plant pathway will be considered for inclusion depending on the location and extent of the zone of impact (ZOI). The OEHHA guidelines require that the soil ingestion and dermal absorption pathways be included with the inhalation pathway to analyze impacts of multipathway pollutants. Other pathways are to be included on a case-by-case basis. Other pathways listed in the OEHHA guidelines for consideration, such as water ingestion, dairy and beef, and poultry and eggs were not viable exposure routes for UCR due to the types of substances emitted, surrounding land use, or extent of the zone of impact. The mother's milk pathway was also included in the HRA. Table 16 presents the substances evaluated in both Scenarios and whether the substances are evaluated for inhalation-only exposure or multipathway exposures.

4.2.1 Exposure Calculations

This subsection presents a brief discussion of the calculations for each exposure pathway. The detailed description of each pathway and how it is addressed in the HARP model is presented in the OEHHA guidelines and the HARP model documentation.

4.2.2 Inhalation Exposure

Exposure to substances in ambient air occurs through inhalation of both gases and PM. For the purpose of this assessment, particulate emissions are considered to be entirely absorbed in the lungs, yielding a conservative estimate of exposure. In reality, only a fraction of the inhaled particulates would deposit in the lungs and be absorbed. Inhalation exposure for the average adult is determined by multiplying the estimated concentration in air by an average daily inhalation volume specified by the OEHHA guidelines (20 cubic meters of air per day) and dividing that quantity by body weight (assumed to be 70 kilograms).

4.2.3 Soil Ingestion

Pollutants emitted in the particulate phase are subject to deposition onto ground surfaces and mixing in the uppermost layer of soil. These particulates include metals and semivolatile organics. Soil concentration calculations assume a constant deposition rate onto soil and an even mixing of emissions into the top one centimeter of soil. Loss mechanisms, primarily degradation over time, are considered in estimating the soil concentration of certain organic emissions over the period of interest.

Exposure from incidental ingestion of soil is estimated by multiplying the soil concentration estimate of each substance by a soil ingestion rate specified by the OEHHA guidelines and dividing by the body weight. The soil ingestion rate is an age-weighted value that reflects higher consumption rates for a child and significantly less consumption for an adult.

4.2.4 Dermal Exposure

Dermal exposure results when soil containing deposited particulate-borne pollutants contacts the skin and these pollutants are absorbed into the body. The daily exposure rate was calculated by multiplying the soil concentration of each pollutant by an estimate of the exposed skin surface area, amount of soil on the skin, and a chemical-specific absorption rate. The OEHHA guidelines provide default estimates of skin area, soil contact rate, and absorption rate.

4.2.5 Plant Ingestion

Locally grown produce presents a secondary route of exposure to emissions. Exposure via plant ingestion from the consumption of home-grown garden produce may be a potential exposure route depending on the extent of the ZOI.

Particulate emissions can accumulate in edible garden produce from direct deposition onto plant surfaces and through absorption by the root system. The calculations for determining the deposition component of the concentration in the produce considers the deposition rate, an interception fraction, and removal of particulates from weathering (i.e., wind, rain, irrigation, etc.). The interception fraction corresponds to the amount of particulate depositing on the garden area that actually contacts exposed edible produce. Concentrations in the produce due to root uptake from the garden soil are estimated by multiplying a root uptake factor, which relates the concentration of a substance in plant tissue to that in soil water, by the estimated soil concentration. Under the OEHHA methodology, root uptake contributes to pollutant concentrations in produce grown above, as well as below, ground. The procedure for estimating soil concentrations is the same as for the soil ingestion pathway, but assumes a 15-centimeter mixing depth (versus a one centimeter mixing depth used for soil ingestion and dermal contact exposure pathways). Human exposure is estimated by multiplying plant concentrations by the daily ingestion rate of garden produce.

As required by the OEHHA guidelines, the plant ingestion pathway was included in the analysis within the ZOI.

4.2.6 Total Exposure

The total daily exposure rate for each emitted substance is calculated by summing the individual exposure for each pathway. These total daily exposure rates are used to assess the potential health risk in Section 5.0.

4.3 OFF- AND ON-CAMPUS EXPOSURE

The OEHHA guidelines require the evaluation of potential health impacts from a facility at offsite residences and workplaces. Since the UCR campus has a day care center and student housing, on-campus receptors to address these specific exposed populations were included in the HRA. The off-campus exposure was calculated similar to OEHHA's exposure and risk calculations for a hypothetical residential maximally exposed individual (MEI). The off-campus MEI is assumed to live at the point of highest toxicity-weighted concentration of facility emissions, in a residentially zoned area, for 24 hours per day, 365 days per year, for 70 continuous years. The MEI concept ensures that exposure will not be underestimated because time spent at work, on vacation, commuting locally, or moving from one residence to another would otherwise reduce the actual exposure to emissions from the UCR campus. The on-campus exposure at the selected receptor locations was calculated the same as the off-campus exposure, except for appropriate adjustments to the exposure parameters (OEHHA recommends a 9-year exposure period for short-term exposures).

An off-campus occupational MEI was not determined since the result is likely to be lower than the residential MEI because exposures occur over a shorter duration and exposure concentrations are lower. An on-campus occupational MEI was not determined since facility worker exposure determination is not required under the OEHHA guidelines and facility worker health and safety is regulated separately.

4.4 ZONE OF IMPACT

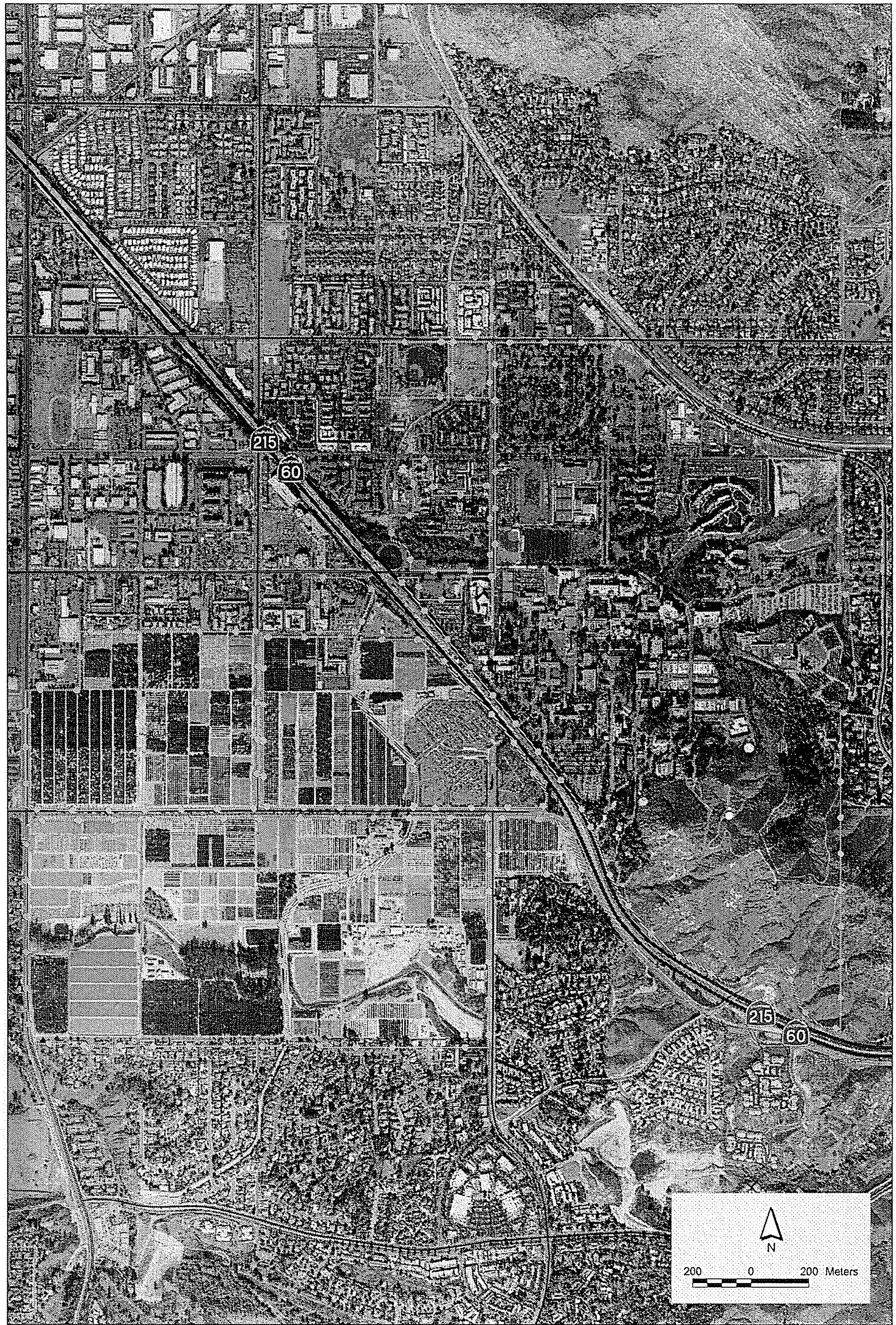
Under OEHHA and SCAQMD guidelines, the ZOI for the carcinogenic risk assessment of facility emissions encompasses the area subject to an estimated cancer risk of greater than one in one million (1.0 x 10^{-6}). In addition, the ZOI for the noncarcinogenic risk assessment encompasses the area subject to a HI greater than 1.0. In this HRA, some of the receptor locations had cancer risks greater than one in one million and, thus, a carcinogenic ZOI was defined. The carcinogenic ZOI extended off-campus approximately 2,500 feet to the east and about 1,000 feet to the southwest and to the north of campus. However, all of the receptors had noncarcinogenic HIs less than 1.0. Thus, a noncarginogenic ZOI was not defined. The location of the carcinogenic ZOI is presented in Section 5.0.

4.5 SENSITIVE RECEPTORS

Sensitive receptors are locations where exposed individuals may be more sensitive to health effects than the general population. OEHHA guidelines define sensitive receptors as hospitals, primary and secondary schools, day care centers, and nursing homes. In this HRA, sensitive receptors were identified within the carcinogenic ZOI. The results for the sensitive receptors are presented in Section 5.0.

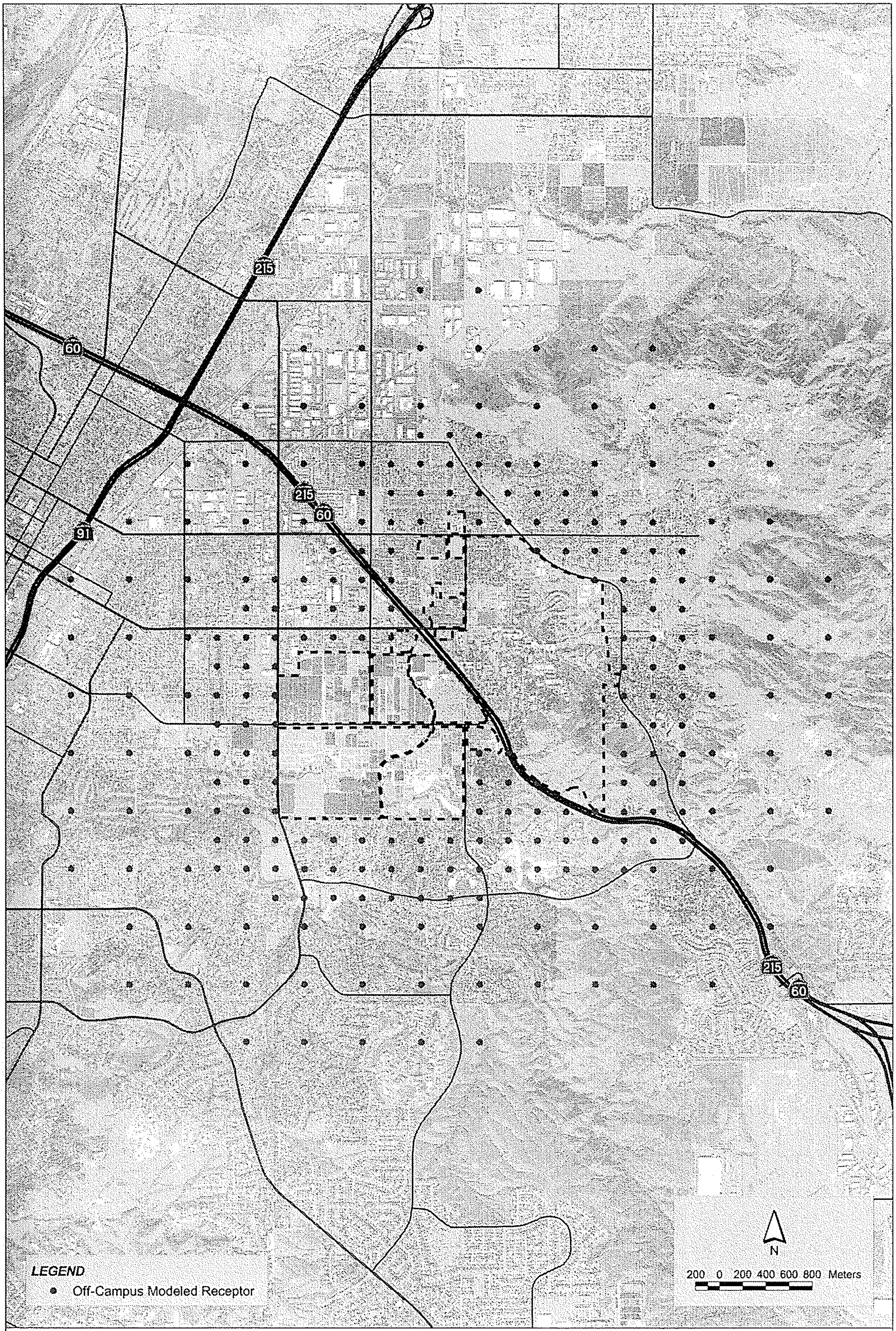
Table 12. Dispersion Modeling Options Used for the UCR HRA

Option Description	ISCST3 Model Option with HARP
Dispersion Coefficients	Urban
Vertical Potential Temperature Gradient (Kelvin/m)	0.02 for E Stability 0.035 for F Stability
Final Plume Rise	Used
Stack Tip Downwash	Used
Buoyancy – Induced Dispersion	Used
Concentrations During Calms Set	Not Used
Regulatory Default Option	Not Used
Anemometer Height	10.0 meters
Decay Coefficient	0.00
Year of Meteorology Used	1981
SCAQMD MET Designation	Riverside



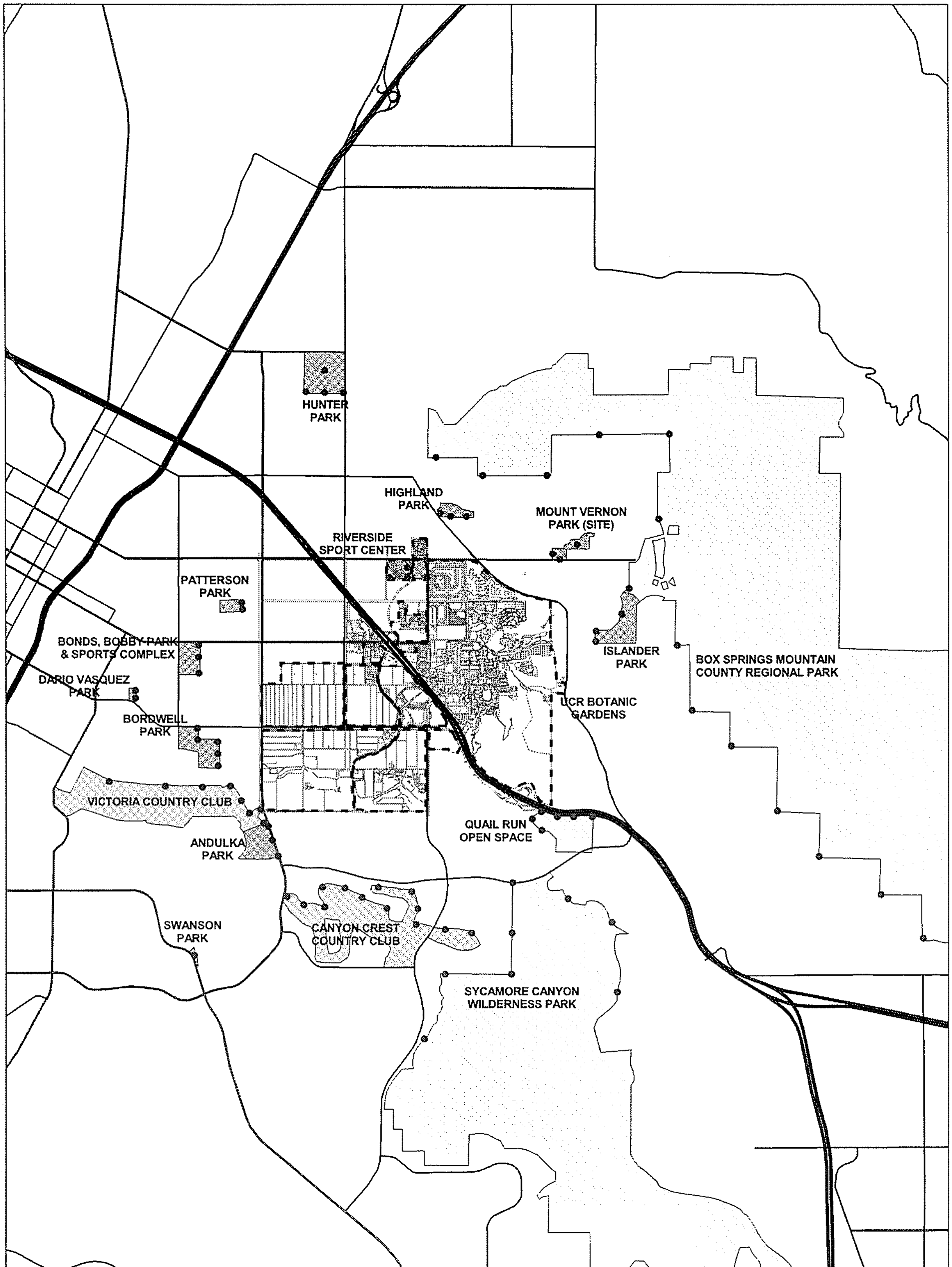
Fenceline Receptor Locations

URS	Project No.: 29869454	Project: UC RIVERSIDE 2004 LRDP HRA	Date: March 2005	Figure 3



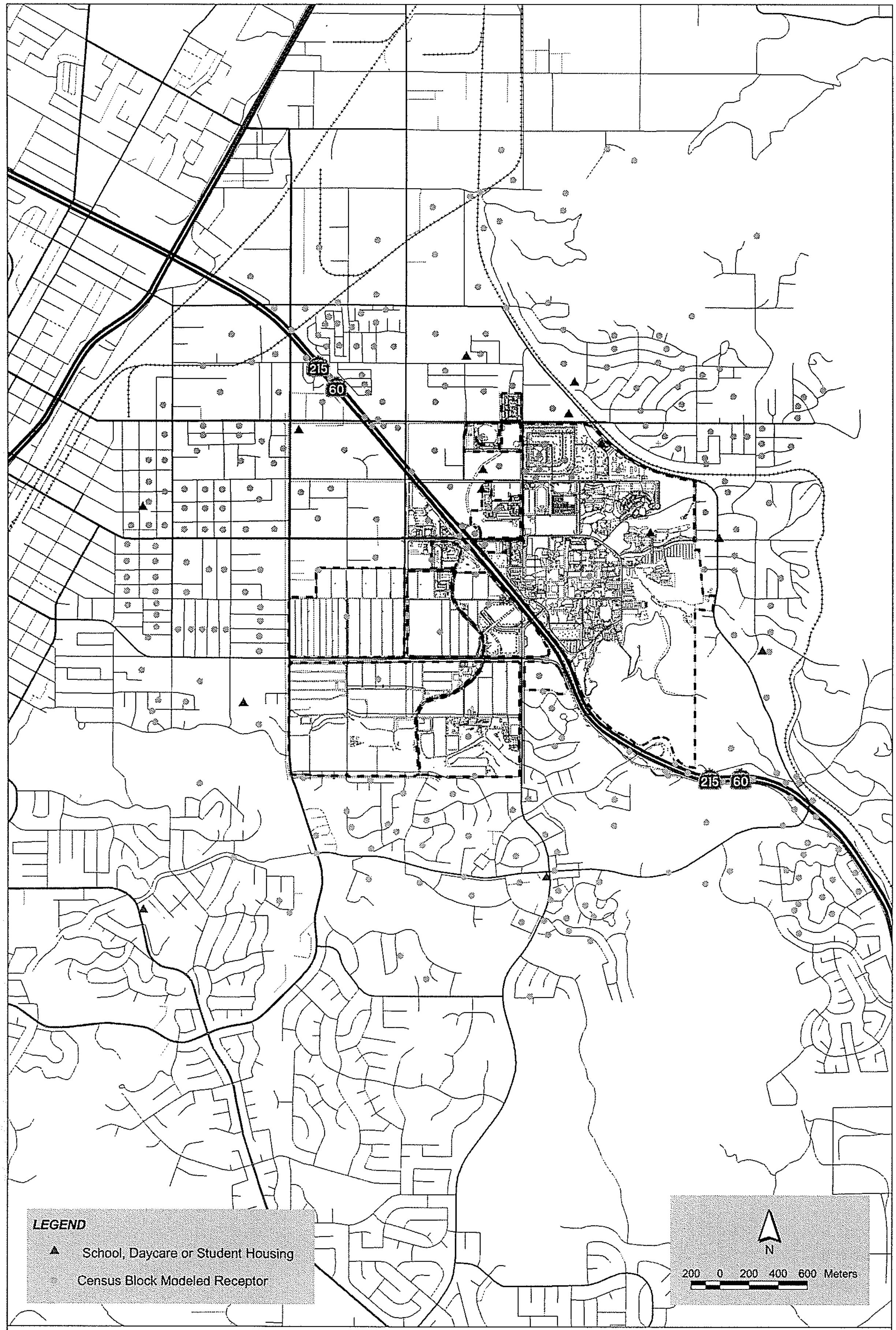
Off-campus Gridded Receptor Locations

URS | Project No.: 29869454 | Project: UC RIVERSIDE 2004 LRDP HRA | Date: March 2005 | Figure 4



Off-campus Discrete Receptor Locations

URS | Project No.: 29869454 | Project: UC RIVERSIDE 2004 LRDP HRA | Date: March 2005 | Figure 5



Sensitive Receptor and Census Block Locations

URS | Project No.: 29869454 | Project: UC RIVERSIDE 2004 LRDP HRA | Date: March 2005 | Figure 6

Table 13. Modeled Point Source Parameters in the UCR HRA for Both Scenarios

Source ID	Source Type	Location	UTM Coordinates		Elev (feet)	Stack Ht. (feet)	Stack dia. (feet)	Exit Temp (Fahrenheit)	Exit Velocity (ft/min)
			East (m)	North (m)					
86	POINT	ABERDEEN BOILER	469909.4	3759770	1082.3	52	2.5	375	41
87	POINT	ABERDEEN BOILER	469909.4	3759845	1080.2	52	2.5	375	41
92	POINT	ABERDEEN KITCHEN	469920.4	3759808	1081.4	52	2	100	197
90	POINT	COMMONS KITCHEN	469674.4	3759376	1062.7	31	2	100	197
169	POINT	ENTOMOLOGY ANNEX	469888.4	3759033	1095.3	10	0.5	374	2543
28	POINT	HOUSING SPRAY BOOTH	470049.4	3760014	1098.7	11	2	70	1500
91	POINT	LIFE SCIENCE INCINERATOR	469862.4	3759172	1074.6	29	3	900	1791
84	POINT	LOTHIAN BOILER	470223.4	3759573	1086.3	52	1	375	41
85	POINT	LOTHIAN BOILER	470187.4	3759515	1079.1	52	1	375	41
89	POINT	LOTHIAN KITCHEN	470217.4	3759481	1079.2	52	2	100	197
66	POINT	PENTLAND BOILER	470103.4	3759724	1080.9	34	2.5	375	41
67	POINT	PENTLAND BOILER	470118.4	3759773	1089.7	34	2.5	375	41
68	POINT	PENTLAND BOILER	470152.4	3759809	1096.7	34	2.5	375	41
69	POINT	PENTLAND BOILER	470200.4	3759828	1102	34	2.5	375	41
70	POINT	PENTLAND BOILER	470248.4	3759825	1100.7	34	2.5	375	41
71	POINT	PENTLAND BOILER	470294.4	3759799	1106	34	2.5	375	41
72	POINT	PENTLAND BOILER	470310.4	3759742	1104.3	34	2.5	375	41
73	POINT	PENTLAND BOILER	470208.4	3759782	1093	34	2.5	375	41
74	POINT	PENTLAND BOILER	470161.4	3759750	1083.1	34	2.5	375	41
75	POINT	PENTLAND BOILER	470224.4	3759746	1091.5	34	2.5	375	41
76	POINT	PENTLAND BOILER	470113.4	3759668	1077.3	34	2.5	375	41
77	POINT	PENTLAND BOILER	470153.4	3759696	1079.7	34	2.5	375	41
79	POINT	PENTLAND BOILER	470187.4	3759719	1081	34	2.5	375	41
80	POINT	PENTLAND BOILER	470161.4	3759663	1081.9	34	2.5	375	41
81	POINT	PENTLAND BOILER	470207.4	3759662	1084.8	34	2.5	375	41
82	POINT	PENTLAND BOILER	470248.4	3759662	1092.2	34	2.5	375	41
83	POINT	PENTLAND BOILER	470288.4	3759684	1101.9	34	2.5	375	41
29	POINT	PHYSICAL PLANT SPRAY BOOTH (CORPORATION)	469446.4	3760195	1036.1	13	2	70	1500
88	POINT	STEAM PLANT	469797.4	3759022	1083.9	22	2	375	659
171	POINT	E-01	470208.4	3759513	1080.5	10	0.5	374	2543
17	POINT	E-02	469934.4	3759808	1082.4	10	0.5	374	2543
30	POINT	E-03	469635.4	3759337	1061.7	10	0.5	374	2543
60	POINT	E-04	469862.4	3758947	1101.7	10	0.5	374	2543
58	POINT	E-06	469623.4	3759062	1057.5	10	0.5	374	2543
54	POINT	E-07	469859.4	3759215	1070.2	10	0.5	374	2543
33	POINT	E-08	470221.4	3759569	1085.6	10	0.5	374	2543
36	POINT	E-09	469763.4	3759347	1066	10	0.5	374	2543
61	POINT	E-10	469860.4	3758907	1109.5	10	0.5	374	2543
34	POINT	E-12	470029.4	3759379	1060.5	10	0.5	374	2543
31	POINT	E-13	469447.4	3759884	1043	10	0.5	374	2543
56	POINT	E-14	469755.4	3759157	1066.6	64	0.5	374	2543
170	POINT	E-15	469757.4	3758961	1080.8	10	0.5	374	2543
62	POINT	E-16	469995.4	3758934	1144.1	10	0.5	374	2543
59	POINT	E-17	469798.4	3759033	1082.8	10	0.5	374	2543

Source ID	Source Type	Location	UTM Coordinates		Elev (feet)	Stack Ht. (feet)	Stack dia. (feet)	Exit Temp (Fahrenheit)	Exit Velocity (ft/min)
			East (m)	North (m)					
53	POINT	E-19	469989.4	3759269	1081.2	10	0.5	374	2543
35	POINT	E-20	469946.4	3759369	1070.3	10	0.5	374	2543
32	POINT	E-22	469367.4	3759272	1045.2	71	0.5	374	2543
57	POINT	E-23	469963.4	3759167	1086.7	62	0.5	374	2543
55	POINT	E-29	469611.4	3759169	1054.1	10	0.5	374	2543

[1] Stack parameters were primarily derived from Screening HRA (Geomatrix, 2002).

Table 14. Modeled Area Source Parameters in the UCR HRA for Both Scenarios

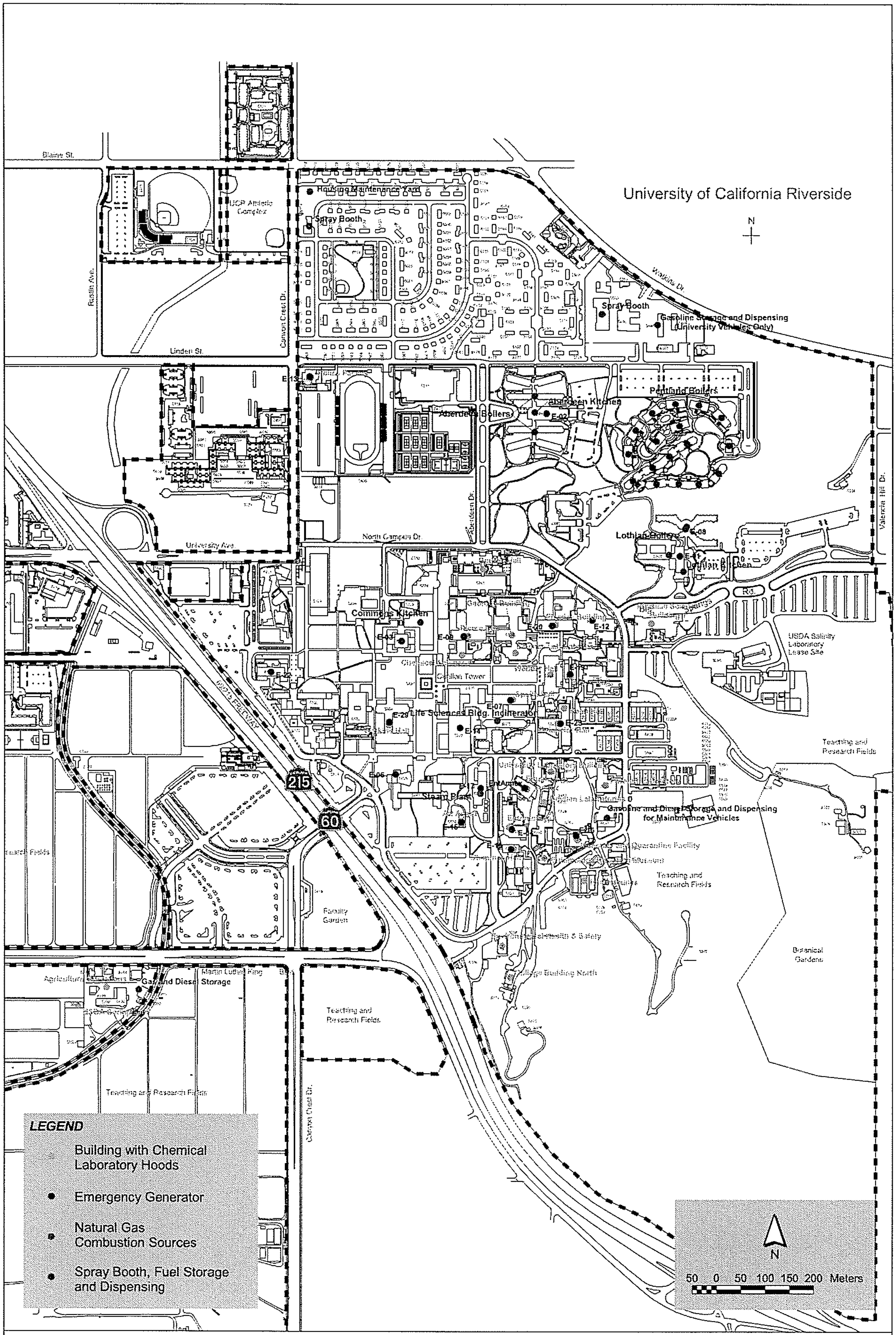
Source ID	Source Type	Location	UTM Coordinates		Elev (feet)	Release Ht. (feet)	Length (feet)	Width (feet)	Angle (deg)
			East (m)	North (m)					
21	AREA	BATCHELOR HALL	469957.431	3759166.726	1085.6	59	216	177	0
25	AREA	BOURNS HALL	469803.43	3759484.727	1061.3	49	321	266	0
20	AREA	BOYCE HALL	469982.431	3759264.727	1081	84	102	226	0
46	AREA	BOYDEN LABORATORIES	469928.43	3759002.726	1111.4	28	52	105	0
44	AREA	CHAPMAN HALL	469866.43	3758906.726	1111.2	42	108	52	0
37	AREA	CHEMICAL SCIENCE BUILDING	469782.43	3759299.727	1066	61.5	108	121	0
41	AREA	ENTOMOLOGY RESEARCH MUSEUM	469929.43	3758887.725	1130.4	39	82	79	0
26	AREA	ENTOMOLOGY SEISMIC REPLACEMENT	469856.43	3758951.726	1099.8	66	154	223	0
49	AREA	ENVIRONMENTAL HEALTH AND SAFETY	469843.43	3758706.725	1111.4	23	62	118	0
43	AREA	FAWCETT LABORATORY	470056.431	3759037.726	1122.2	33	131	207	0
52	AREA	GASOLINE DISPENSING AGRICULTURE	469091.428	3758610.724	1016.8	4	20	20	0
50	AREA	GASOLINE DISPENSING GROUND	470056.431	3758968.726	1142.1	4	20	20	0
51	AREA	GASOLINE FLEET AREA	470160.431	3759987.729	1108.7	4	20	20	0
22	AREA	GEOLOGY BUILDING	469862.43	3759349.727	1069.3	32	203	243	0
47	AREA	INSECTARY AND QUARANTINE	469998.431	3758924.726	1144.6	65	131	89	0
48	AREA	KEEN HALL	469970.431	3759197.727	1084.7	32	69	102	0
27	AREA	PHYSICAL SCIENCE BUILDING	470151.431	3759373.727	1057.9	35	321	164	0
42	AREA	PHYSICS BUILDING	469952.431	3759369.727	1070.2	50	239	69	0
18	AREA	PIERCE HALL	469771.43	3759346.727	1066	45	239	69	0
19	AREA	SCIENCE LABORATORIES I	469870.43	3759312.727	1069.3	40	171	82	0
23	AREA	SPEITH HALL	469864.43	3759215.727	1070.4	36	236	154	0
45	AREA	UNIVERSITY LABORATORY BUILDING	469943.431	3759066.726	1100.9	40	66	102	0
24	AREA	WEBBER HALL	469942.431	3759267.727	1077.2	51	108	249	0

Table 15. Modeled Volume Source Parameters in the UCR HRA for Both Scenarios

Source ID	Source Type	Location	UTM Coordinates		Elev (feet)	Release Ht. (feet)
			East (m)	North (m)		
93	VOLUME	EX1	469873	3759718	1073.4	12
94	VOLUME	EX2	469873	3759681	1060.3	12
95	VOLUME	EX3	469873	3759645	1049.1	12
96	VOLUME	EX4	469873	3759608	1042.7	12
97	VOLUME	EX5	469873	3759572	1040.1	12
98	VOLUME	EX6	469873	3759535	1042	12
99	VOLUME	EX7	469873	3759499	1049	12
100	VOLUME	EX8	469873	3759462	1056.9	12
101	VOLUME	EX9	469873	3759425	1065.5	12
102	VOLUME	EX10	469873	3759380	1069.6	12
103	VOLUME	EX11	469836	3759337	1068.9	12
104	VOLUME	EX12	469799	3759337	1066	12
105	VOLUME	EX13	469763	3759337	1066	12
106	VOLUME	EX14	469726	3759337	1066	12
107	VOLUME	EX15	470025	3759287	1078.7	12
108	VOLUME	EX16	470075	3759266	1081.1	12
109	VOLUME	EX17	470105	3759245	1082.7	12
110	VOLUME	EX18	470134	3759223	1085	12
111	VOLUME	EX19	470160	3759200	1087.9	12
112	VOLUME	EX20	470192	3759218	1074.5	12
113	VOLUME	EX21	470228	3759223	1073.6	12
114	VOLUME	EX22	470265	3759223	1082.9	12
115	VOLUME	EX23	470292	3759253	1107.4	12
116	VOLUME	EX24	470336	3759234	1120.2	12
117	VOLUME	EX25	470367	3759252	1120.6	12
118	VOLUME	EX26	470404	3759256	1121.3	12
119	VOLUME	EX27	470440	3759259	1128.2	12
120	VOLUME	EX28	470474	3759270	1128.5	12
121	VOLUME	EX29	470508	3759285	1124.1	12
122	VOLUME	EX30	470542	3759298	1127.6	12
123	VOLUME	EX31	470577	3759307	1121.5	12
124	VOLUME	EX32	470614	3759307	1108.2	12
125	VOLUME	EX33	470650	3759307	1100	12
126	VOLUME	EX34	470687	3759307	1108	12
127	VOLUME	EX35	470691	3759340	1101.4	12
128	VOLUME	EX36	470691	3759377	1102	12
129	VOLUME	EX37	470691	3759413	1101.7	12
135	VOLUME	EX43	470690	3759633	1102.7	12
136	VOLUME	EX44	470690	3759669	1111.6	12
137	VOLUME	EX45	470690	3759706	1118.2	12
138	VOLUME	EX46	470672	3759728	1122.3	12

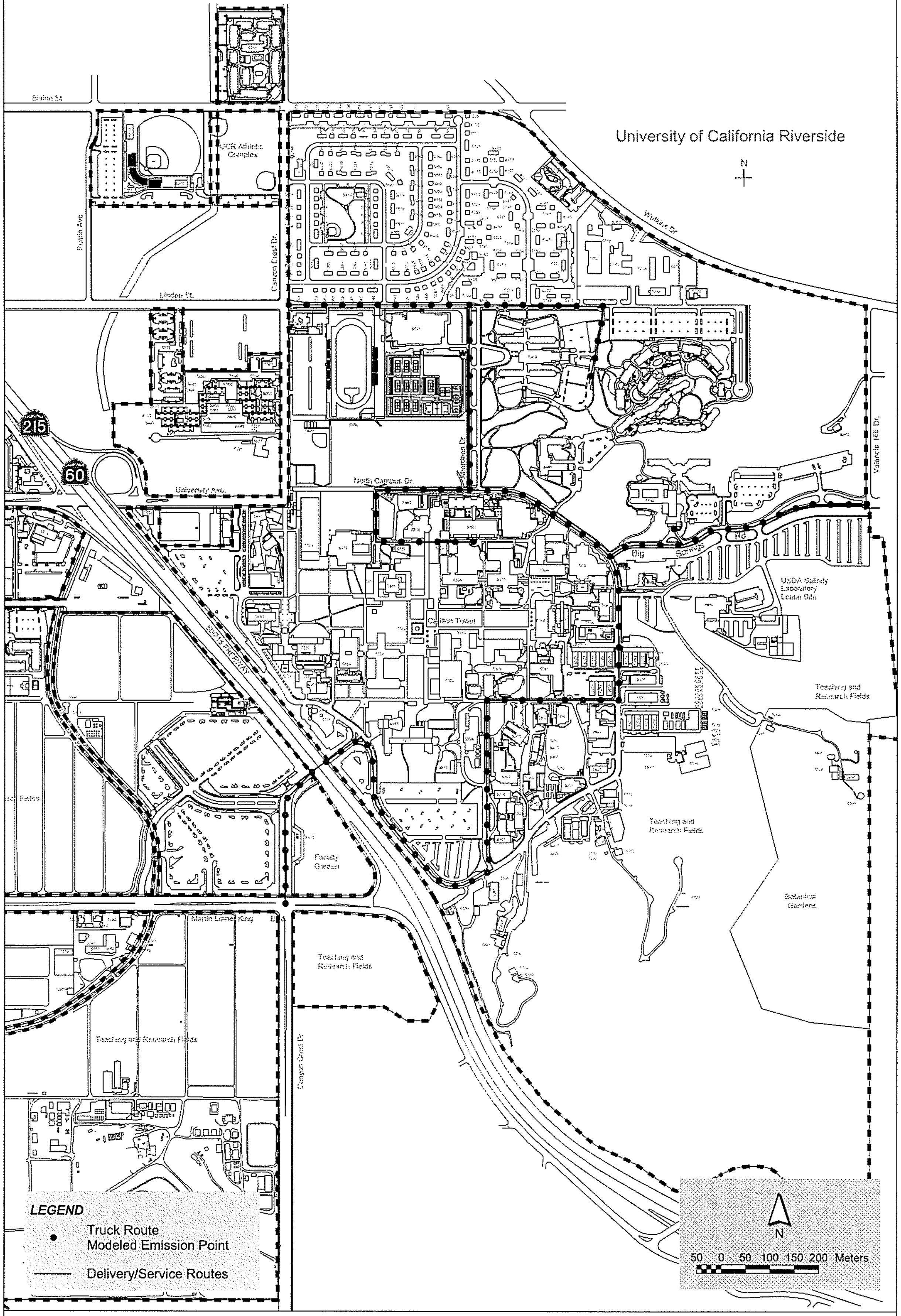
Source ID	Source Type	Location	UTM Coordinates		Elev (feet)	Release Ht. (feet)
			East (m)	North (m)		
139	VOLUME	EX47	470636	3759735	1121.5	12
140	VOLUME	EX48	470600	3759743	1122	12
141	VOLUME	EX49	470565	3759751	1119	12
142	VOLUME	EX50	470529	3759759	1118.5	12
143	VOLUME	EX51	470494	3759768	1118.5	12
154	VOLUME	EX62	469910	3759335	1073	12
155	VOLUME	EX63	469946	3759334	1074.1	12
156	VOLUME	EX64	469982	3759326	1074.9	12
157	VOLUME	EX65	470014	3759308	1075.1	12
158	VOLUME	EX66	469502	3759718	1043	12
159	VOLUME	EX67	469539	3759718	1044.1	12
160	VOLUME	EX68	469576	3759718	1047.9	12
161	VOLUME	EX69	469612	3759718	1050.1	12
162	VOLUME	EX70	469649	3759718	1050.7	12
163	VOLUME	EX71	469685	3759718	1052.5	12
164	VOLUME	EX72	469722	3759718	1054.2	12
165	VOLUME	EX73	469759	3759718	1058.3	12
166	VOLUME	EX74	469795	3759718	1062.2	12
167	VOLUME	EX75	469832	3759718	1067.1	12
168	VOLUME	EX76	469689	3759337	1062.7	12
38	VOLUME	EX78	469873	3759718	1073.4	12
39	VOLUME	EX79	469910	3759718	1075.5	12
40	VOLUME	EX80	469946	3759717	1066.2	12
63	VOLUME	EX81	469983	3759717	1071.2	12
64	VOLUME	EX82	470019	3759717	1078.9	12
65	VOLUME	EX83	470056	3759716	1080	12
78	VOLUME	EX84	470093	3759716	1080	12
172	VOLUME	EX85	470147	3759716	1079.1	12
173	VOLUME	EX86	470144	3759680	1079.5	12
174	VOLUME	EX87	470136	3759644	1081.6	12
175	VOLUME	EX88	470130	3759608	1078.1	12
181	VOLUME	EX94	470069	3758904	1163.2	12
182	VOLUME	EX95	470105	3758904	1174.3	12
183	VOLUME	EX96	470142	3758904	1188.6	12
184	VOLUME	EX97	470179	3758904	1198.6	12
185	VOLUME	EX98	470179	3758939	1168.8	12
186	VOLUME	EX99	470179	3758976	1149.8	12
187	VOLUME	EX100	470179	3759013	1137.1	12
188	VOLUME	EX101	470179	3759056	1127.2	12
189	VOLUME	EX102	470179	3759093	1117.9	12
190	VOLUME	EX103	470178	3759130	1109.4	12
191	VOLUME	EX104	470174	3759166	1102	12

Source ID	Source Type	Location	UTM Coordinates		Elev (feet)	Release Ht. (feet)
			East (m)	North (m)		
192	VOLUME	EX105	469908	3758904	1122.2	12
193	VOLUME	EX106	469945	3758904	1130.6	12
194	VOLUME	EX107	469981	3758904	1141.1	12
195	VOLUME	EX108	470018	3758904	1153.3	12
196	VOLUME	EX109	469495	3758484	1057.8	12
197	VOLUME	EX110	469495	3758521	1057.8	12
198	VOLUME	EX111	469495	3758557	1056.8	12
199	VOLUME	EX112	469495	3758594	1054.7	12
200	VOLUME	EX113	469494	3758630	1054.2	12
201	VOLUME	EX114	469494	3758667	1051.1	12
202	VOLUME	EX115	469500	3758701	1050.3	12
203	VOLUME	EX116	469524	3758728	1052.2	12
204	VOLUME	EX117	469549	3758755	1053.9	12
205	VOLUME	EX118	469579	3758777	1057.2	12
206	VOLUME	EX119	469608	3758798	1058.1	12
207	VOLUME	EX120	469638	3758819	1060.9	12
208	VOLUME	EX121	469663	3758811	1066	12
209	VOLUME	EX122	469674	3758777	1069.2	12
210	VOLUME	EX123	469676	3758741	1073.1	12
211	VOLUME	EX124	469677	3758704	1075.9	12
212	VOLUME	EX125	469693	3758672	1079.6	12
213	VOLUME	EX126	469715	3758642	1086.6	12
1	VOLUME	EX127	469738	3758614	1095	12
2	VOLUME	EX128	469761	3758586	1104.2	12
3	VOLUME	EX129	469784	3758558	1115.6	12
4	VOLUME	EX130	469810	3758532	1123.9	12
5	VOLUME	EX131	469843	3758521	1144.2	12
6	VOLUME	EX132	469877	3758531	1161.1	12
7	VOLUME	EX133	469908	3758904	1122.2	12
8	VOLUME	EX134	469908	3758867	1127.8	12
9	VOLUME	EX135	469908	3758830	1131.6	12
10	VOLUME	EX136	469908	3758794	1134.2	12
11	VOLUME	EX137	469908	3758757	1135.8	12
12	VOLUME	EX138	469908	3758721	1139.7	12
13	VOLUME	EX139	469908	3758684	1156.2	12
14	VOLUME	EX140	469908	3758648	1166	12
15	VOLUME	EX141	469908	3758611	1175.9	12
16	VOLUME	EX142	469912	3758575	1184.2	12



Point and Area Emission Locations

URS	Project No.: 29869454	Project: UC RIVERSIDE 2004 LRDP HRA	Date: March 2005	Figure 7



Volume Emission Source (Delivery Truck) Locations

URS | Project No.: 29869454 | Project: UC RIVERSIDE 2004 LRDP HRA | Date: March 2005 | Figure 8

Table 16. Exposure Pathways Evaluated for Each Substance in Both Scenarios

Substance	CAS Number	Inhalation	Multipathway
Diesel particulate matter	9901	✓	
PAHs, total, w/o individ. Components	1151	✓	✓
Formaldehyde	50000	✓	
Benzene	71432	✓	
Naphthalene	91203	✓	
1,3-Butadiene	106990	✓	
Ammonia	7664417	✓	
Carbon tetrachloride	56235	✓	
Fluorocarbons (chlorinated)	1104	✓	
1,4-Dioxane	123911	✓	
Ethylene dibromide	106934	✓	
Ethylene dichloride	107062	✓	
Ethylene oxide	75218	✓	
Trichloroethylene	79016	✓	
Vinyl chloride	75014	✓	
Methylene chloride	75092	✓	
Toluene	108883	✓	
Mixed xylenes	1330207	✓	
Methyl ethyl ketone	78933	✓	
Isopropyl alcohol	67630	✓	
Ethyl benzene	100414	✓	
Ethylene glycol monobutyl ether	111762	✓	
Methanol	67561	✓	
Lead	7439921	✓	✓
Nickel	7440020	✓	✓
Arsenic	7440382	✓	✓
Cadmium	7440439	✓	✓
Hexane	110543	✓	
Acetaldehyde	75070	✓	
Acrolein	107028	✓	
Propylene	115071	✓	
Methyl chloride	74873		
2,3,7,8-Tetrachlorodibenzo-p-dioxin	1746016	✓	✓
Chromium, hexavalent	18540299	✓	
Perchloroethylene	127184	✓	
Methyl chloroform	71556	✓	

5.0 DOSE-RESPONSE ASSESSMENT

Dose-response assessment has been defined as “an attempt to describe the expected human response to any given level of an exposure” (Hart and Turturro, 1986). Multiple governmental agencies and scientific organizations, such as the EPA, the National Academy of Sciences, the World Health Organization, and OEHHA, have developed dose-response relationships for numerous chemicals. Dose-response assessment can produce three toxicity factors useful in evaluating potential adverse health effects: CSFs and URFs for carcinogens, chronic noncancer RELs (chronic RELs) for substances producing noncarcinogenic toxic effects over a long-term exposure period, and acute noncancer RELs (acute RELs) for acutely toxic compounds. This HRA used current toxicity factors published by OEHHA and incorporated in the HARP model.

5.1 CANCER TOXICITY FACTORS

Cancer Slope Factors (CSFs) represent the potential risk of contracting cancer per dose of carcinogen where dose is in units of milligrams of carcinogen per kilogram of body weight per day. Unit Risk Factors (URFs) define the theoretical risk of developing cancer as a result of continuous exposure to an airborne concentration of 1 $\mu g/m^3$ of a carcinogen. URFs are derived from CSFs based on inhalation rate, body weight, and exposure time. The cancer risk resulting from low levels of exposure to a carcinogenic substance cannot be measured directly by either animal or human epidemiology studies. Therefore, mathematical models are used to extrapolate health effects observed in high dose animal studies or relatively high dose human epidemiology studies, to the low doses encountered in the environment. Generally, CSFs determined from extrapolating from high to low doses represent upper-bound or worst-case estimates and are often calculated from factors estimated at 95% upper confidence limits. The inherent assumption is that there is no threshold concentration below which exposure does not cause a cancer outcome.

The linearized multi-stage (LMS), low-dose extrapolation model is commonly used by the EPA’s Carcinogen Assessment Group and OEHHA to extrapolate data from animal studies to environmental exposure conditions in humans (EPA, 1986; DHS [California Department of Health Services], 1985). The LMS model estimates an upperbound estimate of risk that is consistent with health-conservative theories for mechanisms of carcinogenesis (EPA, 1986). When epidemiology data are used as the basis for estimating a CSF, a variety of models are used. In all cases, the CSFs are based on the assumption that any exposure to a carcinogen contributes to an individual’s chance of developing cancer within a lifetime. CSFs and URFs are developed for both inhalation and noninhalation exposure routes. The cancer toxicity factors used in this HRA are presented in Table 17 and are the most recent values published by OEHHA.

5.2 CHRONIC NONCANCER REFERENCE EXPOSURE LEVELS

Chronic Reference Exposure Levels (RELs) define a dose or exposure concentration at which adverse health effects would be likely if an individual were exposed continuously to that dose over a long-term exposure period. Similar to carcinogens, chronic RELs are derived from animal studies or human epidemiological data and focus on the most sensitive animal or human data set and target organ or system (i.e., liver, kidney, central nervous system, etc.). Different laboratory animals may be used to test the toxicity of a particular substance. Several different target organs are typically examined. The study yielding the lowest effect level would be used as the basis for developing the chronic REL from animal data. Chronic RELs are used to evaluate exposures to noncarcinogens as well as noncarcinogenic effects from carcinogens and are developed for both inhalation and noninhalation exposure routes. The chronic RELs used in this HRA are presented in Table 17 and are the most recent values published by OEHHA when available.

5.3 ACUTE NONCANCER REFERENCE EXPOSURE LEVELS

Acute health effects may result from short-term exposures that typically occur on an infrequent basis. Unlike chronic exposures, criteria for measuring acute health effects have not been standardized. Rather, several approaches may be used to establish allowable one-hour concentrations based on short-term toxicity studies in the literature. The acute RELs used in this HRA are presented in Table 17 and are the most recent values published by OEHHA, when available.

Table 17. Cancer Toxicity Factors and Chronic and Acute Noncancer RELs

Substance	CAS Number	Cancer Toxicity Factors		Chronic Noncancer REL		Acute Noncancer REL
		Inhalation URF (μg/m^3)$^{-1}$	Oral CPF (mg/kg-d)$^{-1}$	Inhalation (μg/m^3)	Oral (mg/kg-d)	Inhalation (μg/m^3)
Diesel particulate matter	9901	3.00E-04		5.00E+00		
PAHs, total, w/o individ. Components	1151	1.10E-03	1.20E+01			
Formaldehyde	50000	6.00E-06		3.00E+00		9.40E+01
Benzene	71432	2.90E-05		6.00E+01		1.30E+03
Naphthalene	91203	3.40E-05		9.00E+00		
1,3-Butadiene	106990	1.70E-04		2.00E+01		
Ammonia	7664417			2.00E+02		3.20E+03
Carbon tetrachloride	56235	4.20E-05		4.00E+01		1.90E+03
Fluorocarbons (chlorinated)	1104			7.00E+02		
1,4-Dioxane	123911	7.70E-06		3.00E+03		3.00E+03
Ethylene dibromide	106934	7.10E-05		8.00E-01		
Ethylene dichloride	107062	2.10E-05		4.00E+02		
Ethylene oxide	75218	8.80E-05		3.00E+01		
Trichloroethylene	79016	2.00E-06		6.00E+02		
Vinyl chloride	75014	7.80E-05		2.60E+01		1.80E+05
Methylene chloride	75092	1.00E-06		4.00E+02		1.40E+04
Toluene	108883			3.00E+02		3.70E+04
Mixed xylenes	1330207			7.00E+02		2.20E+04
Methyl ethyl ketone	78933			1.00E+03		1.30E+04
Isopropyl alcohol	67630			7.00E+03		3.20E+03
Ethyl benzene	100414			2.00E+03		
Ethylene glycol monobutyl ether	111762			2.00E+01		1.40E+04
Methanol	67561			4.00E+03		2.80E+04
Lead	7439921	1.20E-05	8.50E-03			
Nickel	7440020	2.60E-04		5.00E-02	5.00E-02	6.00E+00
Arsenic	7440382	3.30E-03	1.50E+00	3.00E-02	3.00E-04	1.90E-01
Cadmium	7440439	4.20E-03		2.00E-02	5.00E-04	
Hexane	110543			7.00E+03		
Acetaldehyde	75070	2.70E-06		9.00E+00		
Acrolein	107028			6.00E-02		1.90E-01
Propylene	115071			3.00E+03		
Methyl chloride	74873					
2,3,7,8-Tetrachlorodibenzo-p-dioxin	1746016	3.80E+01	1.30E+05	4.00E-05	1.00E-08	
Chromium, hexavalent	18540299	1.50E-01		2.00E-01	2.00E-02	
Perchloroethylene	127184	5.90E-06		3.50E+01		2.00E+04
Methyl chloroform	71556			1.00E+03		6.80E+04

6.0 RISK CHARACTERIZATION

Risk characterization is the final step in the risk assessment process where the results of the exposure and dose-response assessments are combined to estimate the potential for adverse health effects. Risk analysts describe risks numerically in scientific notation, for example 1×10^{-5}, which means that there is one chance in 100,000 of an event occurring. The SCAQMD has established a 10 in a million cancer risk and an HI of 1.0 as the significance criteria for public notification for the AB 2588 program. Cancer risk is defined as the upperbound incremental probability of an individual developing cancer over a lifetime as a result of an exposure to potential carcinogens. The cancer risk level is intended to ensure a sufficient safety margin to prevent a single project or activity from causing a substantial contribution to the overall number of cancer cases in an area. It is not intended or designed to serve as a means to evaluate cumulative risk associated with multiple activities not associated with the project in question or to assess risk posed by ambient background conditions.

The conclusions of a HRA must be considered in context. As a general matter, the background probability of an individual contracting cancer in one's lifetime is about 40% or 400,000 in one million; that is, 4 in 10 people will contract cancer in their lifetime. This overall probability of contracting cancer can be influenced by diet, smoking, heredity, chemicals in the environment and the workplace, and other factors.

It should be recognized that when small populations are exposed, population risk estimates may be very small. For example, if 100 people are exposed to an individual lifetime cancer risk of 1×10^{-5}, the expected number of cases is 0.001.[1] For risk assessment purposes, a lifetime of exposure is considered to be 70 years, 365 days a year, 24 hours per day. It should be further recognized that a risk assessment does not calculate the exact risk for all individuals, but a hypothetical risk assuming that all of a series of "worst-case scenario" exposure assumptions apply. The chance that an individual would be exposed to any of these exposure assumptions is small, and for all assumptions even smaller (e.g. 70 years of continuously breathing air at the location of maximum impact). Thus, an individual's actual risk is likely to be significantly over-estimated by the methodology of an HRA.

It is also important to place health risk and the assessment of probability in the context of daily activity. To provide an idea of the size of risks from environmental hazards, the continuum below provides risk statistics for some familiar events:

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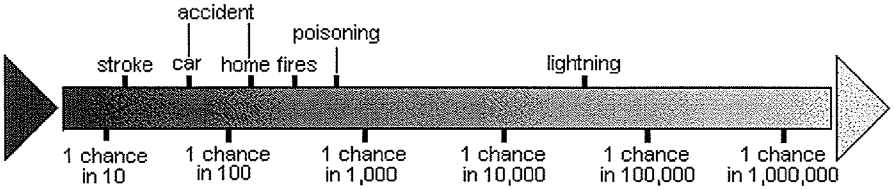
[1] "Guidance for Risk Characterization" US EPA Science Policy Council, February, 1995.

Putting Risks in Perspective



Source: "Air Pollution and Health Risk", EPA Publication 450/3-90-022 (1991)

Health effect categories evaluated in this HRA include the following:

- Lifetime risk of developing cancer;
- Population-wide potential for developing cancer;
- Potential for chronic or long-term noncancer effects; and
- Potential for acute or short-term noncancer effects.

6.1 CANCER RISK FROM THE EXISTING SCENARIO

Lifetime cancer risk is defined as the increased chance of contracting cancer over a 70-year period as a result of exposure to a toxic substance or substances. It is the product of the estimated daily exposure of each suspected carcinogen by its respective cancer toxicity factor. The result represents a worst-case or upper bound estimate of cancer risk.

Results of the cancer health effects assessment indicate that all of the cancer risks are less than 10 in one million (1.0×10^{-5}). Cancer risks less than 10 in one million are considered acceptable and do not require public notification in accordance with state and regional guidelines. The lifetime incremental cancer risk as a result of a lifetime exposure to emissions from the routine campus-wide operation of all sources in the Existing Scenario was estimated to be 4.99 in one million (4.99×10^{-6}) at the *off-campus* MEI and 0.66 in one million (6.64×10^{-7}) at the *on-campus* MEI. The *off-campus* MEI was located on the fenceline east of the campus along the Teaching and Research Fields south of Parking Lot 13. The *on-campus* MEI was located at the student housing receptor near Lothian Residence Hall. A summary of the HRA results for the off- and on-campus MEIs in the Existing Scenario is presented in Table 18. The locations of the cancer, chronic, and acute noncancer off- and on-campus MEIs in the Existing Scenario are presented on Figure 9.

The primary source type contributions to the estimated cancer risk at the off-campus MEI were from the incinerator, diesel-fueled delivery trucks, and emissions from fume hoods. Of the sources modeled, the Life Sciences incinerator contributed 19.9% of the cancer risk followed by fume hoods in the Physical Science Building with 11.2% of the cancer risk. The source contribution to cancer risk at the off-campus MEI in the Existing Scenario is presented in Table 19. The primary source type contributions to the estimated cancer risk at the on-campus MEI were from emissions from fume hoods and boilers. Of the sources modeled, the fume hoods in the Physical Science Building contributed 13.2% of the cancer risk followed by a Pentland boiler with 4.8% of the cancer risk. The source contribution to cancer risk at the on-campus MEI in the Existing Scenario is presented in Table 20. At other off- and on-campus receptor locations, different sources may contribute more significantly as the source-specific contribution is dependent on many variables such as the source to receptor distance the meteorology and the release parameters.

The primary chemical contribution to the estimated cancer risk at the off-campus MEI was diesel particulate matter with approximately 42.9% of the risk, followed by polycyclic aromatic hydrocarbons (PAHs) with approximately 35.5% of the risk. The chemical contribution to cancer risk at the off-campus MEI in the Existing Scenario by substance and by exposure pathway is presented in Table 21. The primary chemical contribution to the estimated cancer risk at the on-campus MEI was PAHs with approximately 64.7% of the risk, followed by diesel particulate matter with approximately 29.4% of the risk. The chemical contribution to cancer risk at the on-campus MEI in the Existing Scenario by substance and by exposure pathway is presented in Table 22. At other off- and on-campus receptor locations, different chemicals may contribute more significantly depending on the types of chemicals emitted by the source nearby the receptor. HARP HRA modeling files are provided in electronic format on the enclosed CD due to their volume.

6.2 CANCER BURDEN FROM THE EXISTING SCENARIO

Population cancer burden is another measure of cancer risk and represents a worst-case estimate of the increased number of cancer cases that might occur in the exposed population as a whole as a result of emissions from routine campus-wide operations. Burden is estimated by multiplying the cancer risk determined at a specific location by the population residing in that location and summing those results for all populated areas within the carcinogenic ZOI. The extent of the ZOI in the Existing Scenario is presented in Figure 10. From census data, the population within the ZOI is approximately 19,000 people. In the Existing Scenario, the maximum cancer risk at a census block receptor within the ZOI, 1.14×10^{-5}, was used to estimate the upper limit of the cancer burden and the cancer risk at the ZOI boundary, 1.0×10^{-6}, was used to estimate the lower limit of the cancer burden. Thus, the entire population within the ZOI was exposed to this level of risk continuously for 70 years, the potential cancer burden ranges from a maximum of 0.22 to an estimated lower limit of 0.02. The result suggests that the emissions from routine campus-wide operations in the Existing Scenario have a minimal impact on the exposed population.

6.3 NONCANCER HEALTH EFFECTS FROM THE EXISTING SCENARIO

The potential for emissions from routine campus-wide operations to cause both chronic (long-term) and acute (short-term) noncancer health effects was also assessed in this HRA. Guidance published by OEHHA specifies which substances are to be evaluated in the noncancer effects assessment and which organ systems within the body are affected (e.g., liver, kidney, respiratory system, central nervous system, etc.).

Results of the chronic noncancer health effects assessment indicate that all of the HI values for each organ system are less than 1.0. Chronic HI values less than 1.0 indicate that noncancer effects from chronic exposure to emissions from routine campus-wide operations are unlikely. The maximum chronic HI for an organ system in the Existing Scenario was 0.004 at the off-campus MEI and 0.003 at the on-campus MEI. The off-campus MEI was located on the fenceline near College Place south of College Building South. The on-campus MEI was located at the student housing receptor near Lothian Residence Hall. The chronic HI results for the off- and on-campus MEIs in the Existing Scenario are presented in Table 23.

Results of the acute noncancer health effects assessment indicate that all of the HI values for each organ system are less than 1.0. Acute HI values less than 1.0 indicate that noncancer effects from acute exposure to emissions from routine campus-wide operations are unlikely. The maximum acute HI for an organ system in the Existing Scenario was 0.07 at the off-campus MEI and 0.03 at the on-campus MEI. The off-campus MEI was located on the fenceline north of campus on Watkins Drive. The on-campus MEI was located at the Child Development Center. The acute HI results for the off- and on-campus MEIs in the Existing Scenario are presented in Table 24.

6.4 SENSITIVE RECEPTOR IMPACTS FROM THE EXISTING SCENARIO

Two sensitive receptors were identified within the carcinogenic ZOI in the Existing Scenario. The HRA evaluated the cancer and noncancer health effects at these locations. The results showed that the potential cancer and noncancer health effects at these locations were well below the established health risk thresholds. The results for the sensitive receptors for the Existing Scenario are presented in Table 25. The locations of the sensitive receptors are shown on Figure 10.

6.5 CANCER RISK FROM THE LRDP SCENARIO

Results of the cancer health effects assessment indicate that all of the cancer risks are less than 10 in one million (1.0×10^{-5}). The lifetime incremental cancer risk as a result of a lifetime exposure to emissions from the routine campus-wide operation of all sources in the LRDP Scenario was estimated to be 7.43 in one million (7.43×10^{-6}) at the *off-campus* MEI and 1.48 in one million (1.48×10^{-6}) at the *on-campus* MEI. The *off-campus* MEI was located on the fenceline east of the campus on Valencia Hills Drive north of Parking Lot 14. The *on-campus* MEI was located at the student housing receptor near Lothian Residence Hall. A summary of the HRA results for the off- and on-campus MEIs in the LRDP Scenario is presented in Table 26. The locations of the cancer, chronic, and acute noncancer off- and on-campus MEIs in the LRDP Scenario are presented on Figure 11.

The primary source type contributions to the estimated cancer risk at the off-campus MEI were from boilers, fume hoods, and diesel-fueled delivery trucks. Of the sources modeled, a Pentland boiler contributed 7.2% of the cancer risk, followed by another Pentland boiler with 6.3% of the cancer risk. The source contribution to cancer risk at the off-campus MEI in the LRDP Scenario is presented in Table 27. The primary source type contributions to the estimated cancer risk at the on-campus MEI were from boilers and laboratory fume hoods. Of the sources modeled, the fume hoods in the Physical Science Building contributed 9.9% of the cancer risk, followed by a Pentland boiler with 8% of the cancer risk. The source contribution to cancer risk at the on-campus MEI in the LRDP Scenario is presented in Table 28. At other off- and on-campus receptor locations, different sources may contribute more significantly as the source-specific contribution is dependent on many variables such as the source to receptor distance.

The primary chemical contribution to the estimated cancer risk at the off-campus MEI was PAHs with approximately 80.2% of the risk, followed by diesel particulate matter with approximately 15.5% of the risk. The chemical contribution to cancer risk at the off-campus MEI in the LRDP Scenario by substance and by exposure pathway is presented in Table 29. The primary chemical contribution to the estimated cancer risk at the on-campus MEI was PAHs with approximately 85.5% of the risk, followed by diesel particulate matter at 11.2% of the cancer risk. The chemical contribution to cancer risk at the on-campus MEI in the LRDP Scenario by substance and by exposure pathway is presented in Table 30. At other off- and on-campus receptor locations, different chemicals may contribute more significantly depending on the types of chemicals emitted by the source nearby the receptor. HARP HRA modeling files are provided in electronic format on the enclosed CD due to their volume.

6.6 CANCER BURDEN FROM THE LRDP SCENARIO

The extent of the ZOI in the LRDP Scenario is presented on Figure 12. From census data, the population within the ZOI is approximately 25,000 people. In the LRDP Scenario, the maximum cancer risk at a census block receptor within the ZOI, 1.71×10^{-5}, was used to estimate the upper limit of the cancer burden and the cancer risk at the ZOI boundary, 1.0×10^{-6}, was used to estimate the lower limit of the cancer burden. Thus, assuming that the entire population within the ZOI was exposed to this level of risk continuously for 70 years, the potential cancer burden ranges from a maximum of 0.29 to an estimated lower limit of 0.03. The result suggests that the emissions from routine campus-wide operations in the LRDP Scenario have a minimal impact on the exposed population.

6.7 NONCANCER HEALTH EFFECTS FROM THE LRDP SCENARIO

The maximum chronic HI for an organ system in the LRDP Scenario was 0.007 at the off-campus MEI and 0.008 at the on-campus MEI. The off-campus MEI was located on the fenceline north of campus on Watkins Drive. The on-campus MEI was located at the student housing receptor near Lothian Residence Hall. The chronic HI results for the off- and on-campus MEIs in the LRDP Scenario are presented in Table 31.

The maximum acute HI for an organ system in the LRDP Scenario was 0.18 at the off-campus MEI and 0.09 at the on-campus MEI. The off-campus MEI was located on the fenceline north of the campus on Watkins Drive. The on-campus MEI was located at the Child Development Center receptor. The acute HI results for the off- and on-campus MEIs in the LRDP Scenario are presented in Table 32.

6.8 SENSITIVE RECEPTOR IMPACTS FROM THE LRDP SCENARIO

Four sensitive receptors were identified within the carcinogenic ZOI in the LRDP Scenario. The HRA evaluated the cancer and noncancer health effects at these locations. The results showed that the potential cancer and noncancer health effects at these locations were well below the established health risk thresholds. The results for the sensitive receptors in the LRDP Scenario are presented in Table 33. The locations of the sensitive receptors for the LRDP Scenario are shown on Figure 12.

Table 18. Summary of HRA Results for the Off- and On-campus MEIs in the Existing Scenario

	Result	Universal Transverse Mercator Coordinates		Location
		East (m)	North (m)	
Off-campus MEI				
Cancer Risk	4.99 x 10^{-6}	470660	3759199	Fenceline east of campus along the Teaching and Research Fields south of Parking Lot 13
Chronic HI	0.004	469818	3758466	Fenceline near College Place south of College Building South
Acute HI	0.07	470139	3760079	Fenceline north of campus along Watkins Drive
On-campus MEI				
Cancer Risk	6.64 x 10^{-7}	470300	3759560	Student housing receptor near Lothian Residence Hall
Chronic HI	0.003	470300	3759560	Student housing receptor near Lothian Residence Hall
Acute HI	0.03	469962	3760179	Child Development Center receptor

Table 19. Source Contribution to Cancer Risk at the Off-Campus MEI in the Existing Scenario

Source I.D.	Source Description	Source Type	Cancer Risk by Exposure Pathway					TOTAL Cancer Risk	% of TOTAL[1]
			Inhalation	Dermal Absorption	Soil Ingestion	Mother's Milk Ingestion	Produce Ingestion		
91	LIFE SCIENCE INCINERATOR	Incinerator	6.74E-08	4.17E-07	1.75E-07	3.06E-07	2.83E-08	9.94E-07	19.9%
27	PHYSICAL SCIENCE BUILDING	Fume Hoods	3.58E-08	2.17E-07	3.25E-08	0.00E+00	2.75E-07	5.60E-07	11.2%
125	EX33	Delivery Truck Segment	1.80E-07	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.80E-07	3.6%
124	EX32	Delivery Truck Segment	1.74E-07	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.74E-07	3.5%
126	EX34	Delivery Truck Segment	1.63E-07	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.63E-07	3.3%
18	PIERCE HALL	Fume Hoods	9.58E-09	5.81E-08	8.70E-09	0.00E+00	7.37E-08	1.50E-07	3.0%
123	EX31	Delivery Truck Segment	1.41E-07	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.41E-07	2.8%
122	EX30	Delivery Truck Segment	1.21E-07	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.21E-07	2.4%
127	EX35	Delivery Truck Segment	1.09E-07	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.09E-07	2.2%
121	EX29	Delivery Truck Segment	1.04E-07	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.04E-07	2.1%
19	SCIENCE LABORATORIES I	Fume Hoods	6.63E-09	4.02E-08	6.02E-09	0.00E+00	5.10E-08	1.04E-07	2.1%
20	BOYCE HALL	Fume Hoods	5.77E-09	3.50E-08	5.24E-09	0.00E+00	4.44E-08	9.04E-08	1.8%
120	EX28	Delivery Truck Segment	8.60E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8.60E-08	1.7%
22	GEOLOGY BUILDING	Fume Hoods	5.21E-09	3.16E-08	4.73E-09	0.00E+00	4.00E-08	8.15E-08	1.6%
128	EX36	Delivery Truck Segment	7.42E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00	7.42E-08	1.5%
21	BATCHELOR HALL	Fume Hoods	4.72E-09	2.86E-08	4.28E-09	0.00E+00	3.63E-08	7.39E-08	1.5%
119	EX27	Delivery Truck Segment	6.73E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00	6.73E-08	1.4%
88	STEAM PLANT	Boiler	3.09E-09	2.35E-08	3.52E-09	0.00E+00	2.98E-08	5.99E-08	1.2%
35	E-20	Emergency Generator	1.76E-08	1.56E-08	2.33E-09	0.00E+00	1.97E-08	5.52E-08	1.1%
129	EX37	Delivery Truck Segment	5.42E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.42E-08	1.1%
34	E-12	Emergency Generator	4.43E-08	4.07E-09	6.68E-10	0.00E+00	4.96E-09	5.40E-08	1.1%
118	EX26	Delivery Truck Segment	5.17E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.17E-08	1.0%
23	SPEITH HALL	Fume Hoods	3.23E-09	1.96E-08	2.94E-09	0.00E+00	2.49E-08	5.07E-08	1.0%
42	PHYSICS BUILDING	Fume Hoods	3.14E-09	1.90E-08	2.85E-09	0.00E+00	2.41E-08	4.91E-08	1.0%
TOTAL FROM ALL EVALUATED SOURCES			**2.31E-06**	**1.14E-06**	**2.83E-07**	**3.06E-07**	**9.46E-07**	**4.99E-06**	**100.0%**
TOTAL FROM LISTED SOURCES			**1.53E-06**	**9.09E-07**	**2.49E-07**	**3.06E-07**	**6.52E-07**	**3.65E-06**	**73.2%**

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[1] Only sources contributing 1% or more to the total cancer risk are listed. Listed sources contribute to 73.2% of the total cancer risk from all evaluated sources.

Table 20. Source Contribution to Cancer Risk at the On-Campus MEI in the Existing Scenario

Source I.D.	Source Description	Source Type	Cancer Risk by Exposure Pathway					TOTAL Cancer Risk^1	% of TOTAL^2
			Inhalation^1	Dermal Absorption^1	Soil Ingestion^1	Mother's Milk Ingestion^1	Produce Ingestion^1		
27	PHYSICAL SCIENCE BUILDING	Fume Hoods	5.63E-09	3.41E-08	5.10E-09	0.00E+00	4.32E-08	8.80E-08	13.2%
76	PENTLAND BOILER	Boiler	4.04E-10	1.31E-08	1.97E-09	0.00E+00	1.67E-08	3.22E-08	4.8%
80	PENTLAND BOILER	Boiler	3.99E-10	1.30E-08	1.94E-09	0.00E+00	1.65E-08	3.18E-08	4.8%
91	LIFE SCIENCE INCINERATOR	Incinerator	1.86E-09	1.16E-08	4.85E-09	8.50E-09	7.86E-10	2.76E-08	4.1%
81	PENTLAND BOILER	Boiler	3.14E-10	1.02E-08	1.53E-09	0.00E+00	1.30E-08	2.50E-08	3.8%
77	PENTLAND BOILER	Boiler	2.52E-10	8.19E-09	1.23E-09	0.00E+00	1.04E-08	2.01E-08	3.0%
79	PENTLAND BOILER	Boiler	2.11E-10	6.85E-09	1.03E-09	0.00E+00	8.69E-09	1.68E-08	2.5%
82	PENTLAND BOILER	Boiler	2.06E-10	6.70E-09	1.00E-09	0.00E+00	8.49E-09	1.64E-08	2.5%
66	PENTLAND BOILER	Boiler	1.95E-10	6.38E-09	9.55E-10	0.00E+00	8.09E-09	1.56E-08	2.3%
18	PIERCE HALL	Fume Hoods	9.36E-10	5.67E-09	8.50E-10	0.00E+00	7.20E-09	1.47E-08	2.2%
33	E-08	Emergency Generator	1.21E-08	8.14E-10	1.22E-10	0.00E+00	1.03E-09	1.40E-08	2.1%
175	EX88	Delivery Truck Segment	1.35E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.35E-08	2.0%
75	PENTLAND BOILER	Boiler	1.66E-10	5.40E-09	8.09E-10	0.00E+00	6.85E-09	1.32E-08	2.0%
74	PENTLAND BOILER	Boiler	1.62E-10	5.26E-09	7.88E-10	0.00E+00	6.67E-09	1.29E-08	1.9%
174	EX87	Delivery Truck Segment	1.24E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.24E-08	1.9%
72	PENTLAND BOILER	Boiler	1.41E-10	4.62E-09	6.92E-10	0.00E+00	5.85E-09	1.13E-08	1.7%
83	PENTLAND BOILER	Boiler	1.40E-10	4.56E-09	6.83E-10	0.00E+00	5.79E-09	1.12E-08	1.7%
73	PENTLAND BOILER	Boiler	1.38E-10	4.47E-09	6.71E-10	0.00E+00	5.68E-09	1.10E-08	1.7%
70	PENTLAND BOILER	Boiler	1.34E-10	4.37E-09	6.54E-10	0.00E+00	5.54E-09	1.07E-08	1.6%
71	PENTLAND BOILER	Boiler	1.34E-10	4.36E-09	6.53E-10	0.00E+00	5.53E-09	1.07E-08	1.6%
173	EX86	Delivery Truck Segment	9.95E-09	0.00E+00	0.00E+00	0.00E+00	0.00E+00	9.95E-09	1.5%
67	PENTLAND BOILER	Boiler	1.20E-10	3.92E-09	5.86E-10	0.00E+00	4.96E-09	9.59E-09	1.4%
171	E-01	Emergency Generator	7.69E-09	6.69E-10	1.01E-10	0.00E+00	8.49E-10	9.31E-09	1.4%
22	GEOLOGY BUILDING	Fume Hoods	5.62E-10	3.41E-09	5.10E-10	0.00E+00	4.32E-09	8.80E-09	1.3%
19	SCIENCE LABORATORIES I	Fume Hoods	5.41E-10	3.28E-09	4.91E-10	0.00E+00	4.17E-09	8.48E-09	1.3%
25	BOURNS HALL	Fume Hoods	5.37E-10	3.27E-09	4.89E-10	0.00E+00	4.14E-09	8.43E-09	1.3%
69	PENTLAND BOILER	Boiler	1.04E-10	3.39E-09	5.08E-10	0.00E+00	4.31E-09	8.31E-09	1.3%
68	PENTLAND BOILER	Boiler	1.02E-10	3.33E-09	4.99E-10	0.00E+00	4.23E-09	8.16E-09	1.2%

Source I.D.	Source Description	Source Type	Cancer Risk by Exposure Pathway					TOTAL Cancer Risk[1]	% of TOTAL[2]
			Inhalation[1]	Dermal Absorption[1]	Soil Ingestion[1]	Mother's Milk Ingestion[1]	Produce Ingestion[1]		
172	EX85	Delivery Truck Segment	7.23E-09	0.00E+00	0.00E+00	0.00E+00	0.00E+00	7.23E-09	1.1%
TOTAL FROM ALL EVALUATED SOURCES			**2.13E-07**	**1.88E-07**	**3.11E-08**	**8.50E-09**	**2.24E-07**	**6.64E-07**	**100.0%**
TOTAL FROM LISTED SOURCES			**7.62E-08**	**1.71E-07**	**2.87E-08**	**8.50E-09**	**2.03E-07**	**4.87E-07**	**73.3%**

[1] The HARP model was run with a 70-year exposure assumption. Values reported above for the on-campus receptor location are HARP results adjusted by a factor of 9/70 to account for the short-term exposure period for the on-campus receptor location at Lothian Residence Hall.

[2] Only sources contributing more than 1.0% of the total cancer risk are listed. Listed sources contribute to 73.3% of the total cancer risk from all sources evaluated.

Table 21. Cancer Risk at the Off-campus MEI by Substance and by Exposure Pathway in the Existing Scenario

Substance	CAS Number	Cancer Risk by Exposure Pathway					TOTAL Cancer Risk	% of TOTAL[1]
		Inhalation	Dermal Absorption	Soil Ingestion	Mother's Milk Ingestion	Produce Ingestion		
Diesel particulate matter	9901	2.14E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.14E-06	42.9%
PAHs, total, w/o individ. Components	1151	2.18E-08	7.23E-07	1.08E-07	0.00E+00	9.18E-07	1.77E-06	35.5%
2,3,7,8-Tetrachlorodibenzo-p-dioxin	1746016	3.95E-08	4.16E-07	1.74E-07	3.06E-07	2.81E-08	9.64E-07	19.3%
Benzene	71432	2.64E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.64E-08	0.5%
Chromium, hexavalent	18540299	2.19E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.19E-08	0.4%
Carbon tetrachloride	56235	2.04E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.04E-08	0.4%
1,3-Butadiene	106990	1.11E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.11E-08	0.2%
Formaldehyde	50000	6.55E-09	0.00E+00	0.00E+00	0.00E+00	0.00E+00	6.55E-09	0.1%
Cadmium	7440439	5.88E-09	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.88E-09	0.1%
Methylene chloride	75092	5.51E-09	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.51E-09	0.1%
Arsenic	7440382	2.23E-10	1.49E-09	7.24E-10	0.00E+00	1.33E-10	2.57E-09	0.1%
TOTAL FROM ALL EVALUATED SOURCES		**2.31E-06**	**1.14E-06**	**2.83E-07**	**3.06E-07**	**9.46E-07**	**4.99E-06**	**100.0%**
TOTAL FROM LISTED SOURCES		**2.30E-06**	**1.14E-06**	**2.83E-07**	**3.06E-07**	**9.46E-07**	**4.97E-06**	**99.7%**

[1] Only substances contributing more than 0.1% of the total cancer risk are listed. Listed substances contribute to 99.7% of the total cancer risk from all evaluated substances.

Table 22. Cancer Risk at the On-campus MEI by Substance and by Exposure Pathway in the Existing Scenario

Substance	CAS Number	Cancer Risk by Exposure Pathway					TOTAL Cancer Risk[1]	% of TOTAL[2]
		Inhalation[1]	Dermal Absorption[1]	Soil Ingestion[1]	Mother's Milk Ingestion[2]	Produce Ingestion[1]		
PAHs, total, w/o individ. Components	1151	5.28E-09	1.76E-07	2.64E-08	0.00E+00	2.22E-07	4.30E-07	64.7%
Diesel particulate matter	9901	1.95E-07	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.95E-07	29.4%
2,3,7,8-Tetrachlorodibenzo-p-dioxin	1746016	1.10E-09	1.15E-08	4.82E-09	8.50E-09	7.80E-10	2.67E-08	4.0%
Benzene	71432	3.96E-09	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.96E-09	0.6%
Carbon tetrachloride	56235	2.39E-09	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.39E-09	0.4%
1,3-Butadiene	106990	1.36E-09	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.36E-09	0.2%
Methylene chloride	75092	1.07E-09	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.07E-09	0.2%
Formaldehyde	50000	9.17E-10	0.00E+00	0.00E+00	0.00E+00	0.00E+00	9.17E-10	0.1%
Chromium, hexavalent	18540299	6.07E-10	0.00E+00	0.00E+00	0.00E+00	0.00E+00	6.07E-10	0.1%
TOTAL FROM ALL EVALUATED SUBSTANCES		**2.13E-07**	**1.88E-07**	**3.11E-08**	**8.50E-09**	**2.24E-07**	**6.64E-07**	**100.0%**
TOTAL FROM LISTED SUBSTANCES		**2.12E-07**	**1.88E-07**	**3.12E-08**	**8.50E-09**	**2.23E-07**	**6.63E-07**	**99.7%**

[1] The HARP model was run with a 70-year exposure assumption. Values reported above for the on-campus receptor location are HARP results adjusted by a factor of 9/70 to account for the short-term exposure period for the on-campus receptor location at Lothian Residence Hall.

[2] Only substances contributing more than 0.1% to the total risk are listed. Listed substances contribute to 99.7% of the total cancer risk from all evaluated substances.

Table 23. Chronic Noncancer Hazard Index at the Off- and On-Campus MEIs in the Existing Scenario

Target Organ	Substance	CAS Number	Chronic Hazard Quotients	
			Off-Campus	On-Campus
CV	1,4-Dioxane	123911	2.06E-08	3.52E-08
	Methylene chloride	75092	7.50E-06	1.57E-05
	Arsenic	7440382	9.41E-06	2.49E-06
	TOTAL		**1.69E-05**	**1.82E-05**
CNS	Benzene	71432	8.76E-06	1.36E-05
	Carbon tetrachloride	56235	4.83E-06	8.24E-06
	Fluorocarbons (chlorinated)	1104	5.88E-08	1.00E-07
	Ethylene oxide	75218	4.64E-08	8.11E-08
	Trichloroethylene	79016	1.42E-07	2.43E-07
	Methylene chloride	75092	7.50E-06	1.57E-05
	Toluene	108883	8.27E-06	2.07E-05
	Mixed xylenes	1330207	2.67E-06	6.43E-06
	Arsenic	7440382	2.87E-06	7.61E-07
	Hexane	110543	1.59E-08	1.27E-08
	Methyl chloroform	71556	7.34E-11	1.44E-11
	TOTAL		**3.52E-05**	**6.60E-05**
DEVEL	Benzene	71432	8.76E-06	1.36E-05
	Carbon tetrachloride	56235	4.83E-06	8.24E-06
	Vinyl chloride	75014	5.44E-09	9.29E-09
	Toluene	108883	8.27E-06	2.07E-05
	Isopropyl alcohol	67630	1.31E-07	4.06E-07
	Ethyl benzene	100414	2.61E-07	5.90E-07
	Ethylene glycol monobutyl ether	111762	5.41E-05	1.79E-04
	Methanol	67561	5.26E-08	1.25E-07
	Arsenic	7440382	2.87E-06	7.61E-07
	2,3,7,8-Tetrachlorodibenzo-p-dioxin	1746016	8.38E-04	1.64E-04
	TOTAL		**9.17E-04**	**3.87E-04**
ENDO	Ethyl benzene	100414	2.61E-07	5.90E-07
	2,3,7,8-Tetrachlorodibenzo-p-dioxin	1746016	8.38E-04	1.64E-04
	TOTAL		**8.38E-04**	**1.65E-04**
EYE	Formaldehyde	50000	2.32E-04	3.00E-04
	Trichloroethylene	79016	1.42E-07	2.43E-07
	Acrolein	107028	1.07E-03	6.69E-04
	TOTAL		**1.31E-03**	**9.70E-04**
GILV	Carbon tetrachloride	56235	4.83E-06	8.24E-06
	1,4-Dioxane	123911	2.06E-08	3.52E-08
	Ethylene dichloride	107062	9.60E-08	1.64E-07
	Vinyl chloride	75014	5.44E-09	9.29E-09
	Ethyl benzene	100414	2.61E-07	5.90E-07

Target Organ	Substance	CAS Number	Chronic Hazard Quotients	
			Off-Campus	On-Campus
	Nickel	7440020	8.42E-08	2.34E-08
	2,3,7,8-Tetrachlorodibenzo-p-dioxin	1746016	8.38E-04	1.64E-04
	Perchloroethylene	127184	2.58E-10	5.04E-11
	TOTAL		**8.43E-04**	**1.73E-04**
KIDN	1,4-Dioxane	123911	2.06E-08	3.52E-08
	Isopropyl alcohol	67630	1.31E-07	4.06E-07
	Ethyl benzene	100414	2.61E-07	5.90E-07
	Cadmium	7440439	1.28E-04	2.58E-05
	Perchloroethylene	127184	2.58E-10	5.04E-11
	TOTAL		**1.29E-04**	**2.68E-05**
REPRO	1,3-Butadiene	106990	1.46E-06	2.34E-06
	Ethylene dibromide	106934	1.72E-05	2.94E-05
	Vinyl chloride	75014	5.44E-09	9.29E-09
	Methyl ethyl ketone	78933	6.41E-07	1.92E-06
	Ethylene glycol monobutyl ether	111762	5.41E-05	1.79E-04
	2,3,7,8-Tetrachlorodibenzo-p-dioxin	1746016	8.38E-04	1.64E-04
	TOTAL		**9.12E-04**	**3.77E-04**
RESP	Diesel particulate matter	9901	8.39E-04	7.36E-04
	Formaldehyde	50000	2.32E-04	3.00E-04
	Naphthalene	91203	2.92E-06	4.08E-06
	Ammonia	7664417	1.09E-03	1.21E-03
	Toluene	108883	8.27E-06	2.07E-05
	Mixed xylenes	1330207	2.67E-06	6.43E-06
	Ethylene glycol monobutyl ether	111762	5.41E-05	1.79E-04
	Nickel	7440020	2.69E-06	7.45E-07
	Cadmium	7440439	5.75E-05	1.15E-05
	Acrolein	107028	1.07E-03	6.69E-04
	Propylene	115071	4.28E-06	3.44E-06
	2,3,7,8-Tetrachlorodibenzo-p-dioxin	1746016	8.38E-04	1.64E-04
	Chromium, hexavalent	18540299	6.27E-07	1.23E-07
	TOTAL		**4.22E-03**	**3.32E-03**
SKIN	Arsenic	7440382	6.54E-06	1.73E-06
	TOTAL		**6.54E-06**	**1.73E-06**
BLOOD	Benzene	71432	8.76E-06	1.36E-05
	Nickel	7440020	2.69E-06	7.45E-07
	2,3,7,8-Tetrachlorodibenzo-p-dioxin	1746016	8.38E-04	1.64E-04
	Chromium, hexavalent	18540299	6.27E-07	1.23E-07
	TOTAL		**8.50E-04**	**1.79E-04**

Table 24. Acute Noncancer Hazard Index at the Off- and On-Campus MEIs in the Existing Scenario

Target Organ	Substance	CAS Number	Acute Hazard Quotients	
			Off-Campus	On-Campus
CNS	Carbon tetrachloride	56235	1.13E-06	1.01E-06
	Vinyl chloride	75014	2.85E-11	2.47E-11
	Methylene chloride	75092	1.28E-04	2.19E-04
	Toluene	108883	5.05E-03	2.24E-03
	Methanol	67561	7.80E-06	1.35E-05
	Perchloroethylene	127184	8.80E-10	7.99E-10
	Methyl chloroform	71556	2.10E-09	1.91E-09
	TOTAL		**5.19E-03**	**2.47E-03**
DEVEL	Benzene	71432	1.09E-04	2.52E-05
	Carbon tetrachloride	56235	1.13E-06	1.01E-06
	Toluene	108883	5.05E-03	2.24E-03
	Arsenic	7440382	2.63E-04	2.41E-04
	TOTAL		**5.43E-03**	**2.50E-03**
EYE	Formaldehyde	50000	4.85E-03	4.33E-03
	Ammonia	7664417	1.79E-03	1.42E-03
	1,4-Dioxane	123911	7.49E-07	6.49E-07
	Vinyl chloride	75014	2.85E-11	2.47E-11
	Toluene	108883	5.05E-03	2.24E-03
	Mixed xylenes	1330207	5.11E-03	2.28E-03
	Methyl ethyl ketone	78933	4.31E-03	1.92E-03
	Isopropyl alcohol	67630	2.93E-02	1.30E-02
	Ethylene glycol monobutyl ether	111762	1.01E-02	4.42E-03
	Acrolein	107028	5.43E-03	4.43E-03
	Perchloroethylene	127184	8.80E-10	7.99E-10
	TOTAL		**6.59E-02**	**3.40E-02**
GILV	Carbon tetrachloride	56235	1.13E-06	1.01E-06
	TOTAL		**1.13E-06**	**1.01E-06**
IMMUN	Formaldehyde	50000	4.85E-03	4.33E-03
	Benzene	71432	1.09E-04	2.52E-05
	Nickel	7440020	2.63E-05	2.39E-05
	TOTAL		**4.99E-03**	**4.38E-03**
REPRO	Benzene	71432	1.09E-04	2.52E-05
	Carbon tetrachloride	56235	1.13E-06	1.01E-06
	Toluene	108883	5.05E-03	2.24E-03
	Arsenic	7440382	2.63E-04	2.41E-04
	TOTAL		**5.43E-03**	**2.50E-03**
RESP	Formaldehyde	50000	4.85E-03	4.33E-03
	Ammonia	7664417	1.79E-03	1.42E-03
	1,4-Dioxane	123911	7.49E-07	6.49E-07
	Vinyl chloride	75014	2.85E-11	2.47E-11

Target Organ	Substance	CAS Number	Acute Hazard Quotients	
			Off-Campus	On-Campus
	Toluene	108883	5.05E-03	2.24E-03
	Mixed xylenes	1330207	5.11E-03	2.28E-03
	Methyl ethyl ketone	78933	4.31E-03	1.92E-03
	Isopropyl alcohol	67630	2.93E-02	1.30E-02
	Ethylene glycol monobutyl ether	111762	1.01E-02	4.42E-03
	Nickel	7440020	2.63E-05	2.39E-05
	Acrolein	107028	5.43E-03	4.43E-03
	Perchloroethylene	127184	8.80E-10	7.99E-10
	TOTAL		**6.59E-02**	**3.40E-02**
BLOOD	Benzene	71432	1.09E-04	2.52E-05
	TOTAL		**1.09E-04**	**2.52E-05**

Table 25. Summary of HRA Results for the Sensitive Receptors within the ZOI in the Existing Scenario

Description	UTM Coordinates		Health Risks		
	East (m)	North (m)	Cancer Risk	Chronic HI	Acute HI
Applegate Learning Center	470777	3759523	2.59×10^{-6}	0.002	0.012
Hyatt Elementary School	471074	3758743	1.90×10^{-6}	0.002	0.005

Table 26. Summary of HRA Results for the Off- and On-Campus MEIs in the LRDP Scenario

	Result	UTM Coordinates		Location
		East (m)	North (m)	
Off-campus MEI				
Cancer Risk	7.43 x 10^{-6}	470606	3759669	Fenceline east of campus on Valencia Hills Drive north of Parking Lot 14
Chronic HI	0.007	470246	3760017	Fenceline north of campus along Watkins Drive
Acute HI	0.18	470139	3760079	Fenceline north of campus on Watkins Drive
On-campus MEI				
Cancer Risk	1.48 x 10^{-6}	470300	3759560	Student housing receptor near Lothian Residence Hall
Chronic HI	0.008	470300	3759560	Student housing receptor near Lothian Residence Hall
Acute HI	0.09	469962	3760179	Child Development Center receptor

Table 27. Source Contribution to Cancer Risk at the Off-Campus MEI in the LRDP Scenario

Source I.D.	Source Description	Source Type	Cancer Risk by Exposure Pathway					TOTAL Cancer Risk	% of TOTAL[1]
			Inhalation	Dermal Absorption	Soil Ingestion	Mother's Milk Ingestion	Produce Ingestion		
72	PENTLAND BOILER	Boiler	6.73E-09	2.19E-07	3.28E-08	0.00E+00	2.78E-07	5.37E-07	7.2%
71	PENTLAND BOILER	Boiler	5.88E-09	1.91E-07	2.87E-08	0.00E+00	2.43E-07	4.69E-07	6.3%
70	PENTLAND BOILER	Boiler	4.75E-09	1.55E-07	2.32E-08	0.00E+00	1.96E-07	3.79E-07	5.1%
83	PENTLAND BOILER	Boiler	4.57E-09	1.49E-07	2.23E-08	0.00E+00	1.89E-07	3.65E-07	4.9%
75	PENTLAND BOILER	Boiler	4.54E-09	1.48E-07	2.22E-08	0.00E+00	1.88E-07	3.63E-07	4.9%
73	PENTLAND BOILER	Boiler	4.40E-09	1.43E-07	2.15E-08	0.00E+00	1.82E-07	3.51E-07	4.7%
79	PENTLAND BOILER	Boiler	4.14E-09	1.35E-07	2.02E-08	0.00E+00	1.71E-07	3.30E-07	4.4%
69	PENTLAND BOILER	Boiler	3.97E-09	1.29E-07	1.94E-08	0.00E+00	1.64E-07	3.16E-07	4.3%
82	PENTLAND BOILER	Boiler	3.49E-09	1.14E-07	1.70E-08	0.00E+00	1.44E-07	2.78E-07	3.8%
74	PENTLAND BOILER	Boiler	3.48E-09	1.13E-07	1.70E-08	0.00E+00	1.44E-07	2.77E-07	3.7%
68	PENTLAND BOILER	Boiler	3.46E-09	1.13E-07	1.69E-08	0.00E+00	1.43E-07	2.76E-07	3.7%
77	PENTLAND BOILER	Boiler	3.28E-09	1.07E-07	1.60E-08	0.00E+00	1.35E-07	2.61E-07	3.5%
91	LIFE SCIENCE INCINERATOR	Incinerator	1.69E-08	1.04E-07	4.37E-08	7.67E-08	7.09E-09	2.48E-07	3.3%
67	PENTLAND BOILER	Boiler	3.00E-09	9.78E-08	1.46E-08	0.00E+00	1.24E-07	2.39E-07	3.2%
81	PENTLAND BOILER	Boiler	2.97E-09	9.68E-08	1.45E-08	0.00E+00	1.23E-07	2.37E-07	3.2%
66	PENTLAND BOILER	Boiler	2.94E-09	9.57E-08	1.43E-08	0.00E+00	1.21E-07	2.34E-07	3.2%
76	PENTLAND BOILER	Boiler	2.48E-09	8.07E-08	1.21E-08	0.00E+00	1.02E-07	1.97E-07	2.7%
80	PENTLAND BOILER	Boiler	2.47E-09	8.05E-08	1.21E-08	0.00E+00	1.02E-07	1.97E-07	2.7%
27	PHYSICAL SCIENCE BUILDING	Fume Hoods	1.22E-08	7.37E-08	1.10E-08	0.00E+00	9.35E-08	1.90E-07	2.6%
141	EX49	Delivery Truck Segment	1.34E-07	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.34E-07	1.8%
142	EX50	Delivery Truck Segment	1.30E-07	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.30E-07	1.8%
143	EX51	Delivery Truck Segment	9.10E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00	9.10E-08	1.2%
137	EX45	Delivery Truck Segment	8.94E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8.94E-08	1.2%
135	EX43	Delivery Truck Segment	8.69E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8.69E-08	1.2%
136	EX44	Delivery Truck Segment	8.55E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8.55E-08	1.2%
18	PIERCE HALL	Fume Hoods	5.45E-09	3.30E-08	4.95E-09	0.00E+00	4.19E-08	8.53E-08	1.1%
138	EX46	Delivery Truck Segment	8.04E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8.04E-08	1.1%
TOTAL FROM ALL EVALUATED SOURCES			**1.30E-06**	**2.54E-06**	**4.09E-07**	**7.67E-08**	**3.10E-06**	**7.43E-06**	**100.0%**
TOTAL FROM LISTED SOURCES			**7.98E-07**	**2.38E-06**	**3.84E-07**	**7.67E-08**	**2.89E-06**	**6.53E-06**	**87.9%**

[1] Only sources contributing 1% or more to the total cancer risk are listed. Listed sources contribute to 87.9% of the total cancer risk from all evaluated sources.

Table 28. Source Contribution to Cancer Risk at the On-Campus MEI in the LRDP Scenario

Source I.D.	Source Description	Source Type	Cancer Risk by Exposure Pathway					TOTAL Cancer Risk[1]	% of TOTAL[2]
			Inhalation[1]	Dermal Absorption[1]	Soil Ingestion[1]	Mother's Milk Ingestion[1]	Produce Ingestion[1]		
27	PHYSICAL SCIENCE BUILDING	Fume Hoods	9.33E-09	5.66E-08	8.47E-09	0.00E+00	7.17E-08	1.46E-07	9.9%
76	PENTLAND BOILER	Boiler	1.47E-09	4.80E-08	7.17E-09	0.00E+00	6.08E-08	1.17E-07	8.0%
80	PENTLAND BOILER	Boiler	1.45E-09	4.74E-08	7.10E-09	0.00E+00	6.00E-08	1.16E-07	7.9%
81	PENTLAND BOILER	Boiler	1.14E-09	3.73E-08	5.58E-09	0.00E+00	4.73E-08	9.13E-08	6.2%
77	PENTLAND BOILER	Boiler	9.17E-10	2.98E-08	4.47E-09	0.00E+00	3.79E-08	7.31E-08	5.0%
79	PENTLAND BOILER	Boiler	7.68E-10	2.49E-08	3.74E-09	0.00E+00	3.18E-08	6.12E-08	4.1%
82	PENTLAND BOILER	Boiler	7.50E-10	2.44E-08	3.65E-09	0.00E+00	3.10E-08	5.98E-08	4.1%
66	PENTLAND BOILER	Boiler	7.15E-10	2.33E-08	3.48E-09	0.00E+00	2.96E-08	5.70E-08	3.9%
75	PENTLAND BOILER	Boiler	6.06E-10	1.97E-08	2.96E-09	0.00E+00	2.49E-08	4.82E-08	3.3%
74	PENTLAND BOILER	Boiler	5.89E-10	1.92E-08	2.88E-09	0.00E+00	2.43E-08	4.69E-08	3.2%
72	PENTLAND BOILER	Boiler	5.17E-10	1.68E-08	2.52E-09	0.00E+00	2.13E-08	4.12E-08	2.8%
83	PENTLAND BOILER	Boiler	5.10E-10	1.66E-08	2.49E-09	0.00E+00	2.11E-08	4.07E-08	2.8%
73	PENTLAND BOILER	Boiler	5.01E-10	1.63E-08	2.44E-09	0.00E+00	2.07E-08	4.00E-08	2.7%
70	PENTLAND BOILER	Boiler	4.90E-10	1.59E-08	2.39E-09	0.00E+00	2.02E-08	3.90E-08	2.6%
71	PENTLAND BOILER	Boiler	4.89E-10	1.59E-08	2.38E-09	0.00E+00	2.02E-08	3.90E-08	2.6%
67	PENTLAND BOILER	Boiler	4.38E-10	1.43E-08	2.13E-09	0.00E+00	1.81E-08	3.50E-08	2.4%
69	PENTLAND BOILER	Boiler	3.81E-10	1.24E-08	1.85E-09	0.00E+00	1.57E-08	3.03E-08	2.1%
68	PENTLAND BOILER	Boiler	3.73E-10	1.22E-08	1.83E-09	0.00E+00	1.54E-08	2.98E-08	2.0%
91	LIFE SCIENCE INCINERATOR	Incinerator	1.86E-09	1.16E-08	4.85E-09	8.50E-09	7.86E-10	2.76E-08	1.9%
18	PIERCE HALL	Fume Hoods	1.56E-09	9.42E-09	1.41E-09	0.00E+00	1.19E-08	2.43E-08	1.6%
84	LOTHIAN BOILER	Boiler	1.44E-09	8.54E-09	1.28E-09	0.00E+00	1.08E-08	2.21E-08	1.5%
22	GEOLOGY BUILDING	Fume Hoods	9.33E-10	5.66E-09	8.47E-10	0.00E+00	7.17E-09	1.46E-08	1.0%
19	SCIENCE LABORATORIES I	Fume Hoods	8.99E-10	5.45E-09	8.16E-10	0.00E+00	6.90E-09	1.41E-08	1.0%
TOTAL FROM ALL EVALUATED SOURCES			**2.03E-07**	**5.27E-07**	**8.22E-08**	**8.50E-09**	**6.56E-07**	**1.48E-06**	**100.0%**
TOTAL FROM LISTED SOURCES			**2.81E-08**	**4.92E-07**	**7.68E-08**	**8.50E-09**	**6.10E-07**	**1.21E-06**	**82.3%**

[1] The HARP model was run with a 70-year exposure assumption. Values reported above for the on-campus receptor location are HARP results adjusted by a factor of 9/70 to account for the short-term exposure period for the on-campus receptor location at Lothian Residence Hall.

[2] Only sources contributing more than 1.0% of the total cancer risk are listed. Listed sources contribute to 82.3% of the total cancer risk from all sources evaluated.

Table 29. Cancer Risk at the Off-campus MEI by Substance and by Exposure Pathway in the LRDP Scenario

Substance	CAS Number	Cancer Risk by Exposure Pathway					TOTAL Cancer Risk	% of TOTAL[1]
		Inhalation	Dermal Absorption	Soil Ingestion	Mother's Milk Ingestion	Produce Ingestion		
PAHs, total, w/o individ. Components	1151	7.33E-08	2.44E-06	3.65E-07	0.00E+00	3.09E-06	5.96E-06	80.2%
Diesel particulate matter	9901	1.15E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.15E-06	15.5%
2,3,7,8-Tetrachlorodibenzo-p-dioxin	1746016	9.89E-09	1.04E-07	4.36E-08	7.67E-08	7.05E-09	2.41E-07	3.2%
Benzene	71432	1.90E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.90E-08	0.3%
Carbon tetrachloride	56235	1.85E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.85E-08	0.2%
Fluorocarbons (chlorinated)	1104	8.85E-09	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8.85E-09	0.1%
Chromium, hexavalent	18540299	5.48E-09	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.48E-09	0.1%
1,3-Butadiene	106990	4.82E-09	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.82E-09	0.1%
Formaldehyde	50000	4.75E-09	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.75E-09	0.1%
TOTAL FROM ALL EVALUATED SOURCES		**1.30E-06**	**2.54E-06**	**4.09E-07**	**7.67E-08**	**3.10E-06**	**7.43E-06**	**100.0%**
TOTAL FROM LISTED SOURCES		**1.29E-06**	**2.54E-06**	**4.09E-07**	**7.67E-08**	**3.10E-06**	**7.41E-06**	**99.8%**

[1] Only substances contributing more than 0.1% of the total cancer risk are listed. Listed substances contribute to 99.8% of the total cancer risk from all evaluated substances.

Table 30. Cancer Risk at the On-campus MEI by Substance and by Exposure Pathway in the LRDP Scenario

Substance	CAS Number	Cancer Risk by Exposure Pathway					TOTAL Cancer Risk[1]	% of TOTAL[2]
		Inhalation[1]	Dermal Absorption[1]	Soil Ingestion[1]	Mother's Milk Ingestion[1]	Produce Ingestion[1]		
PAHs, total, w/o individ. Components	1151	1.56E-08	5.16E-07	7.73E-08	0.00E+00	6.54E-07	1.26E-06	85.5%
Diesel particulate matter	9901	1.66E-07	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.66E-07	11.2%
2,3,7,8-Tetrachlorodibenzo-p-dioxin	1746016	1.10E-09	1.15E-08	4.82E-09	8.50E-09	7.80E-10	2.67E-08	1.8%
Benzene	71432	6.85E-09	0.00E+00	0.00E+00	0.00E+00	0.00E+00	6.85E-09	0.5%
Fluorocarbons (chlorinated)	1104	3.97E-09	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.97E-09	0.3%
Carbon tetrachloride	56235	2.66E-09	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.66E-09	0.2%
1,3-Butadiene	106990	2.19E-09	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.19E-09	0.1%
Formaldehyde	50000	1.92E-09	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.92E-09	0.1%
TOTAL FROM ALL EVALUATED SOURCES		**2.03E-07**	**5.27E-07**	**8.22E-08**	**8.50E-09**	**6.56E-07**	**1.48E-06**	**100.0%**
TOTAL FROM LISTED SOURCES		**2.00E-07**	**5.27E-07**	**8.21E-08**	**8.50E-09**	**6.55E-07**	**1.47E-06**	**99.8%**

[1] The HARP model was run with a 70-year exposure assumption. Values reported above for the on-campus receptor location are HARP results adjusted by a factor of 9/70 to account for the short-term exposure period for the on-campus receptor location at Lothian Residence Hall.

[2] Only substances contributing more than 0.1% to the total cancer risk are listed. Listed substances contribute to 99.8% of the total cancer risk from all sources evaluated.

Table 31. Chronic Noncancer Hazard Index at the Off- and On-Campus MEIs in the LRDP Scenario

Target Organ	Substance	CAS Number	Chronic Hazard Quotients	
			Off-Campus	On-Campus
CV	Carbon tetrachloride	56235	6.53E-05	3.93E-05
	Ethylene dibromide	106934	1.65E-08	5.85E-08
	Arsenic	7440382	2.58E-06	2.49E-06
	TOTAL		**6.79E-05**	**4.18E-05**
CNS	Benzene	71432	5.25E-05	2.36E-05
	Carbon tetrachloride	56235	6.53E-05	3.93E-05
	Fluorocarbons (chlorinated)	1104	3.87E-06	1.37E-05
	1,4-Dioxane	123911	4.71E-08	1.67E-07
	Trichloroethylene	79016	3.69E-08	1.31E-07
	Vinyl chloride	75014	1.14E-07	4.03E-07
	Toluene	108883	3.63E-04	6.18E-05
	Mixed xylenes	1330207	9.94E-05	1.91E-05
	Arsenic	7440382	7.86E-07	7.61E-07
	Hexane	110543	1.19E-08	4.29E-08
	Methyl chloroform	71556	2.17E-11	1.44E-11
	TOTAL		**5.85E-04**	**1.59E-04**
DEVEL	Benzene	71432	5.25E-05	2.36E-05
	Fluorocarbons (chlorinated)	1104	3.87E-06	1.37E-05
	Methylene chloride	75092	4.36E-09	1.54E-08
	Toluene	108883	3.63E-04	6.18E-05
	Isopropyl alcohol	67630	7.76E-06	1.19E-06
	Ethyl benzene	100414	8.76E-06	1.76E-06
	Ethylene glycol monobutyl ether	111762	3.87E-03	5.26E-04
	Methanol	67561	7.62E-07	3.68E-07
	Arsenic	7440382	7.86E-07	7.61E-07
	2,3,7,8-Tetrachlorodibenzo-p-dioxin	1746016	2.48E-04	1.64E-04
	TOTAL		**4.56E-03**	**7.93E-04**
ENDO	Ethyl benzene	100414	8.76E-06	1.76E-06
	2,3,7,8-Tetrachlorodibenzo-p-dioxin	1746016	2.48E-04	1.64E-04
	TOTAL		**2.57E-04**	**1.66E-04**
EYE	Formaldehyde	50000	1.76E-04	6.28E-04
	Vinyl chloride	75014	1.14E-07	4.03E-07
	Acrolein	107028	6.57E-04	2.20E-03
	TOTAL		**8.33E-04**	**2.83E-03**
GILV	Fluorocarbons (chlorinated)	1104	3.87E-06	1.37E-05
	Ethylene dibromide	106934	1.65E-08	5.85E-08
	Ethylene oxide	75218	7.69E-08	2.72E-07
	Methylene chloride	75092	4.36E-09	1.54E-08
	Ethyl benzene	100414	8.76E-06	1.76E-06
	Nickel	7440020	2.17E-08	2.34E-08
	2,3,7,8-Tetrachlorodibenzo-p-dioxin	1746016	2.48E-04	1.64E-04

Target Organ	Substance	CAS Number	Chronic Hazard Quotients	
			Off-Campus	On-Campus
	Perchloroethylene	127184	7.63E-11	5.04E-11
	TOTAL		**2.61E-04**	**1.80E-04**
KIDN	Ethylene dibromide	106934	1.65E-08	5.85E-08
	Isopropyl alcohol	67630	7.76E-06	1.19E-06
	Ethyl benzene	100414	8.76E-06	1.76E-06
	Cadmium	7440439	3.79E-05	2.58E-05
	Perchloroethylene	127184	7.63E-11	5.04E-11
	TOTAL		**5.45E-05**	**2.88E-05**
REPRO	1,3-Butadiene	106990	1.05E-06	3.75E-06
	Ethylene dichloride	107062	1.38E-05	4.88E-05
	Methylene chloride	75092	4.36E-09	1.54E-08
	Methyl ethyl ketone	78933	3.38E-05	5.66E-06
	Ethylene glycol monobutyl ether	111762	3.87E-03	5.26E-04
	2,3,7,8-Tetrachlorodibenzo-p-dioxin	1746016	2.48E-04	1.64E-04
	TOTAL		**4.17E-03**	**7.48E-04**
RESP	Diesel particulate matter	9901	1.46E-04	6.23E-04
	Formaldehyde	50000	1.76E-04	6.28E-04
	Naphthalene	91203	2.16E-06	7.54E-06
	Ammonia	7664417	1.09E-03	4.20E-03
	Toluene	108883	3.63E-04	6.18E-05
	Mixed xylenes	1330207	9.94E-05	1.91E-05
	Ethylene glycol monobutyl ether	111762	3.87E-03	5.26E-04
	Nickel	7440020	6.93E-07	7.45E-07
	Cadmium	7440439	1.70E-05	1.15E-05
	Acetaldehyde	75070	6.30E-06	2.28E-05
	Acrolein	107028	6.57E-04	2.20E-03
	Propylene	115071	3.23E-06	1.16E-05
	2,3,7,8-Tetrachlorodibenzo-p-dioxin	1746016	2.48E-04	1.64E-04
	Chromium, hexavalent	18540299	1.86E-07	1.23E-07
	TOTAL		**6.68E-03**	**8.48E-03**
SKIN	Arsenic	7440382	1.79E-06	1.73E-06
	TOTAL		**1.79E-06**	**1.73E-06**
BLOOD	Benzene	71432	5.25E-05	2.36E-05
	Nickel	7440020	6.93E-07	7.45E-07
	2,3,7,8-Tetrachlorodibenzo-p-dioxin	1746016	2.48E-04	1.64E-04
	Chromium, hexavalent	18540299	1.86E-07	1.23E-07
	TOTAL		**3.02E-04**	**1.88E-04**

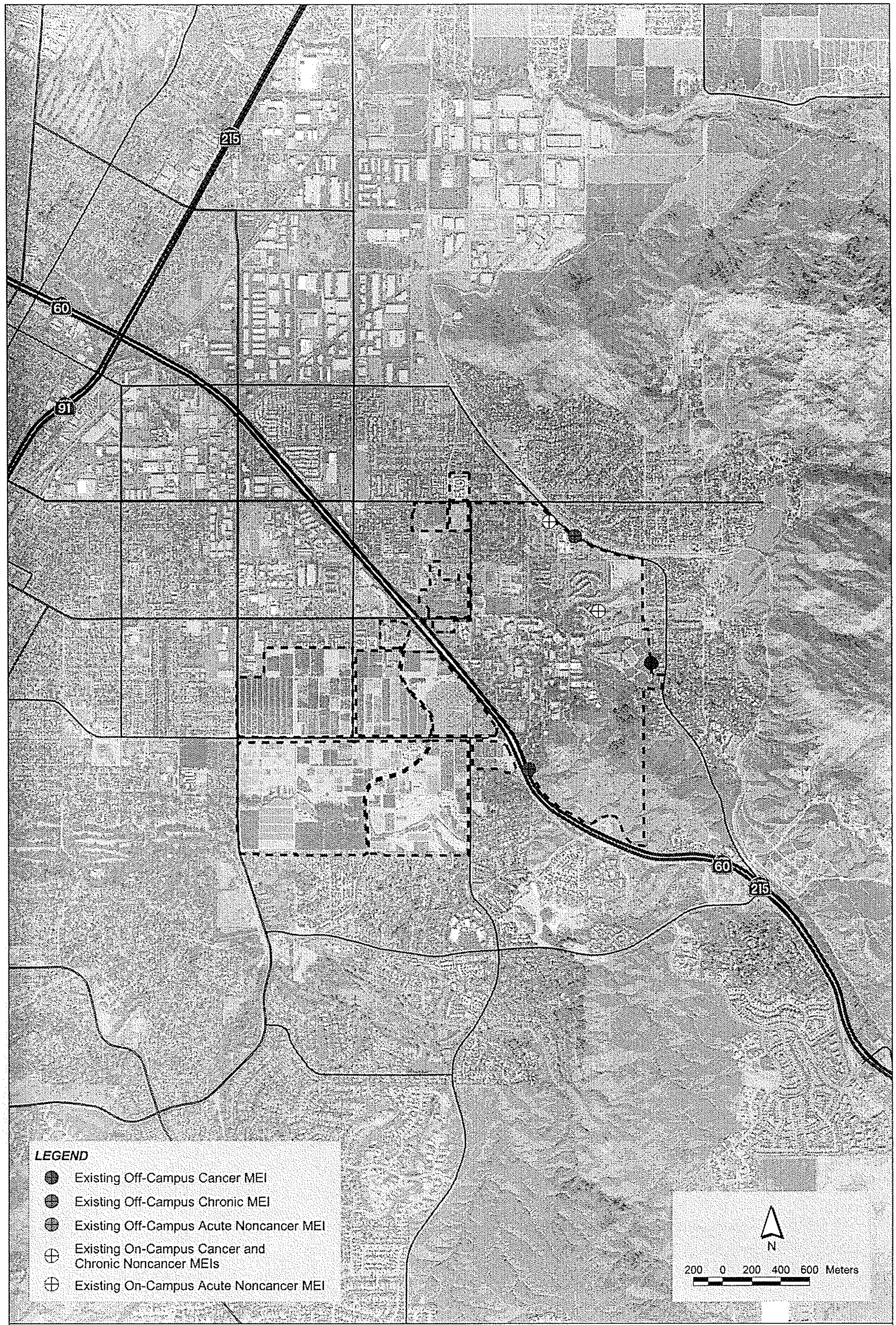
Table 32. Acute Noncancer Hazard Index at the Off- and On-Campus MEIs in the LRDP Scenario

Target Organ	Substance	CAS Number	Acute Hazard Quotients	
			Off-Campus	On-Campus
CNS	Carbon tetrachloride	56235	3.74E-04	6.43E-04
	Fluorocarbons (chlorinated)	1104	1.88E-06	1.68E-06
	Methylene chloride	75092	4.73E-11	4.10E-11
	Toluene	108883	1.49E-02	6.58E-03
	Methanol	67561	2.25E-05	3.90E-05
	Perchloroethylene	127184	8.80E-10	7.99E-10
	Methyl chloroform	71556	2.10E-09	1.91E-09
	TOTAL		**1.53E-02**	**7.26E-03**
DEVEL	Benzene	71432	1.29E-04	2.94E-05
	Fluorocarbons (chlorinated)	1104	1.88E-06	1.68E-06
	Toluene	108883	1.49E-02	6.58E-03
	Arsenic	7440382	2.63E-04	2.41E-04
	TOTAL		**1.53E-02**	**6.85E-03**
EYE	Formaldehyde	50000	5.05E-03	4.48E-03
	Ammonia	7664417	4.66E-03	3.49E-03
	Ethylene dibromide	106934	1.24E-06	1.08E-06
	Methylene chloride	75092	4.73E-11	4.10E-11
	Toluene	108883	1.49E-02	6.58E-03
	Mixed xylenes	1330207	1.50E-02	6.69E-03
	Methyl ethyl ketone	78933	1.27E-02	5.64E-03
	Isopropyl alcohol	67630	8.62E-02	3.81E-02
	Ethylene glycol monobutyl ether	111762	2.96E-02	1.30E-02
	Acrolein	107028	1.38E-02	1.07E-02
	Perchloroethylene	127184	8.80E-10	7.99E-10
	TOTAL		**1.82E-01**	**8.87E-02**
GILV	Fluorocarbons (chlorinated)	1104	1.88E-06	1.68E-06
	TOTAL		**1.88E-06**	**1.68E-06**
IMMUN	Formaldehyde	50000	5.05E-03	4.48E-03
	Benzene	71432	1.29E-04	2.94E-05
	Nickel	7440020	2.63E-05	2.39E-05
	TOTAL		**5.20E-03**	**4.54E-03**
REPRO	Benzene	71432	1.29E-04	2.94E-05
	Fluorocarbons (chlorinated)	1104	1.88E-06	1.68E-06
	Toluene	108883	1.49E-02	6.58E-03
	Arsenic	7440382	2.63E-04	2.41E-04
	TOTAL		**1.53E-02**	**6.85E-03**
RESP	Formaldehyde	50000	5.05E-03	4.48E-03
	Ammonia	7664417	4.66E-03	3.49E-03
	Ethylene dibromide	106934	1.24E-06	1.08E-06
	Methylene chloride	75092	4.73E-11	4.10E-11
	Toluene	108883	1.49E-02	6.58E-03

Target Organ	Substance	CAS Number	Acute Hazard Quotients	
			Off-Campus	On-Campus
	Mixed xylenes	1330207	1.50E-02	6.69E-03
	Methyl ethyl ketone	78933	1.27E-02	5.64E-03
	Isopropyl alcohol	67630	8.62E-02	3.81E-02
	Ethylene glycol monobutyl ether	111762	2.96E-02	1.30E-02
	Nickel	7440020	2.63E-05	2.39E-05
	Acrolein	107028	1.38E-02	1.07E-02
	Perchloroethylene	127184	8.80E-10	7.99E-10
	TOTAL		**1.82E-01**	**8.87E-02**
BLOOD	Benzene	71432	1.29E-04	2.94E-05
	TOTAL		**1.29E-04**	**2.94E-05**

Table 33. Summary of HRA Results for the Sensitive Receptors within the ZOI in the LRDP Scenario

Description	UTM Coordinates		Health Risks		
	East (m)	North (m)	Cancer	Chronic HI	Acute HI
Applegate Learning Center	470777	3759523	8.90×10^{-7}	0.003	0.02
Hyatt Elementary School	471074	3758743	5.43×10^{-7}	0.002	0.008
Riverside Garden Elementary School	469138	3759862	2.06×10^{-7}	0.001	0.02
University Center	469732	3760386	1.80×10^{-7}	0.001	0.03

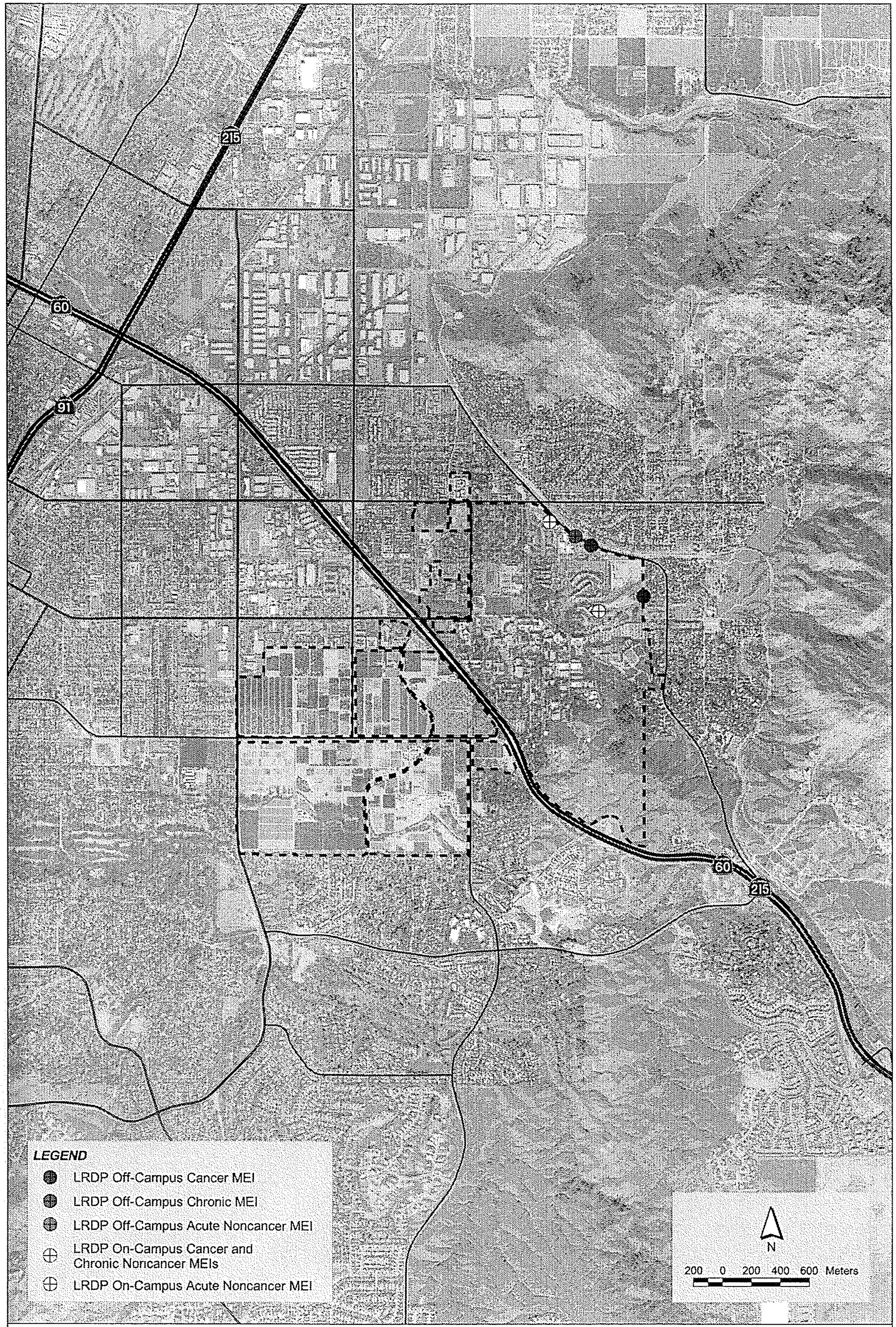


Locations of the Cancer, Chronic Noncancer and Acute Noncancer Off- and On-campus MEIs in the Existing Scenario

URS | Project No.: 29869454 | Project: UC RIVERSIDE 2004 LRDP HRA | Date: March 2005 | Figure 9

Location of the Carcinogenic Zone of Impact and Sensitive Receptor Locations in the Existing Scenario

URS | Project No.: 29869454 | Project: UC RIVERSIDE 2004 LRDP HRA | Date: March 2005 | Figure 10



Locations of the Cancer, Chronic Noncancer and Acute Noncancer Off- and On-campus MEIs in the LRDP Scenario

URS	Project No.: 29869454	Project: UC RIVERSIDE 2004 LRDP HRA	Date: March 2005	Figure 11

Location of the Carcinogenic Zone of Impact and Sensitive Receptor Locations in the LRDP Scenario

URS	Project No.: 29869454	Project: UC RIVERSIDE 2004 LRDP HRA	Date: March 2005	Figure 12

7.0 UNCERTAINTIES

Predictions of future health risks related to UCR activities entails uncertainties because of gaps in scientific knowledge in the practice of exposure and risk assessment, as well as the need to simplify some aspects of the process for a manageable computational effort. In general, there are model and data uncertainties with respect to the assumed emissions, dispersion modeling, characteristics of the potentially exposed populations, and toxicological factors.

Because risk assessments are so often performed to set some regulatory limit on exposure for the protection of public health, the assumptions of risk assessments have tended to overestimate rather than underestimate risk. The methodologies used in this risk assessment followed the "point estimate" approach described in the OEHHA guidelines (OEHHA 2003). Point estimate risk values are based on a central tendency approach combined with 95% upper confidence limit exposure factors to arrive at single point health risk estimates believed to be conservative upper bound estimates (OEHHA 2003). Sometimes, risk assessments follow a "stochastic approach," presenting ranges of health risk rather than single numerical values to better convey the actual uncertainties involved. The OEHHA guidance offers alternative stochastic approaches to defining exposure factors that provide for a quantitative or semi-quantitative treatment of the risk estimate variability. For this HRA, the standard "first tier" regulatory approach of employing health-protective "point estimate" assumptions was used to provide a degree of maximum protection on environmental values. The resulting health risk predictions should be viewed as maximum estimates of the actual health risks. Although the assessment process includes assumptions that may individually either overestimate or underestimate impact, as described below, on balance, health risk impacts are probably overestimated by a substantial margin.

7.1 EMISSION ESTIMATES

Emission estimates could be in error due to limits in scientific certainty. This bias could be toward underestimation or overestimation for any given source. Conservative (i.e., overpredictive) assumptions were applied where possible in the estimation of emissions. However, it is possible that all sources of emissions or emission constituents from routine campus operations were not identified. This could lead to an underestimation of risk. On the other hand, it is believed that all emission sources representing a significant emissions potential have been included in the HRA.

In most risk assessments, calculated health risks are dominated by only a handful of the evaluated emission constituents. The TACs evaluated in this HRA include common chemicals addressed in most risk assessments, and are likely representative of the highest emitted TACs at UCR. Therefore, omission of substances from the HRA is unlikely to lead to a substantial underestimation of health risks.

Finally, the emission estimation methodologies that were used could result in underestimation or overestimation of emissions for any given TAC. For example, the emission estimates for many of the combustion sources are based on actual fuel usage information supplied by UCR. These data were assumed to be representative of typical annual operations, and could be higher or lower for any operation in any given year. EPA and CARB emission factors used by regulatory agencies such as the SCAQMD were applied to the annual fuel use data and rated equipment capacities to arrive at emission estimates. These factors on balance tend to overestimate rather than underestimate potential emissions.

In summary, there are factors in the estimation of emissions that could lead to underestimation or overestimation of health risks. It is believed that the compounds chosen for analysis in this HRA are likely to have characterized the substantial majority of potential health risks, and that the emission calculation procedures used are not likely to have caused a significant underestimation of risk, and may well represent an overestimation.

7.2 AIR DISPERSION MODELING

In general, EPA-approved dispersion models, such as the one used in this risk assessment within the HARP model, tend to overpredict concentrations rather than underpredict them. For example, all chemical emissions are assumed not to be transformed in the atmosphere. For certain pollutants, conversion to less toxic forms may occur sufficiently fast to reduce concentrations from the conservative model predictions. Moreover, these models use assumptions about plume dispersion that tend to overpredict concentrations. In the modeling for this HRA, it was necessary to group multiple sources together (e.g., for many buildings, all laboratory emissions were modeled as one area source rather than many stacks), which tends to overestimate risks because emissions are concentrated into a single low-buoyancy plume rather than in several higher-buoyancy plumes. Finally, while particulate matter settling is assumed, this is not factored into downwind concentration calculations. This leads to "double counting" and overprediction of concentrations.

7.3 EXPOSURE ASSESSMENT

The most important uncertainties concern the definitions of exposed populations and their exposure characteristics. The choice of a 70-year exposure period at residential exposure locations for lifetime risk estimates is very conservative in the sense that no person will actually spend 24 hours a day, 365 days a year over a 70-year period at exactly the point of highest toxicity-weighted annual average air concentrations. The average period of U.S. residency at any one location is about 9 years, and the 90th percentile of residency (typically used by the EPA in "reasonable maximum exposure" estimates) is about 30 years.

For selected non-residential receptors included in the analysis for which a 70-year exposure assumption is not representative, assumptions were applied that likely overestimated long-term exposure. For example, the assumption that university students are at a fixed receptor location on campus and exposed continuously for four years or that a child is at the on-campus day care center continuously for five years is conservative.

For short-term exposure, there is also likely overprediction because the analysis assumed that all campus operations involving the use of chemicals of short-term concern will occur at maximum hourly emission rates all at the same time and that the peak impacts of each source are collocated.

7.4 DOSE RESPONSE ASSESSMENT

All estimates of cancer toxicity and non-cancer toxicity for the HRA are consistent with OEHHA guidelines, and are among the most conservative compilations of toxicity information available. Toxicity estimates are derived either from observations in humans or from projection of information derived from experiments with laboratory animals. Human data are obviously more relevant for health risk assessments, but are often uncertain because of the difficulty of estimating exposures associated with the health effect of interest, because of insufficient numbers of people studied, because relatively high occupational exposures must be extrapolated to low environmental exposures, or because the population studied may be more or less susceptible than the population as a whole. Cancer risk coefficients from human data are typically considered best estimates and are applied without safety factors. As discussed previously, cancer risk is typically considered proportional to pollutant concentration at any level of exposure (i.e., a linear, no-threshold model), which is conservative at low environmental doses. For non-cancer effects, the lowest exposure known to cause effects in humans is usually divided by uncertainty or safety factors to account for variations in susceptibility and other factors. When toxicity estimates come from animal data, they usually involve extra safety factors to account for possibly greater sensitivity in humans, and the less-than-human-lifetime observations in animals.

Overall, the toxicity assumptions and criteria used in this risk assessment are biased toward overestimating risk.

8.0 REFERENCES

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Appendix A

Emissions Estimates

The Appendices to the Health Risk Assessment are available for review by request at the UC Riverside Campus, Office of Academic Planning and Budget.

Appendix E Cultural Resources Technical Report

CULTURAL RESOURCES TECHNICAL REPORT

UCR LONG RANGE DEVELOPMENT PLAN

Submitted to:

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Submitted by:

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CRM TECH
2411 Sunset Drive
Riverside, CA 92506

January 14, 2002

CRM TECH Contract #627
Approximately 1,300 Acres
Sections 19, 20, 29, and 30, T2S R4W, San Bernardino Base Meridian
USGS Riverside East, Calif., 7.5' quadrangle

EXECUTIVE SUMMARY

In 2001-2002, CRM TECH performed a cultural resources overview study on the campus and associated agricultural experiment fields of the University of California, Riverside (UCR), located on the eastern edge of the City of Riverside, Riverside County, California. The subject property of the study, approximately 1,300 acres in total area, consists of portions of Sections 19, 20, 29, and 30, T2S R4W, San Bernardino Base Meridian. The study is a component of the environmental impact report for UCR's Long Range Development Plan (LRDP), which is being updated on the basis of the existing 1990 version. The purpose of the study is to provide the UCR administration with the necessary information and analysis to facilitate cultural resources considerations in the planning process. In order to inventory known cultural resources within the planning area and prepare a sensitivity assessment, CRM TECH conducted a historical/archaeological resources records search, pursued historical and ethnohistorical background research, and carried out a reconnaissance-level field survey.

The results of these research procedures indicate that only a few small parcels of the planning area, amounting to less than 5% of the total acreage, have been previously surveyed systematically and intensively for cultural resources. Through these surveys and other previous investigations, eight historic-era buildings on campus have been formally documented in the various historical resources inventories maintained by the State Office of Historic Preservation (OHP) and evaluated for historical significance. In addition, more than 20 other buildings or groups of buildings that are now more than 45 years old have been identified through the cultural resources study for the 1990 LRDP and/or through the present study, although none of these have been formally recorded.

Besides the historic-era buildings, two archaeological sites have also been recorded within the planning area, representing the historic Gage Canal, an important irrigation work in local history, and a prehistoric grinding slick on a granite outcrop. During the field survey for this study, additional bedrock milling features were noted on the relatively undisturbed hillsides to the southeast of the central campus. In the meantime, in the agricultural fields lying to the south of Martin Luther King Boulevard, CRM TECH observed topographical features and other potential indicators that suggest the possibility of historic-era archaeological remains being present.

In light of the research findings outlined above, this study concludes that the rolling hills in the southeastern portion of the planning area are moderately sensitive for prehistoric archaeology, while the agricultural fields in the southwestern portion, south of Martin Luther King Boulevard, are moderately sensitive for historic-era archaeology. Future development and other ground-disturbing activities in these areas, therefore, should require intensive-level cultural resources surveys in the planning process. Similarly, all historic-era buildings that remain unrecorded and/or unevaluated at the present time should be studies individually and evaluated under the provisions of the appropriate federal of state statutes and regulations prior to any project that may compromise their integrity.

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INTRODUCTION

In 2001-2002, CRM TECH performed a cultural resources overview study on the campus and associated agricultural experiment fields of the University of California, Riverside (UCR), located on the eastern edge of the City of Riverside, Riverside County, California (Fig. 1). The subject property of the study, approximately 1,300 acres in total area, consists of portions of Sections 19, 20, 29, and 30, T2S R4W, San Bernardino Base Meridian (Fig. 2). The study is a component of the environmental impact report for UCR's Long Range Development Plan, which is being updated on the basis of the existing 1990 version. The purpose of the study is to provide the UCR administration with the necessary information and analysis to facilitate cultural resources considerations in the planning process. In order to inventory known cultural resources within the planning area and prepare a sensitivity assessment, CRM TECH conducted a historical/archaeological resources records search, pursued historical and ethnohistorical background research, and carried out a reconnaissance-level field survey. The following report is a complete account of the methods and results of the research, and the final conclusion of this study.

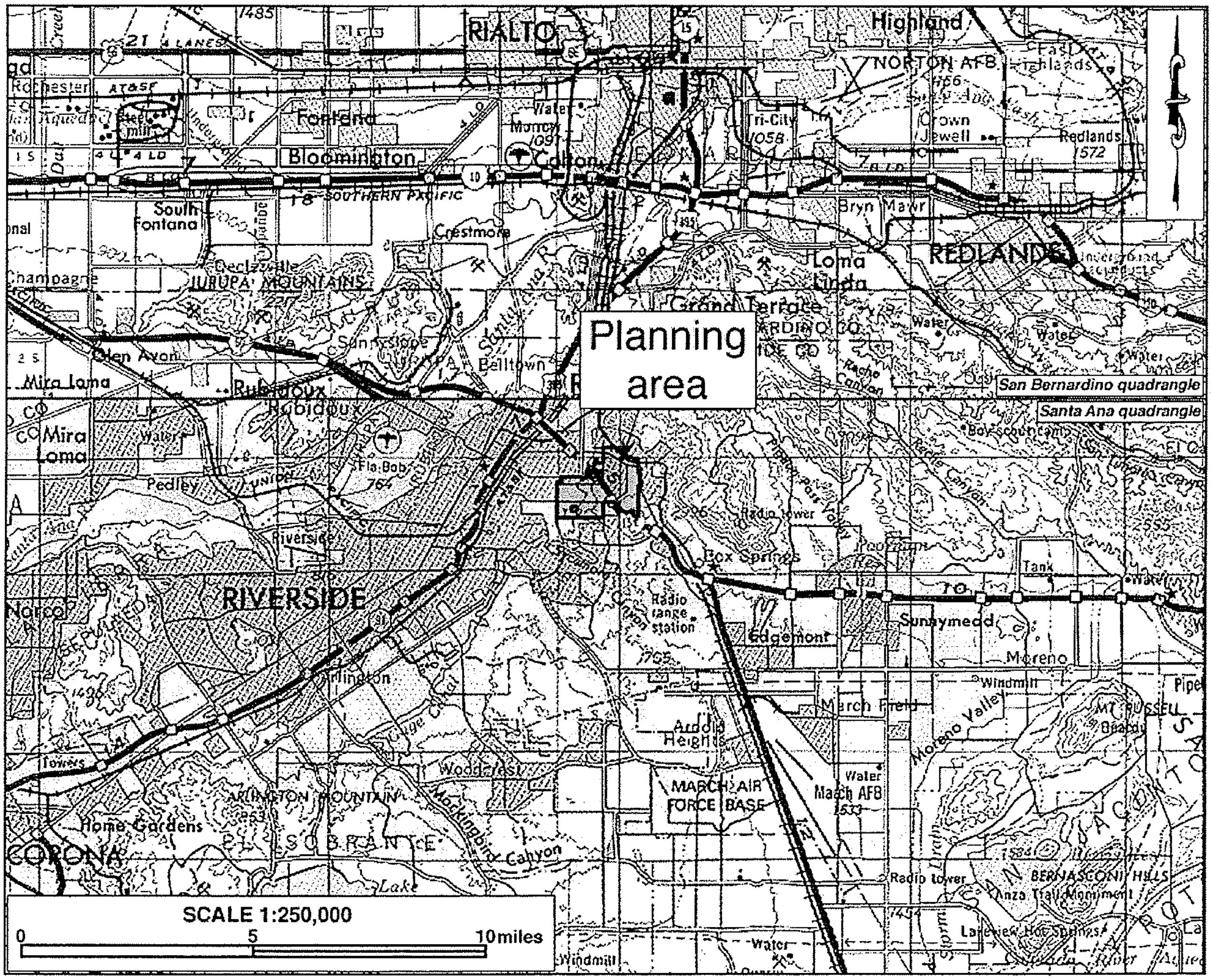

Figure 1. General vicinity of the planning area. (Based on USGS San Bernardino and Santa Ana, Calif., 1:250,000 quadrangles [USGS 1969; 1979])

Figure 2. Location and configuration of the planning area. (Based on USGS Riverside East, Calif., 1:24,000 quadrangle [USGS 1980])

CULTURAL SETTING

PREHISTORY

Archaeology

It is widely acknowledged that human occupation in what is now the State of California began 8,000-12,000 years ago. In attempting to describe and understand the cultural processes that occurred in the ensuing years, archaeologists have developed a number of chronological frameworks that endeavor to correlate the technological and cultural changes that are observable in archaeological records to distinct time periods. Unfortunately, none of these chronological frameworks has been widely accepted, and none has been developed specifically for the so-called Inland Empire, the nearest ones being for the Colorado Desert and Peninsular Ranges area (Warren 1984) and for the Mojave Desert (Warren and Crabtree 1986).

Since archaeological sites found in this region usually contain relatively few artifacts and little or no material that is datable by absolute—e.g., radiocarbon—methods, most archaeologists tend to follow an adapted chronology based on a scheme that was first developed by William J. Wallace in 1955 (Wallace 1955; 1978; Warren 1968; Chartkoff and Chartkoff 1984; Moratto 1984). Although the beginning and ending dates of the different horizons or periods may vary, the general framework of prehistory under this chronology consists of the following four periods:

- Early Hunting Stage (ca. 10,000 BC-6,000 BC), which was characterized by human reliance on big game animals, as evidenced by large, archaic-style projectile points and the relative lack of plant-processing artifacts;
- Millingstone Horizon (ca. 6,000 BC-AD 1,000), when plant foods and small game animals came to the forefront of subsistence strategy, and from which a large number of millingstones, especially well-made, deep-basin metates, were left;
- Late Prehistoric Period (ca. AD 1,000-1,500), during which a more complex social organization, a more diversified subsistence base—as evidenced by smaller projectile points, expedient millingstones and, later, pottery—and regional cultures and tribal territories began to develop;
- Protohistoric Period (ca. AD 1,500-1,700s), which ushered in long-distance contact with Europeans, and thereby led to the Historic Period.

Ethnohistory

The northern Riverside area lies in a region where the traditional territories of three Native American groups overlapped: the Serrano of the San Bernardino Mountains, the Luiseño of the Perris-Elsinore region, and the Gabrielino of the San Gabriel Valley. Kroeber (1925:Plate 57) suggests that the Native Americans of the Riverside area were probably Luiseño, Reid (1968:8-9) states that they were Serrano, and Strong (1929:7-9, 275) claims that they were Gabrielino. In any case, there also occurred a late influx of Cahuilla during the 19th century (Bean 1978).

Whatever the linguistic affiliation, Native Americans in the Riverside area exhibited similar social organization and resource procurement strategies. Villages were based on clan or lineage groups. Their home base sites are marked by midden deposits, often with bedrock mortar features. During their seasonal rounds to exploit plant resources, small groups often ranged some distances in search of specific plants and animals. Their gathering strategies often left behind signs of special use sites, such as boulder slicks and metates at certain plant locations.

HISTORY

Regional Historical Context

The present-day Riverside area received its first European visitors during the early and mid-1770s, shortly after the beginning of Spanish colonization of Alta California in 1769. After the establishment of Mission San Gabriel in 1771, the area became one of the mission's principal *rancherías*, known at the time as Jurupa. But despite these early contacts, no Europeans are known to have settled in the area until after the creation of the Rancho Jurupa land grant in 1838, which encompassed what is now the northern portion of the City of Riverside. During the 1840s, a number of other ranchos were established in the vicinity, including two more that lay partially within the current city limits, La Sierra (Sepulveda) and El Sobrante de San Jacinto. The planning area, however, was not included in any of these land grants, and thus remained unclaimed when California became a part of the United States in 1846.

In 1871, the town of Riverside was founded in today's downtown area, followed in the next few years by two other colonies in the Arlington-La Sierra area. The three separate enterprises eventually merged in 1875, and the City of Riverside was incorporated in 1883. The planning area, a part of Riverside's eastern "highlands," was not involved in any of these early colonies, and was not incorporated into the city at the time. Situated at higher elevations than the original Riverside Canals, the upper plain remained largely undeveloped until 1885-1886, when the completion of the Gage Canal greatly increased the acreage under irrigation in the Riverside area, marking the beginning of a new phase in the city's growth.

During the 1870s and 1880s, amid a land boom that swept through southern California, the young community of Riverside grew rapidly. The most important boost to Riverside's early prosperity came with the introduction of the naval orange in the mid-1870s. Its instant success in Riverside led to the rapid spread of citrus cultivation throughout southern California, and propelled Riverside to the forefront of the citrus industry. In 1893, after a bitter local political dispute, Riverside split itself from San Bernardino County, and became the county seat and the dominant urban center of the newly created Riverside County. Since the mid-20th century, with the increasing diversification of Riverside's economic livelihood, much of Riverside's once extensive citrus acreage has given way to urban expansion. Nevertheless, the "citrus culture" that developed from the city's orange-dominated past continues to be an integral part of the community identity to the present time.

University of California, Riverside

The University of California, Riverside, traces its roots to the university's Citrus Experiment Station, which was initially established at the base of nearby Mount Rubidoux in 1906. In 1917, most of its operations were moved to the present campus, and the new station was officially dedicated the next year. Thirty years later, when the University of California decided to establish a traditional liberal arts college within its system, Riverside was chosen for the site, and the campus was born. The College of Letters and Science, the first component of the Riverside campus to focus on undergraduate education, opened for enrollment in 1954.

In 1959, U.C. regents declared Riverside a general campus of the university. Within the next year, the College of Agriculture and the Graduate Division came into being, followed in 1961-1962 by the University Extension, the Agricultural Extension, and several new research centers. Since then, both the scope and the size of the campus have expanded greatly, despite a temporary setback in the 1970s and the early 1980s. A series of reorganizations since the 1960s fundamentally transformed UCR and its educational philosophy. Today, with a variety of graduate and professional degrees in the offering and a student body of well over 10,000, UCR bears little resemblance to the small and intimate liberal arts college envisioned for this campus in the 1940s[1].

RESEARCH METHODS

RECORDS SEARCH

CRM TECH principal Bruce Love (see App. 1 for qualifications) conducted the historical/ archaeological resources records search for this study at the Eastern Information Center (EIC), the official cultural resource records repository for Riverside County, which is located on UCR campus. During the records search, Love examined maps and records on file at the EIC for previously identified cultural resources in or near the project area, and existing cultural resources reports pertaining to the vicinity. Previously identified cultural resources include properties designated as California Historical Landmarks, Points of Historical Interest, or Riverside County Landmarks, as well as those listed in the National Register of Historic Places, the California Register of Historical Resources, or the California Historical Resource Information System.

HISTORICAL RESEARCH

The historical background research was conducted by CRM TECH historian Bai "Tom" Tang (see App. 1 for qualifications) on the basis of published literature in the history of UCR and the surrounding area, historic maps of the vicinity, and local history materials on file at the Special Collections Department of UCR's Tomás Rivera Library. Among maps consulted for this study are the United States General Land Office's land survey plat map dated 1877, and the United States Geological Survey's topographic maps dated 1901, 1942, 1953, 1967, and 1973. These maps are collected at the Science Library of UCR, and the California Desert District of U.S. Bureau of Land Management, also located in Riverside.

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[1] The general historical background of the Citrus Experiment Station and UCR has been extensively documented in the cultural resources overview prepared for the 1990 LRDP (LSA 1990) and in various UCR publications (e.g., UCR 1979a; 1979b), and need not be repeated at length in this report.

ETHNOHISTORICAL RESEARCH

In conjunction with the records search and the historical research, CRM TECH archaeologist Michael Hogan (see App. 1 for qualifications) pursued ethnohistorical studies in search of possible sites of Native American traditional cultural value in or near the planning area. For that purpose, Hogan consulted leading ethnographic authorities on Gabrielino, Serrano, Luiseño, and Cahuilla culture and history, such as Kroeber (1925), Strong (1929), McCawley (1996), Bean (1978), Bean and Shipek (1978), and Bean and Smith (1978a; 1978b), for information regarding village locations, Native American place names, or other known cultural sites in the planning area, so that they could be taken into consideration for the cultural resource sensitivity analysis.

FIELD RECONNAISSANCE

On January 8 and 9, 2002, Bruce Love and Bai "Tom" Tang carried out the field reconnaissance by conducting a "wind-shield survey" in various portions of the planning area and spot-checking selected locations where historic-era buildings or archaeological features were previously noted or are likely to occur. Aside from inspecting the current conditions of the previously identified historical/archaeological sites, the main purpose of the field reconnaissance was to examine and evaluate the sensitivity of the planning area for cultural resources that are yet to be identified. The results of the field reconnaissance are discussed below.

RESULTS AND FINDINGS

PREVIOUS CULTURAL RESOURCES SURVEYS

According to records on file at the Eastern Information Center, the planning area has not been extensively surveyed for cultural resources. Three relatively small-scale surveys have occurred in the eastern portion of the planning area, along the foot of the rolling hills to the southeast of the central campus, and a pair of linear surveys bisected the western portion of the planning area, across the university's agricultural experiment fields (Fig. 3). Through these surveys and other previous investigations, eight historic-era buildings and two archaeological sites have been formally documented in the various historical resources inventories maintained by the State Office of Historic Preservation (OHP). These resources are discussed in further detail in the section below.

Within a one-mile radius of the planning area, 20 cultural resources studies have occurred on various parcels of land or linear features, some of them adjacent to the planning area boundaries (Fig. 3). These studies resulted in the recordation of 25 prehistoric archaeological sites and 8 historic-era sites within the scope of the records search. The prehistoric sites include 23 that consisted of bedrock milling features and 2 that consisted of possible hunting blinds. Among the eight historic-era sites are the 1920s University Heights Junior High School and the 1930s Peter J. Weber House, both of which have been designated historical landmarks by the City of Riverside and nominated to the National Register of Historic Places, with the former officially listed in the register in 1993. The other six historic-era sites include a small segment of the Southern Pacific (now Union Pacific) Railroad, two trash dumps, remnants of an irrigation system, and two residential structures built in the 1910s-1920s.

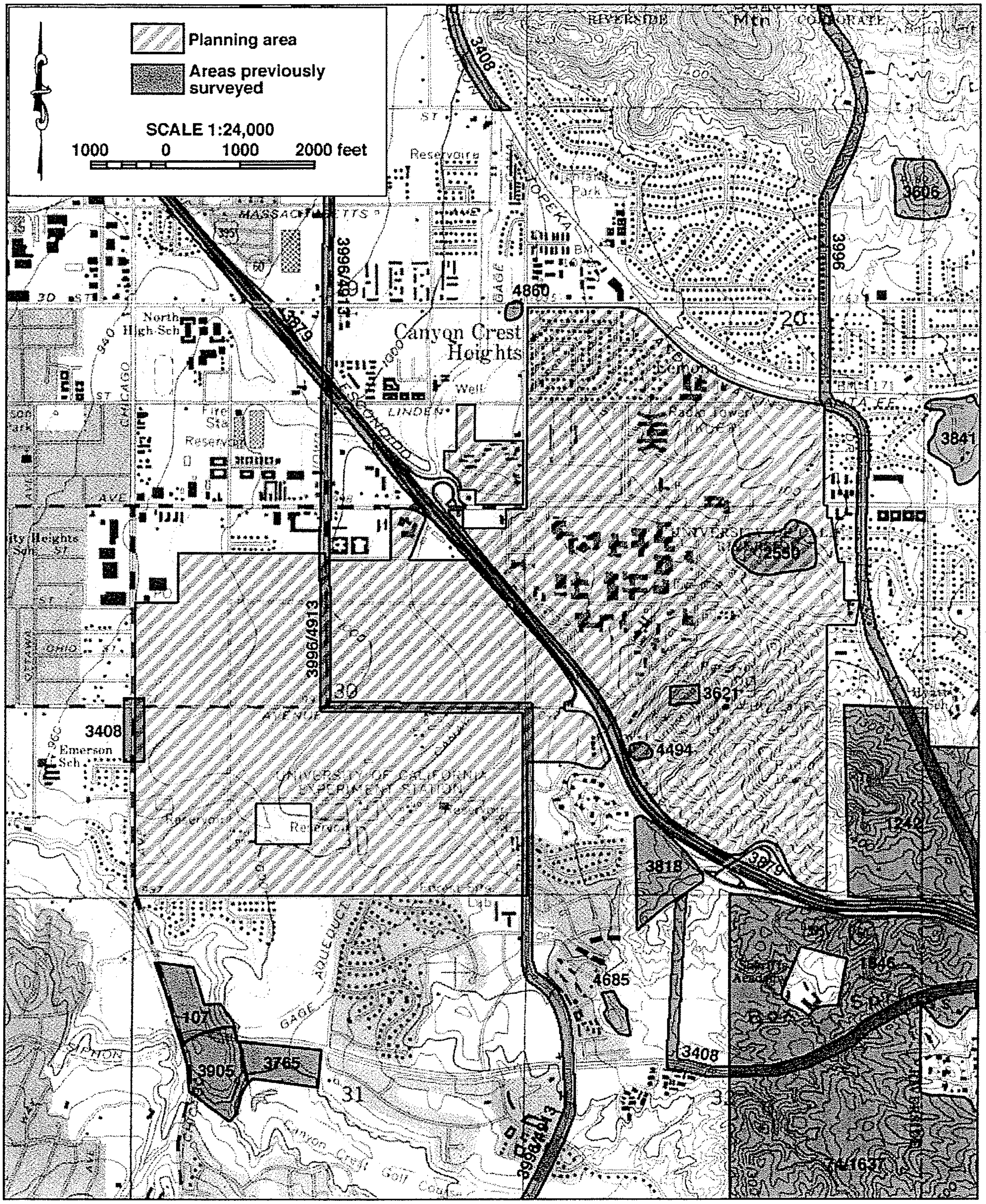

Figure 3. Previous cultural resources surveys in the vicinity of the planning area, indicated by EIC manuscript file number.

KNOWN CULTURAL RESOURCES IN THE PLANNING AREA

Potentially Historic Buildings

Buildings Formally Recorded

As mentioned above, a total of eight historic-era buildings have been previously identified and formally recorded within the planning area. These buildings have been documented in four separate groups, as listed below, but all of them are associated with the history of the Citrus Experiment Station before the establishment of UCR (Fig. 4, A-D).

- **Citrus Experiment Station (33-8090; CPHI Riv-028)** The three main buildings in the original Citrus Experiment Station complex, now fully renovated and renamed Anderson Hall, have been designated a Point of Historical Interest by the OHP and a Historical Landmark by the County of Riverside. The main building of the complex, known historically as the Horticulture Building (Fig. 5), and its south wing, known as the Irrigation Building, were designed by architects Lester H. Hibbard and H. B. Cody and constructed in 1916, while the north wing, known as the Soils and Plant Nutrition Building, was designed by G. Stanley Wilson, a prominent local architect, and constructed in 1931 (UCR 1990:4.4-6).
- **The Barn Group (33-7877)** Originally used as barns, stables, storage shed, and/or workshops in support of the Citrus Experiment Station agricultural operations, the three buildings in this group were also designed by Hibbard and Cody and built in 1916 (UCR 1990:4.4-6; Tang 1993a). After the establishment of the College of Letters and Science in 1954, the Barn Group was transformed into a popular extracurricular activities center on the new campus, a function it has served ever since (Tang 1993a).
- **The University Cottage (33-7878)** Constructed in 1917 on yet another Hibbard and Cody design, this building was originally known as the Teamster's Cottage, one of the earliest residences to be erected by the university at the Citrus Experiment Station (UCR 1990:4.4-6; Tang 1993b). Since 1954, it has housed various university offices.
- **The Insectary (33-6015)** This building was designed by G. Stanley Wilson and constructed in 1931 (Thorne 1994; Fig. 6). It was altered in 1960, but served its original purpose well into the 1990s (*ibid.*).

All eight of these buildings have been evaluated as potential historical resources, and with the exception of the Insectary, seven of them have been determined to be eligible for listing in the National Register of Historic Places or at least historically significant to the UCR community (UCR 1990:4.4-6; Tang 1993a; 1993b; Thorne 1994). The Citrus Experiment Station complex, in fact, was nominated to the National Register in 1989, but the nomination remains uncompleted today (Lortie 2001).

Buildings Noted by LSA in 1990

Besides the formally recorded buildings, the cultural resources overview prepared for the 1990 LRDP identified seven other pre-1945 buildings on campus, along with a WWII-vintage residential complex (LSA 1990:13-17), as listed below (see Fig. 4 for locations). None of these, however, have been recorded into any of the official registers or inventories of potential historical resources.

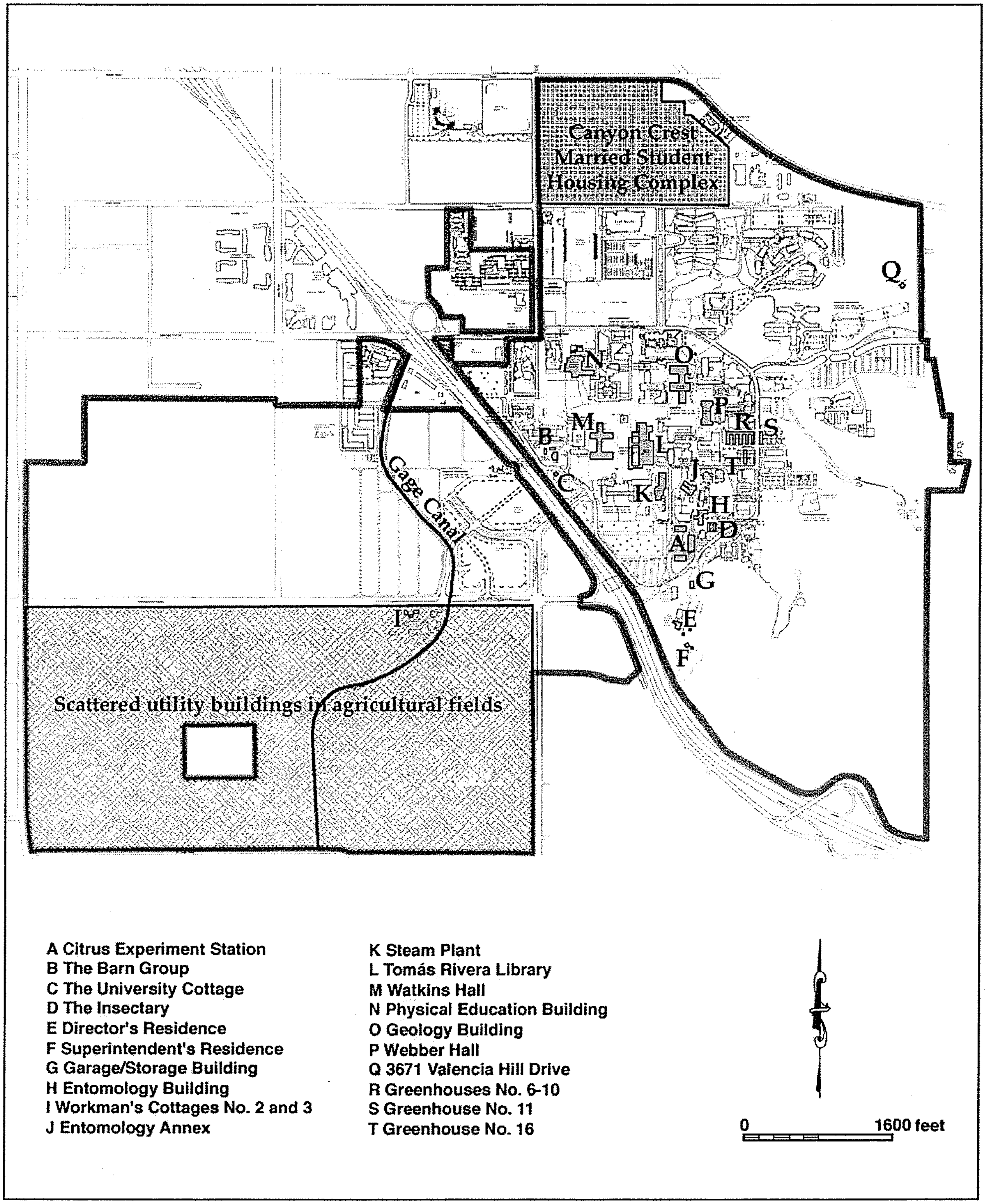

Figure 4. Locations of identified historic-era buildings and other features in the planning area. Locations of prehistoric archaeological features are not shown as a protective measure.

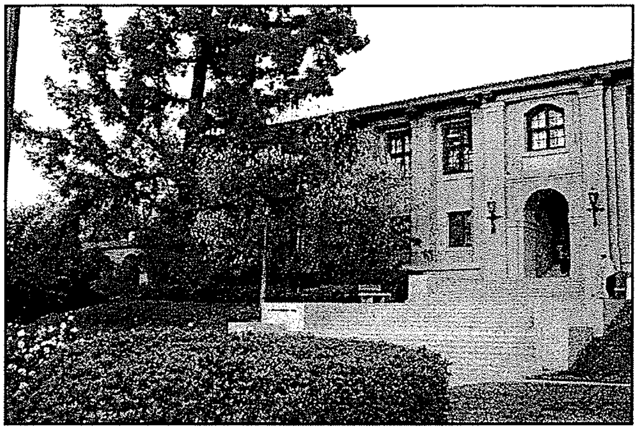

Figure 5. The former Horticulture Building at the Citrus Experiment Station (now Anderson Hall).

Figure 6. The Insectary, built in 1931 during an expansion of the Citrus Experiment Station.

- **The Director's Residence (with Garage and Garden Shed)** The original residence was designed by Lester H. Hibbard and H. B. Cody and built in 1916 (UCR 1990:4.4-6). It is now enlarged significantly, renamed College Building South, and attached to the 1963 College Building North (UCR 2000).
- **The Superintendent's Residence (with Garage)** Like its larger neighbor, the Director's residence, this house was designed by Hibbard and Cody and built in 1916 (UCR 1990:4.4-6; Fig. 7).
- **Garage/Storage Building** This simple utility building was suspected to have been built around the same time as the two nearby residences listed above, with which it is "stylistically contemporaneous" (LSA 1990:14-15).
- **Entomology Building** Together with the Soils and Plant Nutrition Building and the Insectary, the Entomology Building represents an early 1930s expansion of the Citrus Experiment Station. Designed by G. Stanley Wilson, this building was completed in 1932 (UCR 1990:4.4-6). In 1948, it was significantly enlarged through an addition, also designed by Wilson (LSA 1990:16).
- **Canyon Crest Married Student Housing Complex** Located in this complex are some 150 residences developed by the U.S. military in 1941 and acquired by UCR in 1955, before the construction of the first dormitory on campus (UCR 1958:30; 2000). Virtually all of the buildings have been significantly altered through renovation efforts in recent years (Fig. 8).

In the 1990 cultural resources overview, LSA (1990:20-22) offers a series of evaluations of the buildings listed above under the National Register criteria, concluding that all of them except the Canyon Crest Married Student Housing Complex is eligible for listing in the National Register. Some of the LSA's evaluations, however, have since been modified as the result of more focused research on individual buildings, as in the case of the Barn Group and the Insectary (Tang 1993a; Thorne 1994). Therefore, LSA's

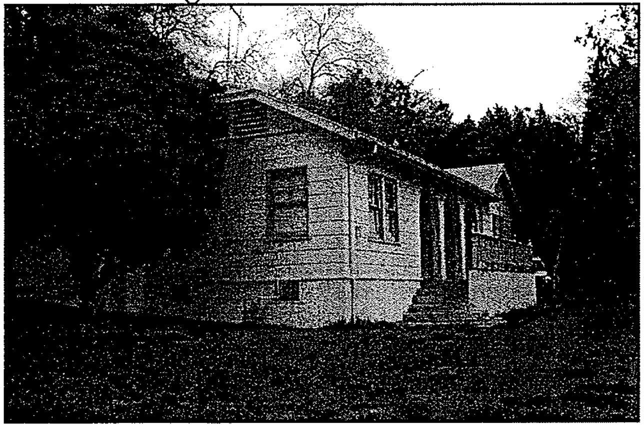

Figure 7. The Superintendent's Residence, constructed in 1916.

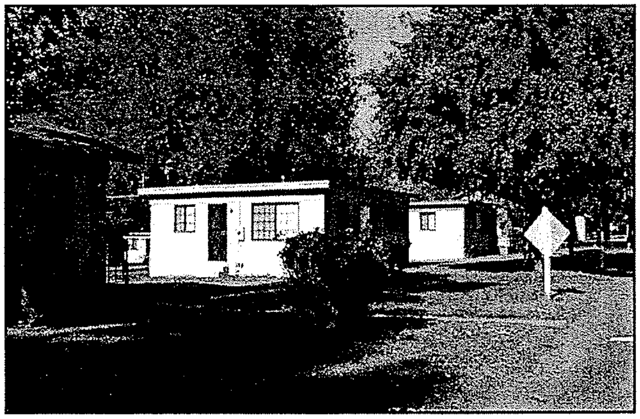

Figure 8. Residences in the Canyon Crest Married Student Housing Complex, formerly a WWII-vintage military housing tract. The two flat-roofed specimens in the center retain more of their historical appearance, but all units in the complex have been significantly altered in recent years.

evaluations on the other buildings, reached on the basis of an overview study, should be considered preliminary, and each of the buildings in the latter group should be analyzed and evaluated individually if its historical integrity is threatened by future development projects.

Additional Buildings from the Historic Period

During the present study, several more pre-1945 buildings were noted in the planning area, including two residences and at least three utility buildings in the agricultural fields south of Martin Luther King Boulevard. In addition, a number of buildings constructed after 1945 but before 1957 have now become more than 45 years old, thus meeting the age threshold established by the OHP for features of built environment to be considered potentially historic. These buildings are listed below (see Fig. 4 for locations).

- **Workman's Cottages No. 2 and 3 (1080 and 1096 Martin Luther King Boulevard, with Garage)** Although LSA reports that these buildings date only to 1958, UCR (2000) records reveal that they were in fact built in 1922, with the garage added in 1955, which is consistent to field estimates based on their style and appearance (Fig. 9). Interestingly, these buildings do not appear in the 1953 USGS map, raising the possibility that they may have been moved to this location between 1953 and 1967 (USGS 1953 [Fig. 10]; 1967), perhaps in 1955.
- **Entomology Annex** According to UCR records, this building was constructed in 1947 (UCR 2000).
- **Steam Plant** Built in 1949, the steam plant was considered the first building to be completed on and for the new Riverside campus (Citizens University Committee 1949).
- **Tomás Rivera Library, Watkins Hall, Physical Education Building, Geology Building, and Webber Hall** All completed before 1954, these five buildings formed the core of the campus of the newly created College of Letters and Science (UCR 1959:5, 8-10; 2000; Fig. 10). Initially, Watkins Hall (Fig. 11), Geology Building, and Webber Hall were home to the college's social sciences and humanities, physical sciences, and life sciences divisions, respectively, with Watkins Hall also housing the college administration offices. The original

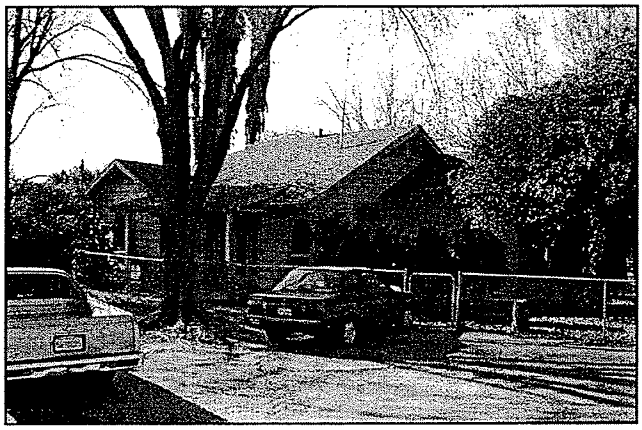

Figure 9. Workman's Cottage No. 3, built in 1922.

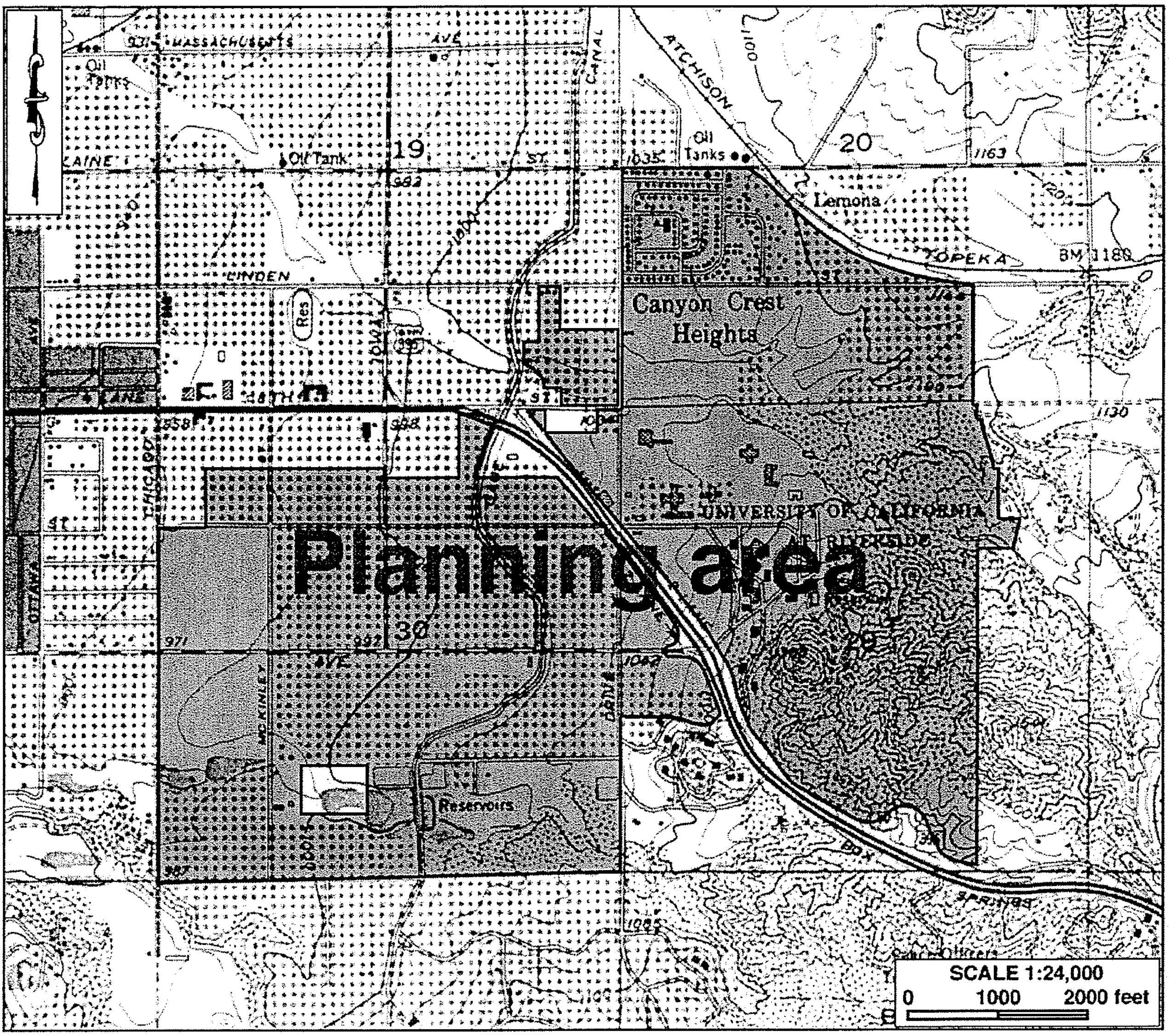

Figure 10. The planning area and vicinity in 1951-1953. (Source: USGS 1953)

library building was greatly expanded in 1966, and now constitutes the northern portion of present-day Tomás Rivera Library.

- **Residence at 3671 Valencia Hill Drive** UCR records indicate that this house was built by the university in 1955 (UCR 2000).
- **Greenhouses No. 6-10, 11, 16** These structures were constructed between 1952 and 1956, and more greenhouses of identical design were added to No. 11 and No. 16 in 1957 (UCR 2000).

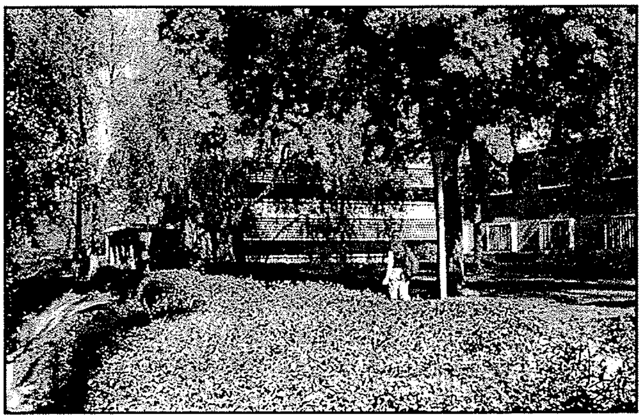

Figure 11. Watkins Hall, one of the first buildings to be completed on the newly established Riverside campus of the University of California.

- **Agricultural Utility Buildings** Among the large number of barns, storage sheds, field laboratories, greenhouses, and other utility buildings in the agricultural fields south of Martin Luther King Boulevard, many date to the pre-1957 period, including at least three that were built in 1924 (UCR 2000). These three are identified in the university's facilities inventory as Garages C2, C3, and S5 (*ibid.*; Fig. 12).

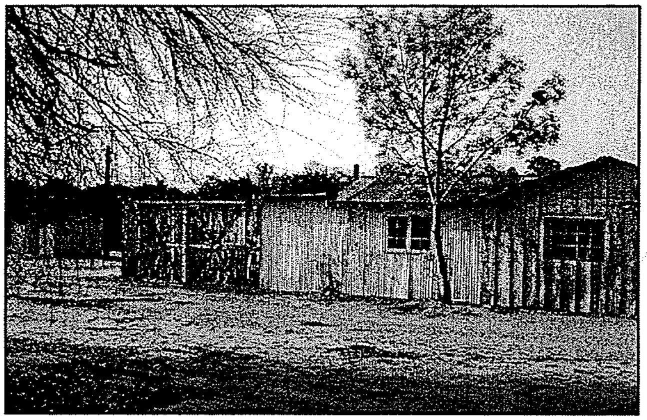

Figure 12. Garage S5, one of the agricultural utility buildings constructed in 1924.

Due to the limited scope of this study, no attempts were made to evaluate the historical significance of the buildings listed in this subsection.

Archaeological Sites

The California Historical Resource Information System currently contains two archaeological sites that have been recorded within the planning area, as listed below.

- **Site CA-RIV-495** Located on a hillside in the southeastern portion of the planning area, this prehistoric site was first identified in 1971, and its presence was confirmed in 1990 (Broadbent 1971; LSA 1990:9-10). Typical of prehistoric sites occurring in the surrounding area, Site CA-RIV-495 was described as a single grinding slick on a bedrock outcrop, with no associated artifacts (Broadbent 1971).
- **Site CA-RIV-4768H** This site represents the historic Gage Canal, which traverses the western portion of the planning (Fig. 4). Constructed in 1885-1886 by Matthew Gage, the Gage Canal played an instrumental role in the development of the "highlands" to east of the first colonies in present-day Riverside, and continues to serve as a vital conduit of irrigation water today. For that reason, it has been designated a historical landmark by the City of Riverside. Within the planning area, however, the canal retains little historic integrity to relate to its period of significance (Fig. 13).

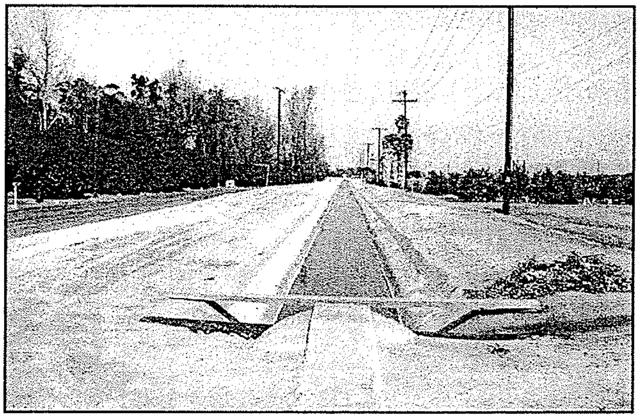

Figure 13. A segment of the Gage Canal within the planning area.

In the general vicinity of Site CA-RIV-495, a cursory field inspection during this study brought about the discovery of a previously undocumented boulder with two grinding slicks (Fig. 14). It appears possible, and indeed probable, that many more prehistoric bedrock milling features, which are quite common in the Riverside area, may remain unrecorded in the rolling hills in the southeastern portion of the planning area.

In the agricultural fields to the south of Martin Luther King Boulevard, the field reconnaissance encountered, along with the historic-era utility buildings, a number of other indicators of human activities dating perhaps to the early years of the Citrus Experiment Station or even before, such as old-growth domestic trees and well-weathered irrigation features. Furthermore, in contrast to the similar fields north of Martin Luther King Boulevard, where the land has been completely leveled and cleared, this southerly area retains much more of its original topographic features, which further suggests the possibility of undisturbed historic-era archaeological remains yet to be detected.

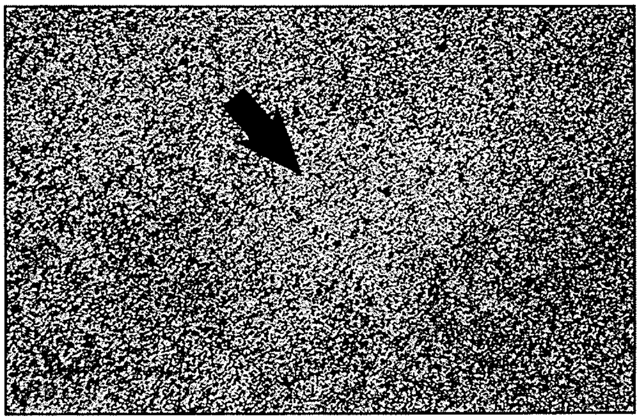

Figure 14. Bedrock milling slick (light area on the granite surface) found on a boulder near the recorded location of Site CA-RIV-495.

Figure 15. Palm trees along Linden Street.

Other Potential Cultural Resources

In addition to the historic-era buildings and archaeological features, other types of potential cultural resources, such as historic landscapes, should also be considered in future planning process. For example, the tall palm trees lining Linden Street in the northeastern portion of the planning area (Fig. 15), reportedly relics of an early ranch, clearly date to the historic period and, pending further research and analysis, may prove to have some historic interest, as discovered in many of the surrounding communities. Such non-traditional types of cultural resources essentially include all man-made features that are more than 45 years old. These features, like buildings and archaeological sites, need to be examined and evaluated if threatened by future development projects.

ARCHAEOLOGICAL SENSITIVITY ANALYSIS

Based on the research findings presented above, this study concludes that two tracts of land in the planning area that have not been involved in the rapid expansion of UCR campus demonstrate a moderate level of archaeological sensitivity, as identified below:

- The rolling hills in the southeastern portion of the planning area, as delineated in Figure 16, appear to be moderately sensitive for prehistoric archaeological remains;
- The agricultural fields in the southwestern portion of the planning area, south of Martin Luther King Boulevard (Fig. 16), appear to be moderately sensitive for historic-era archaeological remains.

The agricultural fields lying to the north of Martin Luther King Boulevard, although also undeveloped and not subjected to intensive-level cultural resources survey, is considered to be low in sensitivity for archaeological resources due to extensive prior disturbances.

The reconnaissance-level survey conducted during this study is thus deemed sufficient for the identification of cultural resources in this area.

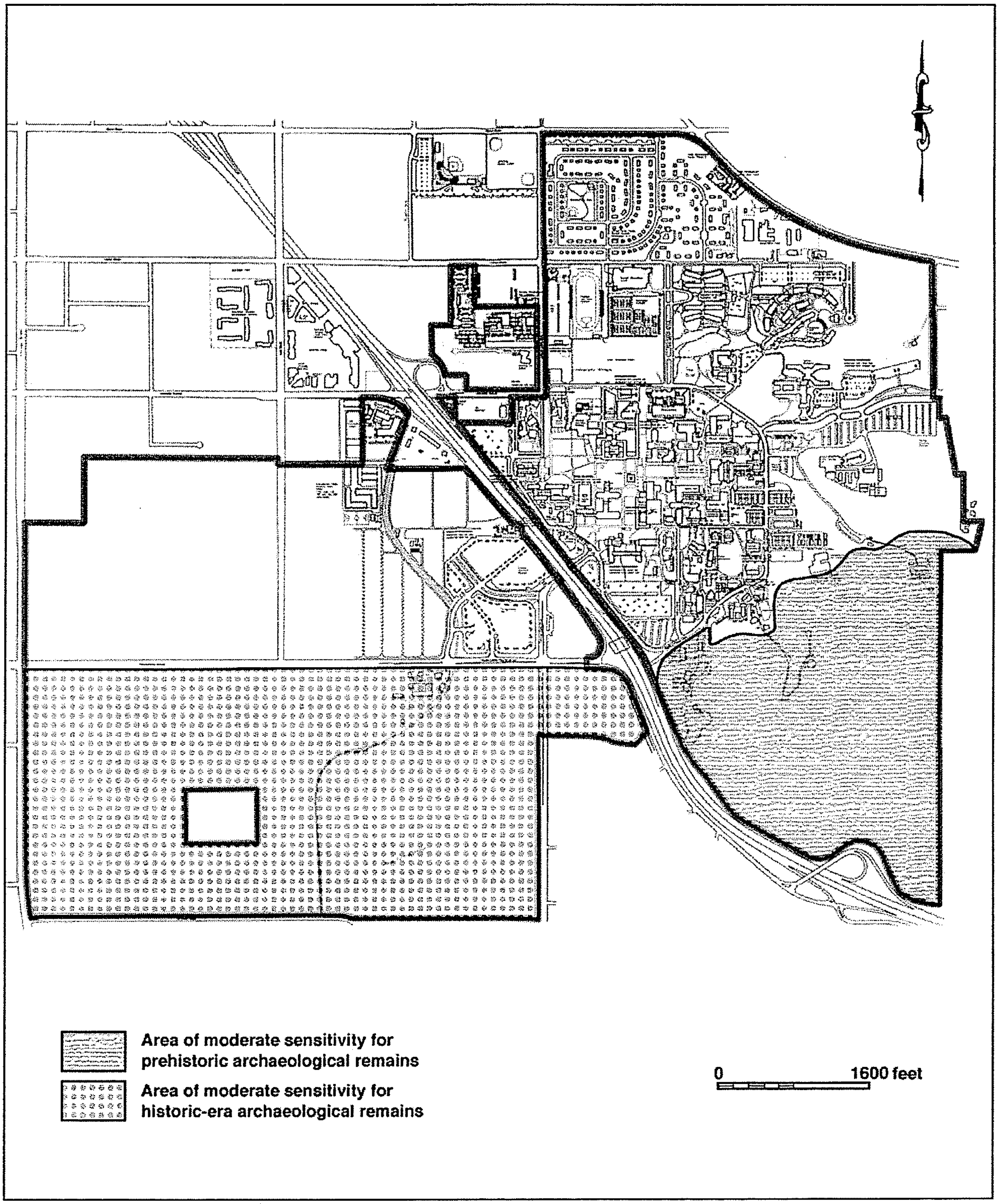

Figure 16. Areas of archaeological sensitivity. Intensive-level cultural resources surveys will be necessary for these areas prior to development.

MANAGEMENT CONSIDERATIONS

AVAILABLE HISTORIC PRESERVATION PROGRAMS

Federal Programs

The National Historic Preservation Act (NHPA) of 1966, as amended, mandates that all federal agencies assume responsibility for the preservation of historic properties owned or controlled by the U.S. government. Section 106 of NHPA requires federal agencies to take into account the effect of an undertaking on any historic properties prior to approval of the undertaking.

Under the provision of NHPA, the Secretary of the Interior maintains the National Register of Historic Places, a nation-wide inventory of districts, sites, buildings, structures, objects, or other features of national, state, or local historical significance. According to statutory definition, any property listed in or determined to be eligible for listing in the National Register constitutes a "historic property." At present, the planning area contains no properties listed in the National Register.

In addition to NHPA, a number of other federal statutes also provide for programs aimed at the preservation of important cultural resources, including investment tax credits on certified rehabilitation of historic buildings, the Community Development Block Grant Program, and the historic building preservation program created by the Transportation Equity Act of 1998.

State Programs

The California Register of Historical Resources, established in 1992, is the State of California's counterpart to the National Register of Historic Places. Its listings include all properties listed in or officially determined eligible for listing in the National Register. Together with the California Register, the OHP maintains two other registers to promote historic preservation in the state: California Historical Landmarks, a designation for properties of statewide historic importance, and Points of Historical Interest, for properties of county-wide or regional importance. At present, the Citrus Experiment Station complex, designated a Point of Historical Interest in 1969, is the only site listed in any of these registers.

Properties included in any of these registers are eligible for a number of state historic preservation incentives, such as property tax reduction, benefits provided by the California Heritage Fund, alternative building regulations under the State Historic Building Code, special historic preservation bond measures, and seismic retrofit tax credits.

REGULATORY GUIDELINES ON CULTURAL RESOURCES MANAGEMENT

As mentioned above, Section 106 of National Historic Preservation Act mandates that public agencies with jurisdiction over federal or federally assisted undertakings take into account the effect of the undertakings on any "historic properties" during the planning process (16 USC 470f). For projects with no federal involvement, the California Environmental Quality Act (CEQA) similarly requires lead agencies to take the necessary action to prevent substantial adverse changes to "historical resources" (PRC §21084.1). Although termed differently in NHPA and CEQA, "historic properties" and "historical resources" both refer to a special class of cultural resources that meet the definitions set forth in the statutes and their implementation regulations.

The term "cultural resource" refers to any physical evidence of human activities that possesses potential historical, archaeological, or traditional cultural value. Among the examples that are most frequently noted as cultural resources are buildings, structures, historic districts, archaeological sites, and such objects as statues and street fixtures. In recent years, cultural resources also began to include non-traditional property types, including historical landscapes and natural features that have acquired cultural significance in history. In order to be considered potentially significant, cultural resources usually need to meet a certain age criterion. In the State of California, the age threshold is generally set at 45 years as per OHP guidelines.

"Historic properties," as defined by the Advisory Council on Historic Preservation, include "prehistoric or historic district, site, building, structure, or object included in, or eligible for inclusion in, the National Register of Historic Places maintained by the Secretary of the Interior" (36 CFR 800.16(l)). The eligibility for inclusion in the National Register is determined by applying the following criteria:

> The quality of significance in American history, architecture, archeology, engineering, and culture is present in districts, sites, buildings, structures, and objects that possess integrity of location, design, setting, materials, workmanship, feeling, and association and
> (a) that are associated with events that have made a significant contribution to the broad patterns of our history; or
> (b) that are associated with the lives of persons significant in our past; or
> (c) that embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or
> (d) that have yielded, or may be likely to yield, information important in prehistory or history. (36 CFR 63)

"Historical resources," according to PRC §5020.1(j), "includes, but is not limited to, any object, building, site, area, place, record, or manuscript which is historically or archaeologically significant, or is significant in the architectural, engineering, scientific, economic, agricultural, educational, social, political, military, or cultural annals of California." More specifically, CEQA guidelines state that the term "historical resources" applies to any such resources listed in or determined to be eligible for listing in the California Register of Historical Resources, included in a local register of historical resources, or determined to be historically significant by the Lead Agency (Title 14 CCR §15064.5(a)(1)-(3)).

Regarding the proper criteria of historical significance, CEQA guidelines mandate that "a resource shall be considered by the lead agency to be 'historically significant' if the resource meets the criteria for listing on the California Register of Historical Resources" (Title 14

CCR §15064.5(a)(3)). A resource may be listed in the California Register if it meets any of the following criteria:

(1) Is associated with events that have made a significant contribution to the broad patterns of California's history and cultural heritage.
(2) Is associated with the lives of persons important in our past.
(3) Embodies the distinctive characteristics of a type, period, region, or method of construction, or represents the work of an important creative individual, or possesses high artistic values.
(4) Has yielded, or may be likely to yield, information important in prehistory or history. (PRC §5024.1(c))

Any property that meets one or more of the criteria listed above, thus, falls under the protection of NHPA and/or CEQA. Depending on the nature, significance, integrity, and current condition of the property, the proper form of protection may range from on-site preservation to project effect mitigation, such as in-depth documentation for historic buildings and data recovery excavation for archaeological sites.

RECOMMENDATIONS

In order to facilitate adequate protection for potential "historic properties" or "historical resources" in the planning area, CRM TECH presents the following recommendations to be considered for adoption into the UCR Long Range Development Plan:

- All buildings, structures, objects, districts, sites, and other features known to be from the pre-1957 era, unless previously evaluated to the satisfaction of federal and/or state statute requirement, should be studied individually and evaluated for historic significance prior to demolition, alteration, or other physical disturbances. Under OHP guidelines, such resources are eligible for formal recordation into the California Historical Resources Information System.
- The southeastern and southwestern portions of the planning area, as delineated in Figure 16, should be subject to intensive-level cultural resources surveys if any future development project or other ground-disturbing activities are proposed for these areas.

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1953 Map: Riverside East, Calif. (7.5', 1:24,000); aerial photos taken in 1951, field-checked in 1953.

1967 Map: Riverside East, Calif. (7.5', 1:24,000); aerial photos taken in 1966, field-checked in 1967.

1969 Map: San Bernardino, Calif. (1:250,000); 1958 edition revised.

1979 Map: Santa Ana, Calif. (1:250,000); 1959 edition revised.

1980 Map: Riverside East, Calif. (7.5', 1:24,000); 1967 edition photorevised in 1978.

Wallace, William J.

1978 Post-Pleistocene Archeology, 9,000 to 2,000 BC. In *Handbook of North American Indians*; Vol. 8, *California*, edited by Robert F. Heizer; pp. 25-36. Smithsonian Institution, Washington, D.C.

Warren, Claude N.

1968 Cultural Traditions and Ecological Adaptations on the Southern California Coast. In *Archaic Prehistory in Western United States*, edited by Cynthia Irwin-Williams; pp. 1-14. Eastern New Mexico University Contributions in Anthropology 1(3). Portales, New Mexico.

1984 The Desert Region. In *California Archaeology*, edited by Michael J. Moratto, pp. 339-430. Academic Press, Orlando, Florida.

Warren, Claude N., and Robert H. Crabtree

1986 Prehistory of the Southwestern Area. In *Handbook of North American Indians*, Vol. 11: *Great Basin*, edited by Warren L. D'Azevedo; pp. 183-193. Smithsonian Institution, Washington, D.C.

APPENDIX 1:
PERSONNEL QUALIFICATIONS

PRINCIPAL INVESTIGATOR

Bruce Love, Ph.D., RPA (Register of Professional Archaeologists)

Education

1986	Ph. D., Anthropology, University of California, Los Angeles.
1981	M.A., Anthropology, University of California, Los Angeles.
1976	B.A., Anthropology, University of California, Los Angeles.

1996	"CEQA 101," presented by the Association of Environmental Professionals.
1995	"CEQA Workshop," presented by Association of Environmental Professionals.
1994	"Assessing the Significance of Historic Archaeological Sites," presented by the Historic Preservation Program, University of Nevada, Reno.
1994	"CEQA 1994: Issues, Trends, and Advanced Topics," presented by UCLA Extension.
1990	"Introduction to Federal Projects and Historic Preservation Law," presented by U.S. General Services Administration Training Center.

Professional Experience

1993-	Owner and Principal, CRM TECH, Riverside.
1990-1993	Director, Archaeological Research Unit, UC Riverside; Coordinator, Archaeological Information Center, UC Riverside.
1989-1990	Coordinator, Archaeological Information Center, UCLA.
1987-1990	Owner and Principal, Pyramid Archaeology, Palmdale, California.
1986-1987	Junior Fellow, Dumbarton Oaks Center for Pre-Columbian Research, Washington, D.C.
1981-1986	Part-time cultural resources management consultant; doctoral student at UCLA.

Memberships

Register of Professional Archaeologists.
Association of Environmental Professionals.
American Planning Association.
Society for American Archaeology.
Society for California Archaeology.
Pacific Coast Archaeological Society.
Coachella Valley Archaeological Society.

PROJECT HISTORIAN

Bai "Tom" Tang, M.A.

Education

1988-1993	Graduate Program in Public History/Historic Preservation, UC Riverside.
1987	M.A., American History, Yale University, New Haven, Connecticut.
1982	B.A., History, Northwestern University, Xi'an, China.

2000	"Introduction to Section 106 Review," presented by the Advisory Council on Historic Preservation and the University of Nevada, Reno.
1994	"Assessing the Significance of Historic Archaeological Sites," presented by the Historic Preservation Program, University of Nevada, Reno.

Professional Experience

1993-	Project Historian, CRM TECH, Riverside, California.
1993-1997	Project Historian, Greenwood and Associates, Pacific Palisades, California.
1991-1993	Project Historian, Archaeological Research Unit, UC Riverside.
1990	Intern Researcher, California State Office of Historic Preservation, Sacramento.
1990-1992	Teaching Assistant, History of Modern World, UC Riverside.
1988-1993	Research Assistant, American Social History, UC Riverside.
1985-1988	Research Assistant, Modern Chinese History, Yale University.
1985-1986	Teaching Assistant, Modern Chinese History, Yale University.
1982-1985	Lecturer, History, Xi'an Foreign Languages Institute, Xi'an, China.

Honors and Awards

1988-1990	University of California Graduate Fellowship, UC Riverside.
1985-1987	Yale University Fellowship, Yale University Graduate School.
1980, 1981	President's Honor List, Northwestern University, Xi'an, China.

Cultural Resources Management Reports

Preliminary Analyses and Recommendations Regarding California's Cultural Resources Inventory System (With Special Reference to Condition 14 of NPS 1990 Program Review Report). California State Office of Historic Preservation working paper, Sacramento, September 1990.

Approximately 350 cultural resources management reports with the Archaeological Research Unit, Greenwood and Associates, and CRM TECH, since October 1991.

Membership

California Preservation Foundation.

PROJECT ARCHAEOLOGIST

Michael Hogan, Ph.D.

Education

1991	Ph.D., Anthropology, University of California, Riverside.
1981	B.S., Anthropology, University of California, Riverside.
1980-1981	Education Abroad Program, Lima, Peru.
1992	"Southern California Ceramics Workshop," presented by Jerry Schaefer.
1992	"Historic Artifact Workshop," presented by Anne Duffield-Stoll.

Professional Experience

1999-	Project Archaeologist/Field Director, CRM TECH, Riverside.
1996-1998	Project Director and Ethnographer, Statistical Research, Inc., Redlands.
1992-1995	Project Director, Archaeological Research Unit, University of California, Riverside. • Duties: supervision of all aspects of projects including communicating with clients and/or public agencies to determine appropriate scope of work and scheduling of tasks; arranging logistics, including transportation, food, and lodging; organizing crew people into appropriate tasks and directing field work; overseeing laboratory analysis of findings, including sending samples to outside researchers for analysis and cataloguing/organizing all data recovered by the fieldwork; producing final reports, including background research, description of fieldwork, discussion of study results, preparation of site records, and formulation of final recommendations.
1991-1992	Crew Chief, Archaeological Research Unit, University of California, Riverside.
1984-1998	Part-time technician for various cultural resources management firms, including CRM TECH; Archaeological Research Unit, University of California, Riverside; Cultural Resource Facility, California State University, Bakersfield; Greenwood and Associates; RMW Paleo Associates; and WESTEC Services, Inc.

Publications

Author, co-author, and contributor to more than 35 archaeological publications and CRM reports, including "Yuma Area Office Sediment Project: Contact with Native Americans" (1998), "Early Hunter-Gathers and Historic Settlers along San Sevaine Creek: Data Recovery Efforts at the Hunter's Ridge Community Development Project" (1998), "Continuity and Change: 8,500 Years of Lacustrine Adaptation on the Shores of Lake Elsinore" (1997), and "Historic Properties Management Report for the Whittier Narrows Flood Control Basin" (1997).

PROJECT ARCHAEOLOGIST

Mariam Dahdul, B.A.

Education

2001 (Exp.)	M.A., Anthropology, California State University, Fullerton.
1993	B.A., Geography, California State University, Fullerton.

Professional Experience

2000-	Project Archaeologist, CRM TECH, Riverside.

Laboratory and Field Experience

2001	Archaeological field school under the direction of Dr. Brian Byrd. Test excavations of sites at the San Elijo Lagoon Reserve, including flotation of soil samples and sorting and cataloguing of artifacts.
2000	Archaeological field class under the direction of Dr. Claude Warren. Excavated units at Soda Lake in the Mojave Desert and produced lake bottom stratigraphic profiles.
1999-2000	Assisted in the catalogue and analysis of artifacts at the CSU, Fullerton archaeology laboratory.
1999	Field survey course under the direction of Dr. Phyllisa Eisentraut; surveyed and mapped prehistoric site in the Mojave Desert.

CULTURAL RESOURCES TECHNICAL REPORT

UCR LONG RANGE DEVELOPMENT PLAN

Part 2: Recordation and Evaluation
Canyon Crest Family Student Housing Compound

Submitted to:

Neill Brower, Associate Manager
EIP Associates
12301 Wilshire Boulevard, Suite 430
Los Angeles, CA 90025

Submitted by:

Bruce Love, Principal
Bai "Tom" Tang, Historian
CRM TECH
2411 Sunset Drive
Riverside, CA 92506

February 26, 2002

CRM TECH Contract #627
Section 20, T2S R4W, San Bernardino Base Meridian
USGS Riverside East, Calif., 7.5' quadrangle

State of California--The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

PRIMARY RECORD

Primary #
HRI #
Trinomial
NRHP Status Code 6Z
Other Listings
Review Code **Reviewer** **Date**

Page 1 **of** 5 ***Resource Name or #** (Assigned by recorder)

P1. Other Identifier: Canyon Crest Family Student Housing

***P2. Location:** ____ **Not for Publication** √ **Unrestricted** ***a. County** Riverside
and (P2b and P2c or P2d. Attach a Location Map as necessary.)

***b. USGS 7.5' Quad** Riverside East, Calif. **Date** 1967, photorevised 1980
T2S; **R**4W; NW **1/4 of** SW **1/4 and a portion of** E **1/2 of** NE **1/4 of** SW **1/4 of Sec** 20 ; S.B. **B.M.**
Elevation: Ca. 1,030-1,100 feet above mean sea level

c. Address Various **City** Riverside **Zip** 92507

d. UTM: (Give more than one for large and/or linear resources) **Zone** 11 ;
A: 469510 **mE/** 3760110 **mN**
B: 469910 **mE/** 3760110 **mN**
C: 470100 **mE/** 3759900 **mN**
D: 470100 **mE/** 3759730 **mN**
E: 469510 **mE/** 3759730 **mN**

UTM Derivation: √ USGS Quad ____ GPS

e. Other Locational Data: (e.g., parcel #, directions to resource, etc., as appropriate) Located on the eastern side of Canyon Crest Drive between Blaine Street and Linden Street, approximately 1/4 mile north of the central campus of the University of California, Riverside (UCR)

***P3a. Description:** (Describe resource and its major elements. Include design, materials, condition, alterations, size, setting, and boundaries) The Canyon Crest Family Student Housing compound is owned and operated by the University of California, Riverside, to provide an on-campus residential alternative for, as its name suggests, students with families. Formerly a WWII-era military housing project, the compound consists of some 190 residential structures divided almost evenly between single-unit houses and duplexes (see photos on p. 5). Also located in the compound are three storage/utility buildings, a former day-care facility, and three former residential buildings that have been converted to other uses, including one that houses the KUCR radio station.

All of the houses in the compound are one-story wood-frame structures with stuccoed walls, and in most cases the top portion of the exterior wall surface is further clad with wide clapboards or flush boards. Typical of buildings erected by the U.S. military, their simple design demonstrates much more an emphasis on utilitarianism than the influence of any established architectural style. The rectangular ground plans are essentially identical among the two subtypes, although in a dozen or so duplexes the two units are slightly offset from each other to create a modest variation. The interior living quarters sit upon elevated footings, with the entrances accessed through small stoops built of wood or concrete and flanked by wooden handrails.

While shown to be flat-roofed in historic photographs, the majority of the houses today sport recently installed low-pitch gable roofs with wide eaves, and the remaining flat-roofed specimens have also received wood-framed roof overlays with projecting eaves (see photo on p. 5). Only three structures in the compound still retain the original "box-like" appearance (see photo on p. 5), including the KUCR radio station. The new roofs are covered with composition shingles.

(Continued on p. 2)

State of California--The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
PRIMARY RECORD (Continued)

Primary #
HRI #
Trinomial

Page 2 **of** 5
***Resource Name or #** (Assigned by recorder)

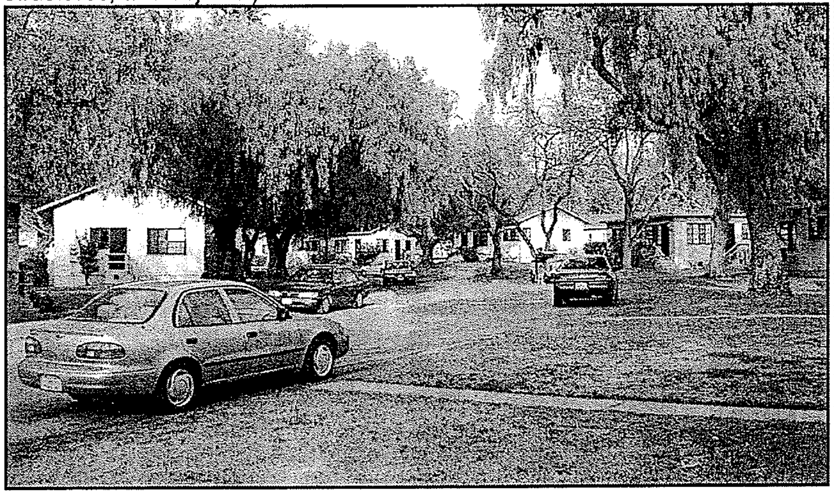
The KUCR radio station and an adjacent duplex, both in the southeastern corner of the compound, have also kept some of the steel-framed casement windows, as has the community center in the southwestern corner. In all other buildings throughout the compound, the windows have been replaced with aluminum-framed sliding sashes, with occasional double-hungs to accommodate window-mounted air conditioning units. The paneled and glazed front doors appear to be original, but are now obscured by steel-framed security doors.

The buildings in the compound are located in a spacious, lawn-covered area of approximately 55 acres. Most are placed along the narrow streets, except for 35 in the eastern portion of the compound that form small "courts" of three to six houses each. The streets are typically lined with mature landscaping trees, mostly pepper. A community park with modern picnic facilities and playground occupies approximately three acres in the west-central portion of the compound. Scattered storage sheds and clotheslines complete the picture of a modest and relaxed residential neighborhood of mid-20th century vintage.

***P3b. Resource Attributes:** (List attributes and codes) HP2—single family property; HP3—multiple family property; HP34—(former) military property

***P4. Resources Present:** ____Building ____Structure ____Object ____Site √ District ____Element of District ____Other (isolates, etc.)

P5a. Photograph or Drawing (Photograph required for buildings, structures, and objects.)



Overview on Idaho Street
(See p. 5 for additional photographs)

P5b. Description of Photo: (view, date, accession #) Photo taken on February 13, 2002; view to the northwest

***P6. Date Constructed/Age of Sources:** √ Historic ____Prehistoric ____Both

***P7. Owner and Address:**
University of California,
Riverside
900 University Avenue
Riverside, CA 92521

***P8. Recorded by:** (Name, affiliation, and address)
Bai "Tom" Tang, CRM TECH
2411 Sunset Drive
Riverside, CA 92506

***P9. Date Recorded:** February 2002

***P10. Survey Type:** Historical resources evaluation

***P11. Report Citation:** (Cite survey report and other sources, or enter "none.") None

***Attachments:** ____None ____Location Map ____Continuation Sheet ____Building, Structure, and Object Record ____Archaeological Record √ District Record ____Linear Resource Record ____Milling Station Record ____Rock Art Record ____Artifact Record ____Photograph Record √ Other (List): Continuation sheet (additional photographs)

State of California--The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
DISTRICT RECORD

Primary #
HRI #
Trinomial

Page 3 **of** 5

***NRHP Status Code** 6Z
***Resource Name or #** (Assigned by recorder)

D1. Historic Name: March Field, Riverside, California, Defense Housing Project

D2. Common Name: Canyon Crest Family Student Housing

***D3. Detailed Description** (Describe overall coherence of the district, its setting, visual characteristics, and minor features. List all elements of district.): See Item P3a on pp. 1-2.

***D4. Boundary Description** (Describe limits of district and attach map showing boundary and district elements.): The compound is bounded on the north by Blaine Street, on the west by Canyon Crest Drive (formerly California Avenue), on the south by Linden Street, and on the east by UCR's corporate yard and a day care center on Watkins Drive.

***D5. Boundary Justification:** The boundaries are established to encompass the physical area occupied by the buildings in the compound.

***D6. Significance: Theme** N/A **Area** N/A
Period of Significance N/A **Applicable Criteria** N/A
(Discuss district's importance in terms of its historical context as defined by theme, period of significance, and geographic scope. Also address the integrity of the district as a whole.)

According to archival records maintained by the University of California, Riverside, and by the County of Riverside, the Canyon Crest Family Student Housing compound was built in 1941 by the U.S. government as a military housing project in association with March Field, now March Air Reserve Base in Moreno Valley (County Recorder 1955; UCR 2000). The army air base was originally established in 1918, and its operations were greatly expanded during WWII.

After the end of the war, like many other wartime military establishments around the country, the "March Field, Riverside, California, Defense Housing Project" was no longer needed by the military. In 1955, a year after the dedication of the University of California's College of Letters and Science in Riverside, regents of the university acquired the compound from the U.S. government (County Recorder 1955).

During its first few years under the university's ownership, prior to the completion of the dormitories, the Canyon Crest compound was used for general student housing (UCR 1958:30). The transition "from Crest to dorms" took place in 1959, after the completion of the nearby Aberdeen-Inverness Residential Hall, the first dormitory building on the UCR campus (UCR 1959:87). By 1960, the compound housed married students, instructors, and other employees (UCR 1960:112-113). Plans were reported in that year for the return of upper-division students to the compound (*ibid.*), but it is unclear whether these plans were ever carried out.

During recent decades, the university renovated almost all of the buildings in the compound. Many of the exterior features observed in the buildings today, including the new roofs, windows, and security doors, resulted from these renovations. Some of them, such as the aluminum-framed windows and steel-framed security doors, were installed some time since the early 1990s, based on photographs taken in that period.

In 1990, LSA Associates, Inc., of Irvine, California, evaluated the historic significance of the compound under the National Register criteria, and concluded that it did not appear eligible for listing in the National Register due to the lack of specific architectural merits and of historic integrity (LSA 1990:22). Since then, the buildings in this compound have been further altered. While the overall setting of the compound and the spatial

(Continued on p. 4)

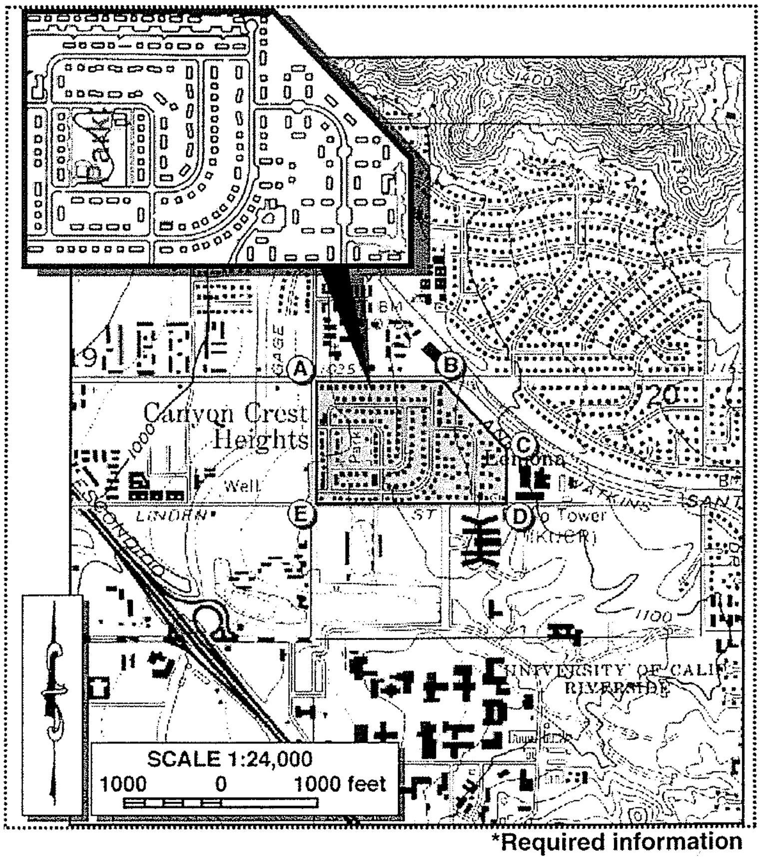
relationships among the buildings apparently remain unchanged, none of the buildings retains sufficient elements from its original appearance to relate to the compound's early history as a military housing project and the first dormitories on the UCR campus.

Based on these considerations, the present study concurs with LSA Associates' 1990 conclusion that the Canyon Crest Family Student Housing compound is not eligible for listing in the National Register of Historic Places, despite its association with the U.S. war efforts in the 1940s and the birth of UCR in the 1950s.

***D7. References** (Give full citations including the names and addresses of any informants, where possible):

County Recorder, Riverside
    1955 Quitclaim Deed: the United States of America to the Regents of the University of California. Microfilm on file, Riverside County Recorder's Office (Book 1760, Page 13), Riverside.
LSA (LSA Associates, Inc.)
    1990 An Inventory and Assessment of Cultural Resources on the Campus of UC Riverside. Appendix D to Environmental Impact Report: Long Range Development Plan, University of California, Riverside. On file, Office of Design and Construction, University of California, Riverside.
UCR (University of California, Riverside)
    1958-1960 *Tartan*. The University of California, Riverside, yearbook.
    2000 Riverside Facilities Management Buildings Biographical Listing. On file, Office of Academic Planning and Budget, University of California, Riverside.

***D8. Evaluator:** Bai "Tom" Tang
Date: February 2002
Affiliation and Address: CRM TECH, 2411 Sunset Drive, Riverside, CA 92506



(This space reserved for official comments.)

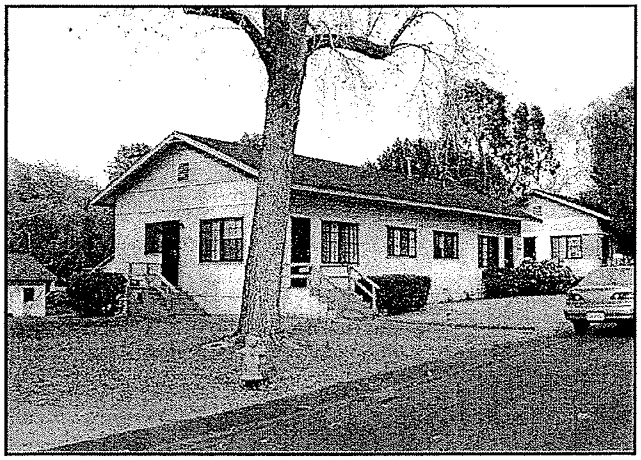
State of California--The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

CONTINUATION SHEET

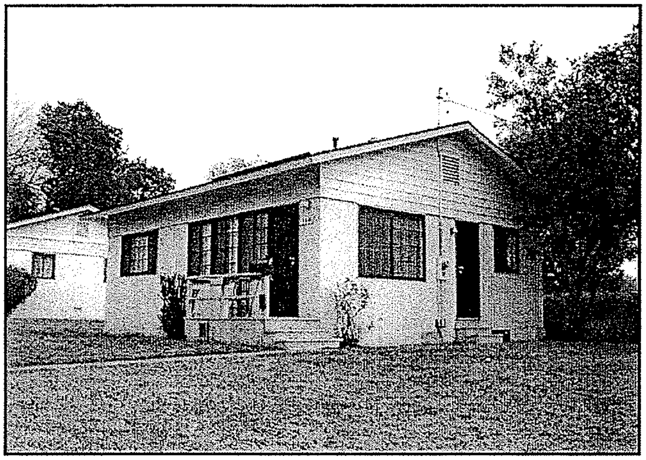
Primary #
HRI #
Trinomial

Page 5 of 5 *Resource Name or # (Assigned by recorder)

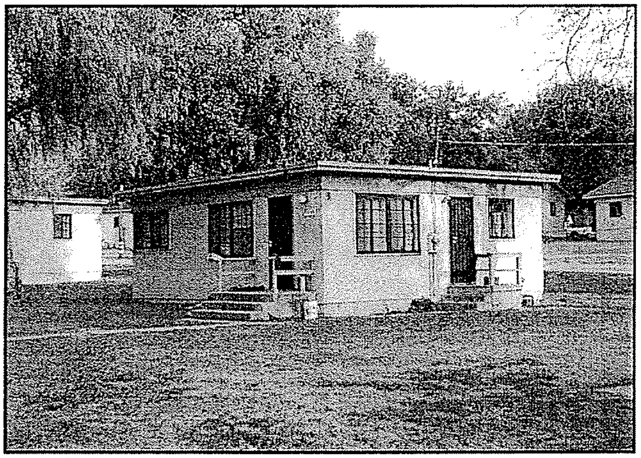
Recorded by Bai "Tom" Tang *Date February 2002 √ Continuation ___ Update



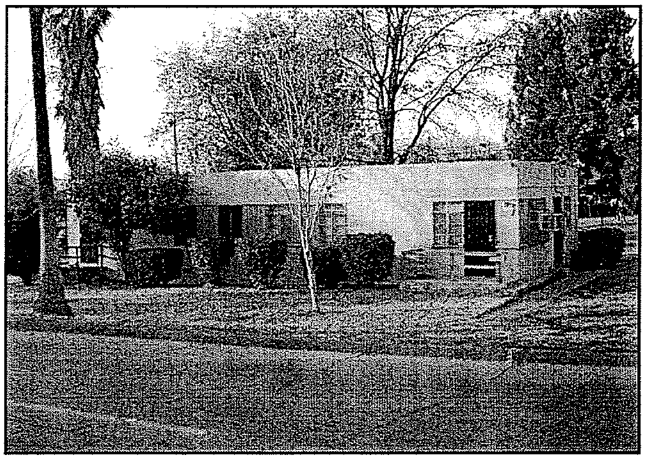
Typical duplex



Typical single-unit house



Flat-roofed specimen



One of the few relatively unaltered buildings in the compound

DPR 523L (1/95) *Required information

Appendix F Geology Technical Appendix

August 31, 2001

EIP Associates
12301 Wilshire Boulevard, Suite 430
Los Angeles, California 90025
Attention: Mr. Neill Brower

Job No. 01335-3

Subject: Existing Conditions - Geology Technical Appendix
EIR for UC Riverside Long-Range Development Plan
Riverside, California

Dear Mr. Brower:

As requested, this report summarizes existing geologic and geotechnical conditions at the campus of the University of California, Riverside. This report is intended to be utilized as a technical appendix to the environmental impact report you are preparing for the Long-Range Development Plan for the campus. The approximate boundaries of the campus are shown on the Index Map included as Enclosure 1.

During preparation of this report, we reviewed published and unpublished references, including numerous geotechnical investigations that we have conducted at the campus. We also reviewed stereoscopic aerial photographs of the campus dating back to 1927. In addition, we conducted a brief geologic field reconnaissance of the campus and vicinity in order to verify existing field conditions. A list of references and a list of aerial photographs reviewed are attached to this report.

GEOLOGIC AND GEOTECHNICAL CONDITIONS

The UCR campus (site) is located in the northwest portion of the Perris Block, which is a portion of the Peninsular Ranges geomorphic province. The Peninsular Ranges province is characterized by northwest-trending mountains separated by northwest-trending faults. The Perris Block is a fault-bounded region of relative tectonic stability, a mass of relatively high land composed of crystalline bedrock thinly and discontinuously mantled by sedimentary material (Woodford and others, 1971). The area of the site is the valley of the Santa Ana River, which is the topographically lowest portion of the Perris Block. The position of the site is a west-sloping alluvial apron located at the west side of the Box Springs Mountains. The Box Springs Mountains are composed of Cretaceous-age granitic rock. This material is exposed at the surface in the southeast portion of the site. A Geologic Index Map (Morton and Cox, 1994) is included as Enclosure 2.

The native geologic materials at the site include, from oldest to youngest, granitic bedrock, older alluvium, and younger alluvium. A significant amount of fill has been placed as a consequence of grading for the campus. Each of these units and pertinent engineering properties is discussed below.

GRANITIC BEDROCK:

The granitic bedrock has been mapped as part of the Val Verde tonalite (Morton and Cox, 1994; Enclosure 2). The bedrock is prominently exposed in steep hillsides in the southeast portion of the campus, southeast of East Campus Drive. These hillsides are a westerly extension of the Box Springs Mountains, located east of the site. The bedrock is locally exposed in a low hill northwest of South Campus Drive, known as Picnic Hill. As observed on the site, the granitic rock is very weathered to relatively fresh with a faint foliation dipping to the northeast. This material generally forms bouldery outcrops where it is exposed in the southeast portion of the site.

The rippability of the on-site bedrock varies dramatically due to the variability of weathering, erosion rates, and jointing. In the areas where hard residual outcrops (corestones) are present, rock that is non-rippable with large equipment (D9 bulldozer or equivalent) can be expected to be encountered at least locally in the very shallow subsurface. Bedrock areas with more uniform weathering and sparse outcrops can be expected to be generally rippable to depths of up to approximately 30 feet. Due to the concentrations of people and sensitive equipment on the campus, blasting or jack hammering of hard bedrock may not be feasible. Excavation methods may be restricted to heavy ripping or vibratory ripping only. Alternatively, proposed grades can be adjusted to avoid the need for heavy ripping of bedrock.

The rippability (and trenchability) of bedrock for specific projects should be evaluated on a site-specific basis with seismic refraction surveys and/or drilling.

OLDER ALLUVIUM:

Most of the site is a distinctive, elevated geomorphic surface underlain by older alluvium. The geomorphic surface is a relatively ancient feature that represents the valley floor as it existed during late Pleistocene time (greater than 11,000 years ago). During Holocene time, this former valley floor was abandoned and incised, resulting in its current, slightly elevated landscape position relative to active washes, including University Wash and Box Springs Arroyo.

The older alluvium generally consists of sands and silty sands, typically with minor to moderate amounts of clay in surficial horizons (upper 2 to 5 feet). The clay content in the upper soils is a result of a long period of in-situ weathering and consequent formation of an argillic soil profile in silty parent materials. The clay content imparts a reddish-brown color to the older alluvium. Studies in Southern California and the Central Valley have shown that the development of an argillic soil profile in alluvium derived from granitic rocks requires a very long period of subaerial exposure, on the order of 15,000 years or more. The argillic soils are generally less developed or absent where the parent materials are relatively clean coarse sands.

Except for the upper weathered and disturbed materials, the older alluvium is generally well consolidated, typically in a medium dense to dense condition and generally suitable for support of structures. Localized areas on the site have been found to include less dense strata and lenses of older alluvium that are prone to collapse when subjected to a surcharge load and inundated with water (hydroconsolidation). Depending on the type of structure and the proposed grading, these collapsible soils may need to be removed and recompacted or avoided with the use of deep foundations (piles).

YOUNGER ALLUVIUM:

The elevated geomorphic surface has been incised by recent west-flowing stream channels that are partially in-filled with younger alluvium and fill. These drainages include University Wash, comprised of several tributaries in the northeast portion of the campus. These tributaries meet and form one large wash along the north side of North Campus Drive. The younger alluvium is typically sandy. Soil development in this material is weak to nonexistent due to its very young age. This material is often very porous and riddled with rodent burrows.

Consolidation testing conducted on samples of the younger alluvium indicate that it is subject to significant compressibility and a high potential for hydroconsolidation. The younger alluvium has been found to extend to depths of at least 50 feet below ground surface in the drainages. This material is considered unsuitable for support of structures and may need to be removed and recompacted or avoided with the use of deep foundations (piles). Enclosure 3 (Selected Geologic Hazards Map) shows the general distribution of these younger alluvial soils on the campus.

FILL:

Significant amounts of fill exist on the campus associated with previous grading for structures and roads. Most of these fills are undocumented fills placed many years ago, typically placed without the compaction effort and documentation that is currently required under modern building codes. Investigations on the site have shown great variability in the density and compressibility of these fills. As such, all of the undocumented fills on campus are considered to be unsuitable for support of structures.

USDA SOILS CONDITIONS

The U.S. Department of Agriculture (Knecht, 1971) has identified two broad groups of soil types, known as soil associations, at the site. These soil associations correspond closely to the geomorphology (landscape position) at the campus.

The Cieneba - Rock land - Fallbrook association corresponds to the steeper bedrock areas on the southeast portion of the campus and consist of "well-drained and somewhat excessively drained, undulating to steep, very shallow to moderately deep soils that have a surface layer of sandy loam and fine sandy loam" (Knecht, 1971).

The flatter alluvial areas of the site, comprising most of the campus, consist of the Monserate - Arlington - Exeter association. These soils are characterized as "well-drained, nearly level to moderately steep soils that have a surface layer of sandy loam to loam and are shallow to deep to a hardpan" (Knecht, 1971).

A copy of the USDA soils mapping for the site is included as Enclosure 4 (Knecht, 1971). This soils mapping includes a detailed breakdown of soils types on the basis of grain sizes, structures, slope angles and numerous other characteristics. The soils are classified by series, which are designated based on a type locality in California. The soils mapping also includes classification as to the limitations for various applications of the soils, including agricultural uses. The following table summarizes the soils classifications with respect to agricultural uses.

TABLE 1
SOIL CLASSIFICATIONS - AGRICULTURAL USES

Capability Class	Description
Class I	Soils have few limitations that restrict their use.
Class II	Soils have moderate limitations that reduce the choice of plants or that require moderate conservation practices.
Class III	Soils have severe limitations that reduce the choice of plants, require special conservation practices, or both.
Class IV	Soils have very severe limitations that reduce the choice of plants, require very careful man-agement, or both.
Class V	Soils are not likely to erode, but have other limitations, impractical to remove, that limit their use largely to pasture or range, woodland, or wildlife habitat.
Class VI	Soils have severe limitations that make them generally unsuited to cultivation and limit their use largely to pasture or range, woodland, or wildlife habitat.
Class VII	Soils have very severe limitations that make them unsuited to cultivation and that restrict their use largely to pasture or range, woodland, or wildlife habitat.
Class VIII	Soils and landforms have limitations that preclude their use for commercial plants and restrict their use to recreation, wildlife habitat, water supply, or to aesthetic purposes.
Subclasses	**Description**
e	Main limitation is erosion risk
c	Main limitation is coldness or dryness
- 1	Indicates an actual or potential erosion hazard
- 8	Limitation of root penetration due to bedrock or hardpan

Source: Knecht (1971)

The hillside areas of the site include the Cieneba series and the Vista series. These are minimally developed and relatively thin soils developed on weathered granitic rocks. Both soils have severe limitations for agricultural uses, with Cieneba soils in capability class VIIe-1 dryland, and Vista soils in capability class VIe-1 dryland.

The flatter alluvial fan areas of the site include the Hanford, Arlington, Buren, Madera, and Monserate series. These series develop on alluvial fans derived entirely or mostly from erosion of granitic rocks.

The Hanford series and the Arlington series comprise most of the west campus area, including soils that are currently utilized for agricultural purposes by the University. The Hanford soils are relatively thin and moderately developed. The Hanford soils at the site are in capability class IIe-1 irrigated, IVec-1 dryland, and I-1 irrigated. The Arlington soils are well developed and thicker, and include an argillic horizon. The Arlington soils are in capability class IIIe-8 irrigated and IIe-1 irrigated.

The east campus is comprised mainly of the Arlington, Hanford, Buren, and Monserate soils. The Buren series is relatively thick and well developed, with an argillic horizon and a calcic (hardpan) layer. The Buren soils are in capability class IIIe-8 irrigated and I'VE-8 irrigated. The Monserate series are similar to the Buren soils in that they are relatively thick and well developed, with an argillic horizon and an iron and silica cemented hardpan layer. The Monserate soils are in capability class IIIe-8 irrigated, I'VE-8 irrigated, and VIe-8 dryland.

FAULTING

The tectonics of the Southern California area are dominated by the interaction of the North American Plate and the Pacific Plate, which are apparently sliding past each other in a transform motion. Although some of the motion may be accommodated by rotation of crustal blocks such as the western Transverse Ranges (Dickinson, 1996), the San Andreas fault zone is thought to represent the major surface expression of the tectonic boundary and to be accommodating most of the transform motion between the Pacific Plate and the North American Plate. However, some of the plate motion is apparently also partitioned out to the other northwest-trending, strike-slip faults that are thought to be related to the San Andreas system, such as the San Jacinto fault and the Elsinore fault. Local compressional or extensional strain resulting from the transform motion along this boundary is accommodated by left-lateral, reverse, and normal faults such as the Cucamonga fault, the Crafton Hills fault zone, and the blind thrust faults of the Los Angeles Basin (Matti and others, 1992; Morton and Matti, 1993).

No portion of the site is included within an Alquist-Priolo Earthquake Fault Zone designated by the State of California to include traces of suspected active faulting. No evidence of active faulting on or immediately adjacent to the site was observed on the aerial photographs reviewed, in the published literature reviewed or during the geologic field reconnaissance.

The Box Springs fault is shown by Rogers (1966) as a buried trace beneath Pleistocene-age alluvium approximately coincident with the northeast corner of the site. This fault is named for its barrier effect on the southward movement of groundwater, forming springs along the southwest margin of the Box Springs Mountains. Although this fault is readily visible as a bedrock feature southeast of the site, it is not expressed in Pleistocene-age alluvium and is considered to be inactive.

The San Jacinto fault zone, a system of northwest-trending, right-lateral, strike-slip faults, is present across the San Jacinto Valley and through the San Timoteo Badlands, approximately 6 miles northeast of the site. The San Jacinto fault is the closest known active fault to the site and is considered to be the most important fault to the site with respect to the hazard of seismic shaking. More large historic earthquakes have occurred on the San Jacinto fault than any other fault in Southern California (Working Group on California Earthquake Probabilities, 1988).

Based on the data of Matti and others (1992), the portion of the San Jacinto fault adjacent to the site may be accommodating much of the motion between the Pacific Plate and the North American Plate in this area. Matti and others (1992) suggest this motion is transferred to the San Andreas fault in the Cajon Pass region by "stepping over" to parallel fault strands which include the Glen Helen fault. The Working Group on California Earthquake Probabilities (1995) tentatively assigned a 43 percent (±17 percent) probability of a major earthquake on the San Jacinto Valley segment of the San Jacinto fault for the 30 year interval from 1994 to 2024.

The San Andreas fault zone is located along the southwest margin of the San Bernardino Mountains, approximately 14 miles northeast of the site. The toe of the mountain front in the San Bernardino area roughly demarcates the presently active trace of the San Andreas fault, which is characterized by youthful fault scarps, vegetational lineaments, springs, and offset drainages. The Working Group on California Earthquake Probabilities (1995) tentatively assigned a 28 percent (±13 percent) probability to a major earthquake occurring on the San Bernardino Mountains segment of the San Andreas fault between 1994 and 2024.

The southern margin of the San Gabriel Mountains is coincident with a series of east-west trending, predominantly reverse and thrust faults known as the Transverse Ranges frontal fault system. The San Fernando fault of this system ruptured during the 1971 magnitude (**M**) 6.7 San Fernando earthquake. The Cucamonga fault of this system is located at the base of the San Gabriel Mountains, approximately 16 miles northwest of the site. Evidence of recent activity on this fault includes fresh scarps, sag ponds, and disrupted Holocene alluvium (Dutcher and Garrett, 1963; Yerkes, 1985; Morton and Yerkes, 1987).

The Elsinore fault zone is present approximately 18 miles southwest of the site. The Elsinore fault zone is composed of multiple *en echelon* and diverging fault traces and splays into the Whittier and Chino faults to the north. Although a zone of overall right-lateral deformation consistent with the regional plate tectonics, traces of the Elsinore fault zone form the graben of the Elsinore and Temecula Valleys. Holocene surface rupture events have been documented for several principal strands of the Elsinore fault zone (Saul, 1978; Rockwell and others, 1986; Wills, 1988).

HISTORICAL EARTHQUAKES

A map of recorded earthquake epicenters is included as Enclosure 5 (Epi Software, 2000). The epicenters and magnitudes that are shown are based on data from recording instruments in the CalTech database. This enclosure presents circles as epicenters of earthquakes with $\mathbf{M_L}$ equal to or greater than 4.0 that were recorded from 1977 through July 2001.

The San Jacinto fault is the most seismically active fault in Southern California, although it has no record of producing great events comparable to those that occurred on the San Andreas fault during the Fort Tejon earthquake of 1857 and the San Francisco earthquake of 1906 (Working Group on California Earthquake Probabilities, 1988). Between 1899 and 1990, seven earthquakes of **M** 6 .0 or greater have occurred along the San Jacinto fault. Two of these earthquakes, an estimated **M** 6.7 1 in 1899 and a **M** 6.8 in 1918, took place in the San Jacinto Valley, east of the site. Two others, an estimated **M** 6.5 in 1899 and a **M** 6.2 in 1923, took place in the San Bernardino Valley, north of the site (Working Group on California Earthquake Probabilities, 1988).

The only large historical earthquake that can definitely be attributed to the Elsinore fault was a **M** 6.0 event in 1910 in the Temescal Valley area. This event caused damage to structures from Corona to Wildomar (Weber, 1977). Since 1932, four **M** 4.0+ earthquakes have occurred along the Elsinore fault zone in the Santiago Peak area (Weber, 1977).

No large earthquakes have occurred on the San Bernardino Mountains segment of the San Andreas fault within the regional historical time frame. Using dendrochronological evidence, Jacoby and others (1987) inferred that a great earthquake on December 8, 1812 ruptured the northern reaches of this segment. Recent trenching studies have revealed evidence of rupture on the San Andreas fault at Wrightwood occurred within this time frame (Fumal and others, 1993). Comparison of rupture events at the Wrightwood and Pallett Creek, and analysis of reported intensities at the coastal missions, led Fumal and others (1993) to conclude that the December 8, 1812 event ruptured the San Bernardino Mountains segment of the San Andreas fault largely to the southeast of Wrightwood, possibly extending into the San Bernardino Valley.

Surface rupture occurred on the Mojave segment of the San Andreas fault in the great 1857 Fort Tejon earthquake. The Coachella Valley segment of the San Andreas fault was responsible for the

1948 **M** 6.5 earthquake in the Desert Hot Springs area and for the 1986 **M** 5.6 earthquake in the North Palm Springs area.

No significant historical earthquakes have been specifically attributed to the Box Springs fault or the Cucamonga fault in the general area of the site.

SEISMIC ANALYSIS

The precise relationship between magnitude and recurrence interval of large earthquakes for a given fault is not known due to the relatively short time span of recorded seismic activity. As a result, a number of assumptions must be made to quantify the ground shaking hazard at a particular site. Seismic hazard evaluations can be conducted from both a probabilistic and a deterministic standpoint. The probabilistic method is prescribed by current codes and was utilized to estimate the seismic hazard to the site during this investigation.

PROBABILISTIC HAZARD ANALYSIS:

The probabilistic analysis of seismic hazard is a statistical analysis of seismicity of all known regional faults attenuated to a particular geographic location. The results of a probabilistic seismic hazard analysis are presented as the annual probability of exceedance of a given strong motion parameter for a particular exposure time (Johnson and others, 1992).

For this report, the probabilistic analysis computer program FRISKSP (Blake, 2000) was used to analyze the location of the site under the criteria for alluvial sites by three current attenuation relations (Campbell, 1997, 2000; Boore and others, 1997; and Abrahamson and Silva, 1997) in relation to seismogenic faults within a 62-mile (100 km) radius of the site. The fault database utilized is published by the California Division of Mines and Geology (Petersen and others, 1998). The FRISKSP program assumes that significant earthquakes occur on mappable faults and that the occurrence rate of earthquakes on a fault is proportional to the estimated slip rate of that fault.

Potential earthquake magnitudes are correlated to expected fault rupture areas and the resultant maximum ground acceleration at the site is computed. From the summation of the accelerations from all the potential sources, the total average annual expected number of occurrences of an acceleration greater than each of the values requested is calculated (Blake, 1998). The resultant graphs of probability of exceedance vs. acceleration indicate that an average peak horizontal ground acceleration of 0.62g has a 10 percent probability of exceedance in 50 years. This corresponds to the Design Basis Earthquake as defined in the California Building Code (1998) and has a statistical return period of 475 years. The Design Basis Earthquake applies to most commercial and residential structures and is the design earthquake that is typically utilized at the site.

GROUNDWATER AND LIQUEFACTION

Static or perched groundwater has generally not been encountered in exploratory borings drilled on the site to depths of up to approximately 100 feet below ground surface. Based on review of depth to groundwater data from a well located on or near the southeast portion of the site (State Well No. T2S/R4W 29M01S) available from Western Municipal Water District (2000), the current depth to groundwater beneath the site is expected to be generally greater than 50 feet. Groundwater contour mapping conducted by Carson and Matti (1982) utilizing data from the years spanning 1973 to 1979, indicates a minimum depth to groundwater of 75 to 150 feet below the ground surface.

Liquefaction is a process in which strong ground shaking causes saturated soils to lose their strength and behave as a fluid (Matti and Carson, 1991). Ground failure associated with liquefaction can result in severe damage to structures. The geologic conditions for increased susceptibility to liquefaction are: 1) shallow groundwater (less than 50 feet in depth; 2) presence of unconsolidated sandy alluvium, typically Holocene in age; and 3) strong ground shaking. All three of these conditions must be present for liquefaction to occur. Based upon the known geotechnical data, only one of the three geologic conditions for increased liquefaction susceptibility (strong ground shaking) is expected to exist on the site. The older alluvium and bedrock at the site are considered to be non-liquefiable regardless of groundwater depth.

Some potential exists for groundwater to perch above relatively impermeable interfaces, such as the top of bedrock or fine-grained alluvial beds in the older or younger alluvium. Application of landscape water on site can be expected to aggravate perched groundwater conditions. Landscape water application should be limited to the amount actually necessary for sustained plant growth.

FLOODING AND EROSION

No evidence of significant flooding of the site was observed during our geologic field reconnaissance or on the aerial photographs reviewed. The on-site drainages have sustained surface flows in the past during periods of precipitation and may include surface flows in the future.

University Wash is included within the boundaries of the 100-year flood plain as shown by the Riverside County Safety Element (1976).

SLOPE STABILITY

The alluvial materials and bedrock at the site are generally massive, with no weak planar structures developed that could trigger a large deep-seated landslide. These materials are considered to have a very low susceptibility to deep-seated landsliding. No evidence for deep-seated landsliding at the site was found during this investigation or during numerous previous geotechnical investigations by this firm on the site. The natural slopes have a very low potential for deep-seated landsliding. Some potential for landsliding could exist where a large oversteepened cut slope is created that exposes adversely dipping bedding, jointing, or a pre-existing landslide.

The alluvial materials and surficial soils developed on bedrock have a very high susceptibility to erosion and surficial failure, particularly when runoff is concentrated onto slopes. Remnants of oversteepened natural slopes in the alluvium exist along the sidewalls of the on-site drainages, including University Wash. These steep natural slopes have a high potential for surficial failure, particularly when runoff is not properly controlled.

The on-site bedrock generally weathers to large rounded outcrops. This weathering pattern is, in part, a result of the intersection of at least two regularly spaced fracture sets (joints) developed in the bedrock of the Box Springs Mountains. Numerous rounded bedrock outcrops are present on the bedrock hillside above East Campus Drive. While the majority of these outcrops are considered to be stable with respect to rockfall hazard, even in the event of strong seismic shaking, a large number of potentially unstable boulders were observed on the slopes above the site. These precarious boulders could become dislodged during the course of normal weathering processes, but they are more likely to roll downhill in response to a large earthquake in the region or as a result of grading in the hillside. The potential rockfall hazard area is shown on the Selected Geologic Hazards Map (Enclosure 3), and generally corresponds to the area of steep bedrock outcrops in the southeast portion of the site.

CONCLUSIONS

Most of the campus is underlain by older alluvium that is generally well consolidated, typically in a medium dense to dense condition, and generally suitable for support of structures. Localized areas on the site have been found to include less dense strata and lenses of older alluvium that are prone to collapse when subjected to a surcharge load and inundated with water (hydroconsolidation). Depending on the type of structure and the proposed grading, these collapsible soils may need to be removed and recompacted or avoided with the use of deep foundations (piles).

The southeast portion of the site is underlain by dense and nearly incompressible granitic bedrock. The rippability of the on-site bedrock varies dramatically due to the variability of weathering, erosion rates, and jointing. In the areas where hard residual outcrops (corestones) are present, rock that is non-rippable with large equipment (D9 bulldozer or equivalent) can be expected to be encountered at least locally in the very shallow subsurface. Bedrock areas with more uniform weathering and sparse outcrops can be expected to be generally rippable to depths of up to approximately 30 feet.

The drainage areas on the site include younger alluvium. This material is subject to significant compressibility and a high potential for hydroconsolidation. This material is considered unsuitable for support of structures and may need to be removed and recompacted or avoided with the use of deep foundations (piles).

Significant amounts of fill exist on the campus associated with previous grading for structures and roads. Most of these fills are undocumented fills placed many years ago, typically placed without the compaction effort and documentation that is currently required under modern building codes. As such, all of the undocumented fills on campus are considered to be unsuitable for support of structures.

The hillside areas of the site include the Cieneba series and the Vista series. These are minimally developed and relatively thin soils developed on weathered granitic rocks. Both soils have severe limitations for agricultural uses.

The Hanford series and the Arlington series comprise most of the west campus area, including soils that are currently utilized for agricultural purposes by the University. Both of these soils have few limitations for agricultural uses.

The east campus is comprised mainly of the Arlington, Hanford, Buren, and Monserate soils. These soils generally have few to moderate limitations for agricultural uses.

No evidence of active faulting on or immediately adjacent to the site was observed during the geologic field reconnaissance or on the aerial photographs reviewed.

Moderate to severe seismic shaking of the site can be expected during the lifetime of the proposed development.

The lack of shallow static groundwater generally precludes liquefaction as a hazard at the site.

Localized perched groundwater conditions may occur at the site. These conditions could be aggravated by landscape irrigation.

No evidence of significant flooding of the site was observed during our geologic field reconnaissance or on the aerial photographs reviewed. The on-site drainages have sustained surface flows in the past during periods of precipitation and may include surface flows in the future. University Wash is included within the boundaries of the 100-year flood plain as shown by the Riverside County Safety Element (1976).

No evidence for landsliding on or immediately adjacent to the site was observed during the geologic field reconnaissance or on the aerial photographs reviewed.

Rockfalls are a potential hazard to areas coincident with, or immediately downslope of, the steep bedrock areas in the southeast portion of the site.

CLOSURE

We appreciate this opportunity to be of service and trust this information is as requested. If you should have any questions, please feel free to contact this firm at your convenience.

Respectfully submitted,
C.H.J., INCORPORATED

Jay J. Martin, E.G. 1529
Senior Geologist

Robert J. Johnson, G.E. 443
Senior Vice President

JJM/RJJ:jm

Enclosures: 1 - Index Map
2 - Geologic Index Map
3 - Selected Geologic Hazards Map
4 - USDA Soils Index Map
5 - Earthquake Epicenter Map

Distribution: EIP Associates (6)

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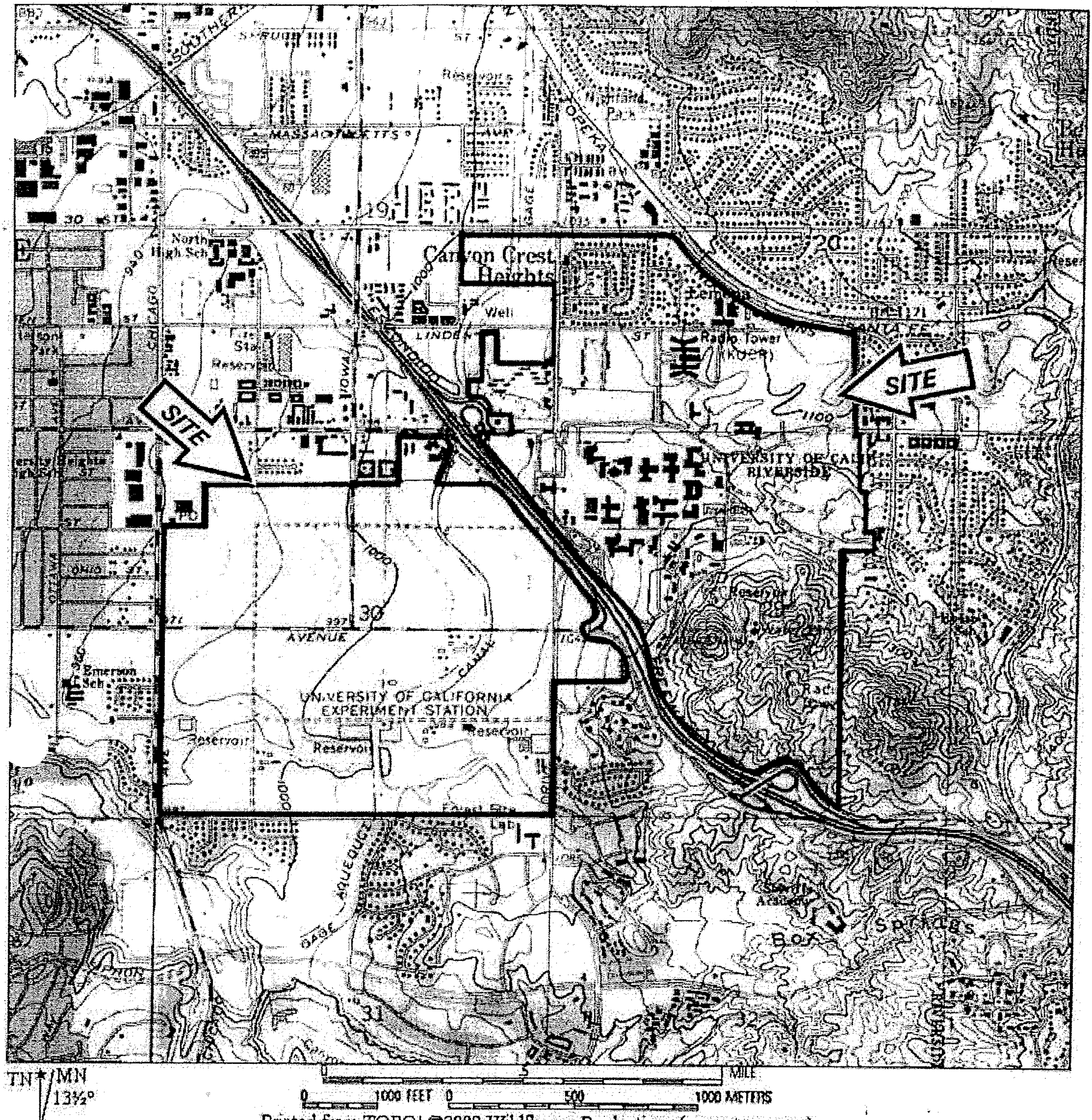

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INDEX MAP

FOR:
EIP ASSOCIATES

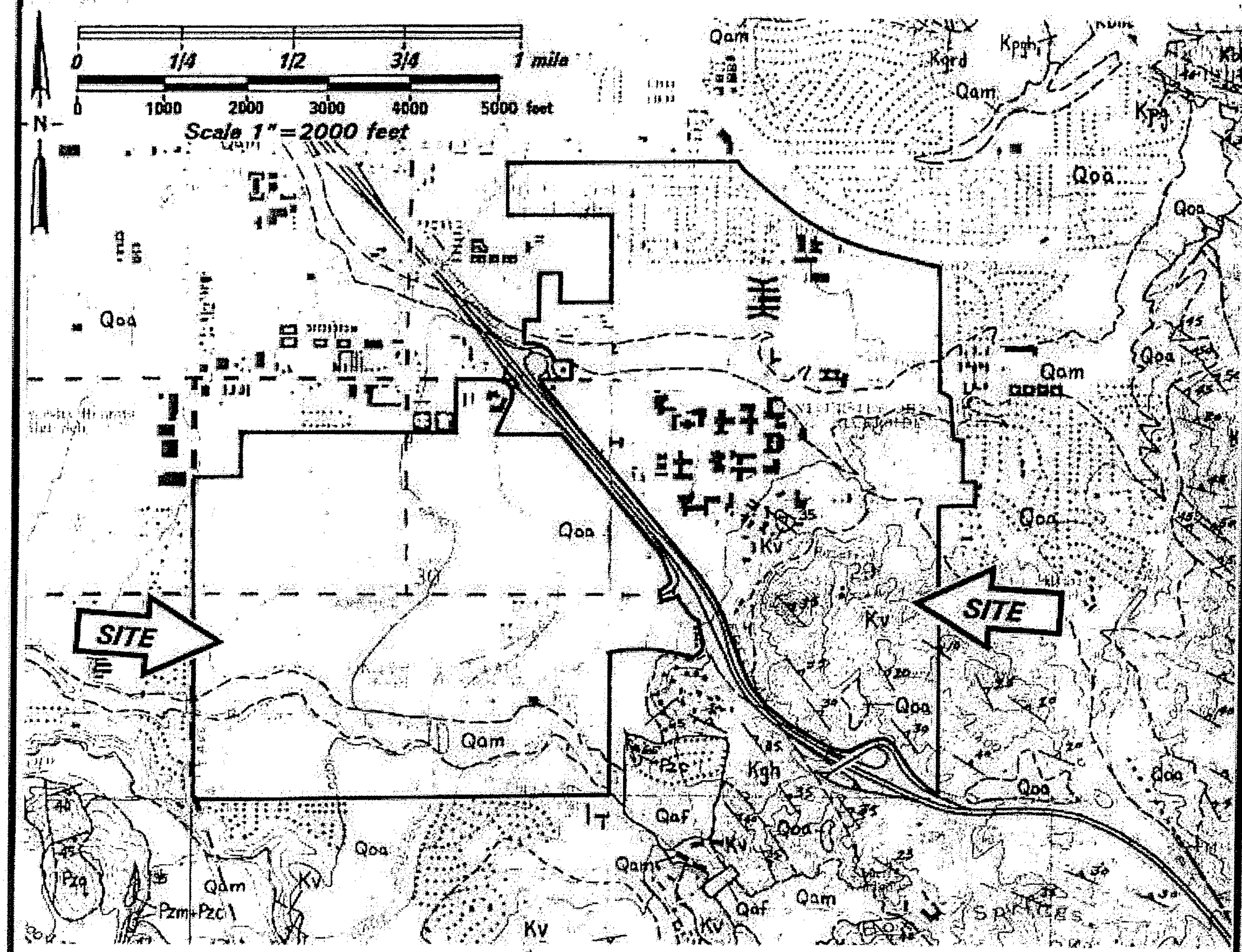
E: AUGUST 2001

EIR FOR LONG-RANGE DEVELOPMENT PLAN
UNIVERSITY OF CALIFORNIA, RIVERSIDE
RIVERSIDE, CALIFORNIA

ENCLOSURE
1

JOB NUMBER
01335-3

C.H.J., INCORPORATED



Legend:

Qaf	Artificial fill (Holocene)
Qam	Alluvium of minor streams (Holocene)
Qoa	Older alluvium (Pleistocene)
Kgh	Heterogeneous plutonic rocks
Kv	Val Verde tonalite of Osborn (1939)
Pzc	Calc-silicate hornfels

85

Contact- Dashed where approximately located. Arrows indicate dip

60 ▷ *Strike and dip of inclined foliation*

Base Map: D.M. Morton and B.F. Cox (1994)

GEOLOGIC INDEX MAP

FOR:
EIP ASSOCIATES

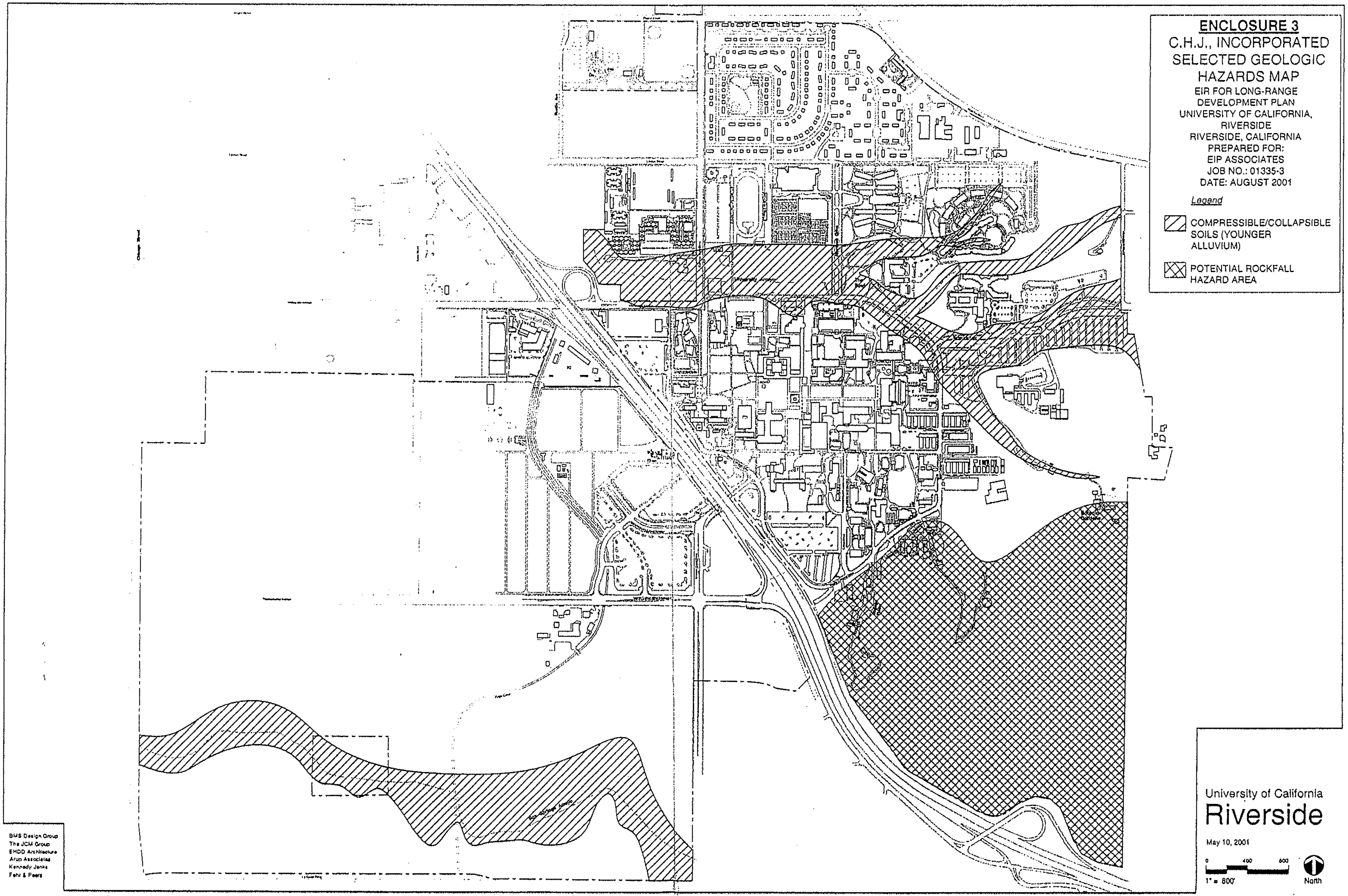
EIR FOR LONG-RANGE DEVELOPMENT PLAN
UNIVERSITY OF CALIFORNIA, RIVERSIDE
RIVERSIDE, CALIFORNIA

ENCLOSURE
2

DATE: AUGUST 2001

JOB NUMBER
01335-3

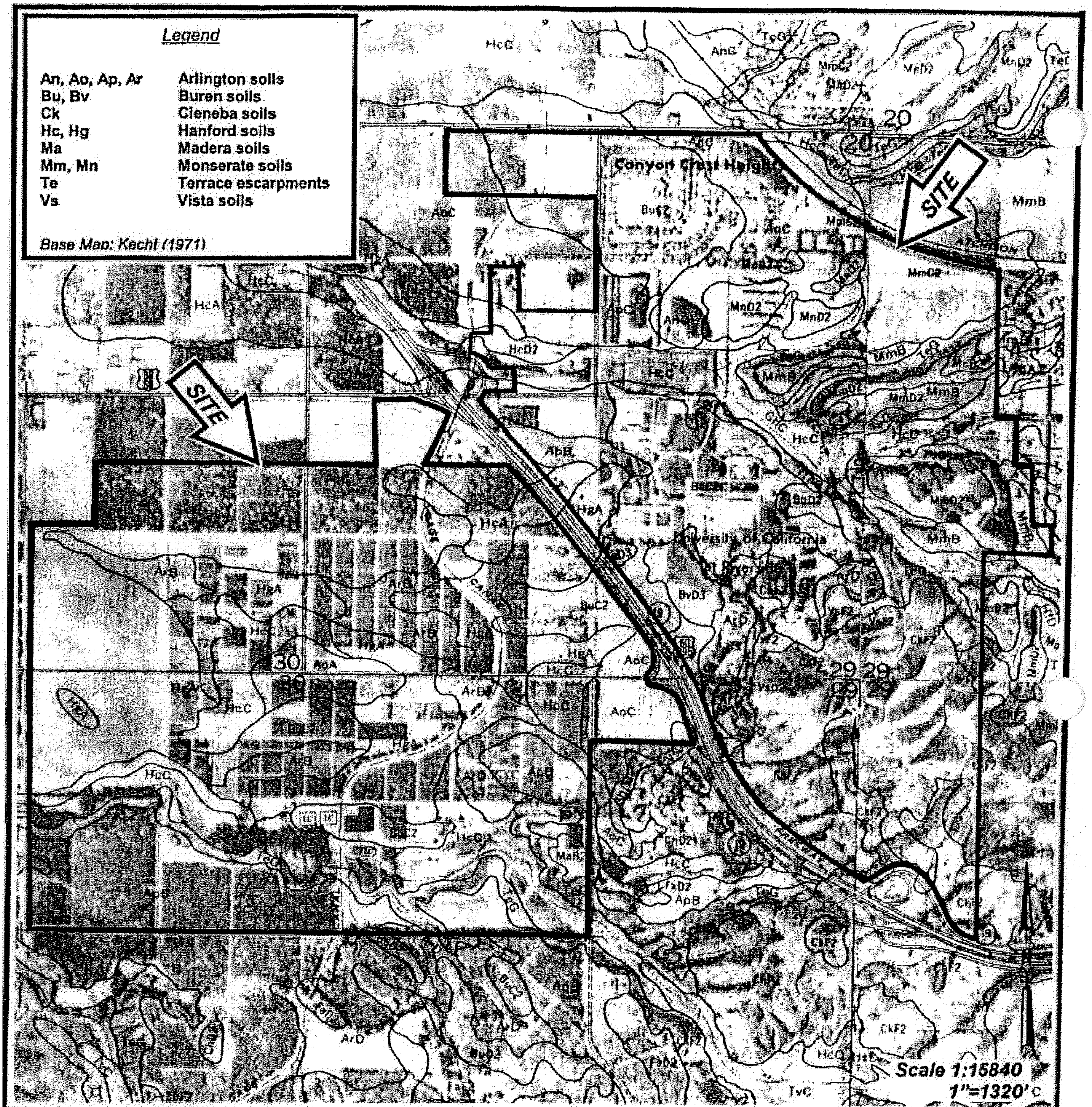
C.H.J., INCORPORATED



ENCLOSURE 3

C.H.J., INCORPORATED SELECTED GEOLOGIC HAZARDS MAP

EIR FOR LONG-RANGE
DEVELOPMENT PLAN
UNIVERSITY OF CALIFORNIA,
RIVERSIDE
RIVERSIDE, CALIFORNIA
PREPARED FOR:
EIP ASSOCIATES
JOB NO.: 01335-3
DATE: AUGUST 2001



Legend

An, Ao, Ap, Ar	Arlington soils
Bu, Bv	Buren soils
Ck	Cieneba soils
Hc, Hg	Hanford soils
Ma	Madera soils
Mm, Mn	Monserate soils
Te	Terrace escarpments
Vs	Vista soils

Base Map: Kecht (1971)

Scale 1:15840
1"=1320'

USDA SOILS INDEX MAP

FOR:
EIP ASSOCIATES

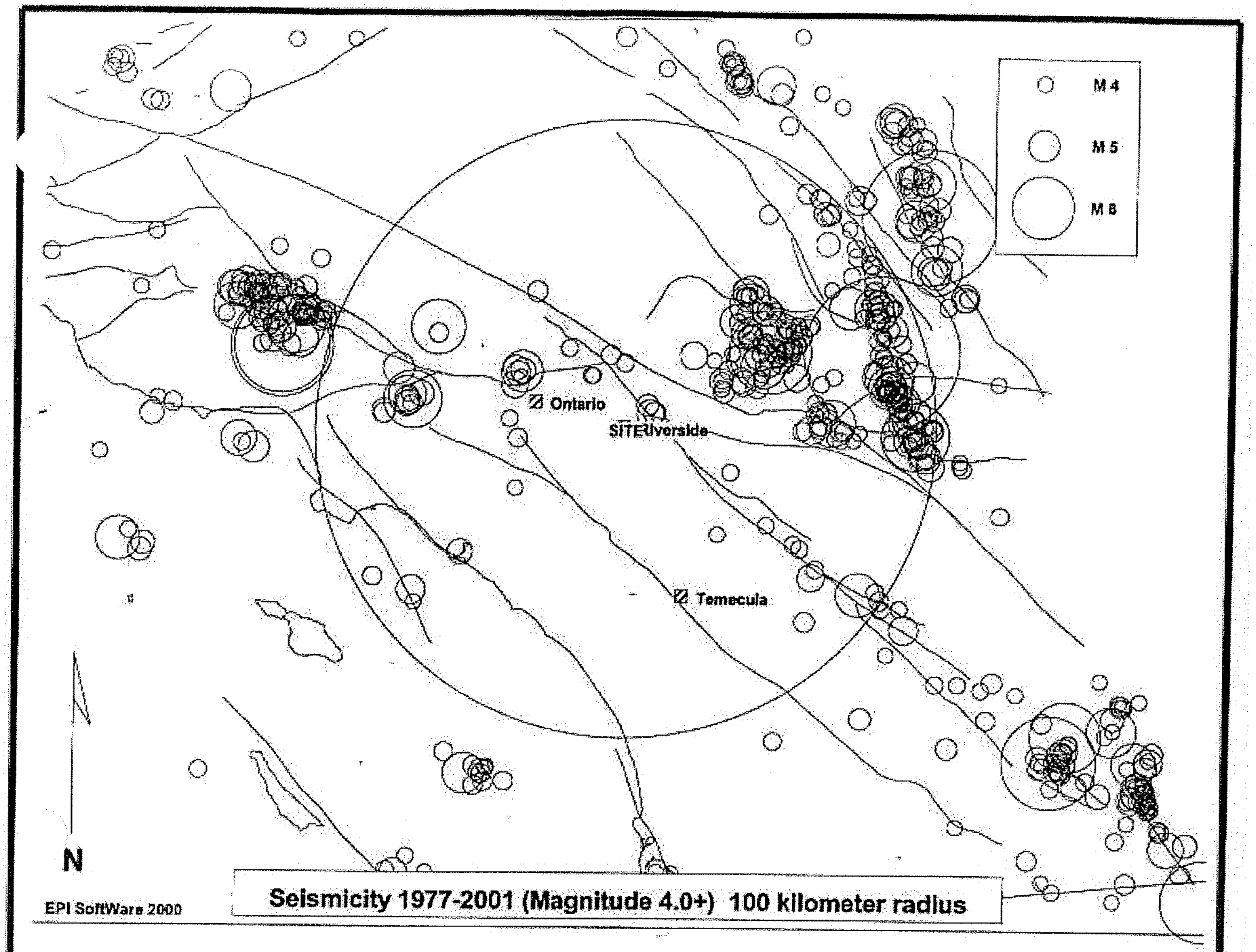
DATE: **AUGUST 2001**

EIR FOR LONG-RANGE DEVELOPMENT PLAN
UNIVERSITY OF CALIFORNIA, RIVERSIDE
RIVERSIDE, CALIFORNIA

ENCLOSURE
4

JOB NUMBER
01335-3

C.H.J. INCORPORATED



EPI SoftWare 2000

Seismicity 1977-2001 (Magnitude 4.0+) 100 kilometer radius

SITE LOCATION: 33.972 LAT. -117.331 LONG.

MINIMUM LOCATION QUALITY: C

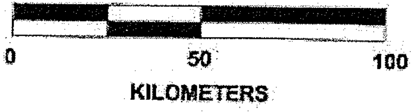
TOTAL # OF EVENTS ON PLOT: 558

TOTAL # OF EVENTS WITHIN SEARCH RADIUS: 259

MAGNITUDE DISTRIBUTION OF SEARCH RADIUS EVENTS:

4.0- 4.9 : 229
5.0- 5.9 : 27
6.0- 6.9 : 2
7.0- 7.9 : 1
8.0- 8.9 : 0

CLOSEST EVENT: 4.8 ON WEDNESDAY, OCTOBER 02, 1985 LOCATED APPROX. 10 KILOMETERS NORTHEAST OF THE SITE



EARTHQUAKE EPICENTER MAP

FOR:
EIP ASSOCIATES

E: AUGUST 2001

EIR FOR LONG-RANGE DEVELOPMENT PLAN
UNIVERSITY OF CALIFORNIA, RIVERSIDE
RIVERSIDE, CALIFORNIA

ENCLOSURE
5

JOB NUMBER
01335-3

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Appendix G Hydrologic Analysis of Peak Runoff Conditions

Hydrologic Analysis of Peak Runoff Conditions for the UCR Year 2002 Long Range Development Plan (LRDP)

Prepared for

The University of California at Riverside

Prepared by

Philip Williams & Associates, Ltd.

July 31, 2002

PWA Ref. 1418.01

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1. INTRODUCTION

This report presents finding from a peak discharge hydrologic analysis performed for The University of California at Riverside (UCR). This analysis was conducted to support the current Year 2002 Long Range Development Plan (LRDP). More specifically, this report addresses how potential land use changes will affect peak runoff conditions across campus. The standard Rational Method, as described in the Riverside County Flood Control and Water Conservation District's (RCFCWD) Hydrology Manual, was used, in conjunction with a spatial GIS database, to compare existing and future peak runoff rates for individual campus parcels.

Section 2 of this report presents the data sources used in developing the project GIS framework. Section 3 describes the standard Rational Method and provides a brief discussion of certain limitations in using this type of peak discharge approach. In Section 4, results for existing and future hydrologic conditions are presented and compared. This report concludes with a discussion of future tasks that could be undertaken to further assist the campus planning effort.

2. DATA SOURCES

A number of informational resources were collected and processed to provide input for the peak runoff hydrologic analysis. Project data were compiled into a spatial database by thematic type (coverages) using ArcView GIS software. Several maps, provided by The University of California at Riverside (UCR), were used to represent existing and future land use conditions associated with the Long Range Development Plan (LRDP). These campus maps presented land uses according to parcels that were represented as polygons in the project GIS. All geographic features, including parcel delineations, contributing catchment areas, and impervious fractions were extracted from digital versions of these maps (provided as AutoCAD files by BMS Design Group and dated May 9, 2002). Hydrologic soils data used to define infiltration potential across the campus, were provided by Riverside County (GIS Department, August 22, 2000). The hydrologic soils data, as well as, other relevant hydrologic parameters were referenced from the recently completed University Arroyo Flood Management and Enhancement Program (PWA, 2001). The aerial photograph, used as a background image in the attached figures, was downloaded from the UCR webpage (http://www.campusmap.ucr.edu/images/aerial_high.jpg) and manually georeferenced to the LRDP maps. The photograph represents campus land use conditions from approximately 2001. Lastly, other hydrologic parameters specific to using the standard Rational Method (i.e. rainfall intensity, time of concentration, runoff curve numbers) were selected from the most current Riverside County Flood Control and Water Conservation District (RCFCWCD) Hydrology Manual, dated April 1978. The following section (Section 3) describes these input parameters that were used to conduct the peak discharge analysis.

3. METHODOLOGY

3.1 RATIONAL METHOD

The Rational Method is a simple and widely used technique for estimating a design peak discharge for a small watershed or catchment area. The parameters used for the rational method are time of concentration (to determine the rainfall intensity), basin size, and runoff coefficient, which is a function of the land use, soil cover, and slope.

The rational method is defined by the following equation:

$$Q = CiA$$

Where Q = Peak discharge rate (cfs)
C = Runoff Coefficient
i = Intensity of precipitation (in/hr) for a duration equal to the time of concentration, t_c, and a return period T.
A = drainage area (acres)

3.1.1 Area (A)

The area (A) for each parcel was assigned from the GIS database using the appropriate LRDP map. This resulted in analyzing a total of 144 parcels.

3.1.2 Intensity (i)

The intensity of rainfall (i) experienced throughout the UCR campus is dependent on two factors: (1) the duration of rainfall and (2) the storm frequency or recurrence interval. For the current analysis, the storm duration is calculated from the sub-basin time of concentration and the recurrence interval is assumed to be 100 years. For the Rational Method, time of concentration is the time required for flow to reach the point in question (the distal end of the parcel) from the hydraulically most remote point in the catchment area. The time of concentration for each parcel is a function of many variables, including flow length, slope and surface roughness. To determine time of concentration, a template parcel was used to adequately represent length, slope, and roughness conditions across campus parcels. This template parcel was then used to derive a standard time of concentration for the analysis.

The area of the template parcel was derived by averaging acreages for all 144 parcels. The template parcel is square in shape with the longest flow length corresponding to the diagonal length of the square. Based on field observations, slope and roughness parameters were selected to be 2% and 0.3 respectively. Next, the Kirby Equation (Gupta, 1995) was used to estimate time of concentration for the representative template parcel based on the above parameters. This resulted in an average time of concentration of 20 minutes.

Once the time of concentration was calculated, Plate D-4.1 (5 of 6) from the Riverside County Hydrology Manual (variables: time of concentration, 100-yr return period, Riverside Foothills Areas) was referenced to derive a basin-wide representative rainfall intensity of 2.20 in/hr.

3.1.3 Runoff Coefficient (C)

The runoff coefficient (C) is the final variable necessary to perform the rational method analysis. It is also the most critical element and serves to convert the average rainfall rate into peak runoff intensity. The runoff coefficient accounts for many complex processes including antecedent moisture conditions, ground slope, ground cover, soil moisture, drainage basin shape, rainfall intensity and so on. For the present study, intermediate antecedent soil moisture conditions (AMC II) were assumed, as recommended by the RCFCWCD Hydrology Manual. In practice, the runoff coefficient can be estimated via the runoff index (RI), which is a function of soil type and land use. A runoff index was therefore derived for each parcel using Plate D-5.5 from the RCFCWCD Hydrology Manual, inputting appropriate cover type and proportional coverage of each underlying hydrologic soil group.

For existing campus conditions, the *Urban Covers* (Residential or Commercial Landscaping) and *Agricultural Covers* (Orchards, Evergreen; fair) general land cover types were used as directed by the Hydrology Manual. Urban Covers were applied to all parcels east of Interstate 15 while the agricultural cover was applied west of I-15 to the existing orchards. For future conditions, the Urban Covers (Residential or Commercial Landscaping) table was used throughout.

The next step in developing runoff coefficients was to assign an impervious fraction to each land-use type. This was accomplished by developing a representative parcel for each land use type within the campus. An impervious fraction was developed for these representative parcels by digitizing and preparing area ratios from either existing campus maps or proposed campus conditions according to the Long Range Development Plan. The results of this analysis are provided in the following table:

Land Use Type	% Impervious
Academic	50
Academic/Residential	50
Athletic & Recreation	5
Open Space	5
Orchard	5
Parking	95
Residential: East Campus	25
West Campus	50
Support	50

Table 1: Impervious Fractions for Each Land Use Type

Lastly, runoff coefficients (C) were calculated for each parcel using Plate D-5.7 from the RCFCWCD Hydrology Manual, using the parameters described above (impervious fraction, rainfall intensity (i) and runoff index (RI)).

3.2 LIMITATIONS OF THE RATIONAL METHOD

As stated previously, the Rational Method is widely accepted and a relatively simple technique for estimating a design peak discharge for a small watershed or catchment. However, there are certain limitations of the Rational Method approach, which should be considered. Most importantly, this method, as it has been applied to the UCR campus, does not account for temporal changes in runoff, rather it only estimates peak flows. In subsequent hydrologic analyses, it will likely be necessary to include time varying calculations, which will not only develop runoff hydrographs, but also account for flow attenuation throughout the complex surface and sub-surface stormwater infrastructure of the campus. Similar to many standard rainfall-runoff models, the Rational Method assumes that the frequency of runoff is the same as the frequency of design precipitation used in the equation. This may or may not be the case.

It is also important to note that, as calculated, estimated peak runoff rates correspond only to future land use delineations. Results do not necessarily represent the actual storm water conveyance system that is, or will be, in place and therefore may not accurate portray some of the site-specific conditions on campus.

Other limitations to the Rational Method include the assumption that the rainfall intensity is uniform over the watershed for the entire duration of the storm. The method also does not account for changing soil conditions or the collective influence of runoff, as flows generated from separate parcels drain together into the same channel.

While acknowledging these limitations, the Rational Method is still considered a useful and appropriate approach to evaluate hydrologic conditions in support of the campus land use planning process and preliminary environmental impact assessment.

4. RESULTS AND DISCUSSION

Following instructions from the Riverside County Hydrology Manual, the standard Rational Method approach was used to perform a peak runoff analysis for the UCR campus under 100-year rainfall conditions. For consistency and to aid interpretation, the results are presented by three categories: existing conditions; future conditions; and a comparison highlighting the impact associated with the LRDP. Tabular and graphical results are also included at the end of the section. Lastly, several *next steps* are recommended for consideration during future phases of the campus planning process.

4.1 EXISTING CONDITIONS RESULTS

Under existing land use conditions, parcels producing highest peak runoffs are those with the largest tributary area. This trend can be seen in Table 2 for parcels 10, 19, 64 and 66. Figure 1 provides a parcel reference map to be viewed in conjunction with Table 2. Impervious fraction can also strongly influence surface runoff generation. This is also apparent in Table 2 and Figures 2a and 3a for parcels designated as *parking* (95% impervious). Geographically, higher rates of imperviousness are seen most strongly in the main campus east of Interstate 15, where the most extensive development currently exists.

The influence of underlying soil conditions on rainfall infiltration capacity (per unit area) is also an important consideration in viewing existing conditions results across the campus. Along the eastern portion of campus at the base of the Box Springs Mountains the majority of soil types have a lower infiltration capacity (hydrologic soil types C & D), thus further increasing the overall peak discharge rates.

4.2 FUTURE LONG-RANGE BUILD-OUT CONDITION RESULTS

Figures 2b and 3b, as wells as Table 2, present results for future conditions according to the LRDP. The west campus area shows the most significant changes in peak runoff due to increased impervious land covers of the LRDP. Considered cumulatively, individual increases in parcel runoff owing to new campus projects are somewhat offset by the conversion of current agricultural and parking to athletic or recreational land uses that offer improved infiltration capacity. Also providing potential runoff improvements are proposed buffer zones along roadways.

4.3 HYDROLOGIC IMPACTS ASSOCIATED WITH THE LRDP

A comparison of the hydrologic impacts associated with the LRDP is presented in Figure 4. It is apparent that runoff generation associated with the western campus is most significant. Many of the parcels, which are highlighted red, show an increase in surface runoff generation. From a regional standpoint, this additional runoff is compensated for by the blue parcels, which display reduced peak runoff rates. However, looking more closely at a scale of single parcels or small groups, it is apparent that increases in localized runoff may require on-site detention or a conveyance system to move the excess water to areas that provide additional infiltration capacity. This may be accomplished locally using infiltration swales, small detention ponds, infiltration opportunities in the proposed Campus Grove, or a restored stream channel along the southern west campus margin. Also possible, is to integrate potentially required drainage needs into a broader (and more regional) stormwater collection, conveyance and detention system.

4.4 NEXT STEPS

Continued planning and analysis to further develop the University's long-range development program should consider the following suggested measures. These measures are recommended to streamline hydrologic analyses providing efficiency and project savings during subsequent environmental review and engineering design processes that will occur as the campus continues to develop.

- Begin considering surface water infrastructure needs, including channels, storm sewers, on-site detention or swales and local buffer zones that can provide runoff management solutions and environmental benefits.
- Analyze the cost/benefits of local versus regional stormwater solutions.
- Develop a dynamic hydrologic model, based on the proposed infrastructure improvement, that will more accurately predict surface runoff contributions and facilitate the analysis of flood management, BMP, and restoration alternatives.
- Re-develop or expand the existing hydraulic models (University Arroyo project) to include the proposed infrastructure enhancements, as well as, results from the proposed hydrologic analysis.
- Utilize the above-mentioned models into future planning and design phases to assist in actual project system design and optimization.

Future	A	B	BC	C	D	(in/hr)	Future	Existing	Future	Existing	Existing	Future	(min)	Future
Support	0%	0%	72%	28%	0%	2.2	0.79	0.79	16.33	16.33	64.3	64.3	20	50
AthleticRecreation	0%	10%	0%	81%	9%	2.2	0.71	0.71	5.99	5.99	68.3	68.3	20	5
AthleticRecreation	0%	100%	0%	0%	0%	2.2	0.57	0.57	0.16	0.16	56.0	56.0	20	5
Academic	0%	2%	24%	58%	16%	2.2	0.80	0.80	14.90	14.90	68.2	68.2	20	50
Academic	0%	21%	0%	56%	22%	2.2	0.80	0.80	11.52	11.52	67.5	67.5	20	50
Academic	0%	24%	0%	54%	22%	2.2	0.79	0.79	4.29	4.29	67.2	67.2	20	50
Academic	0%	0%	0%	100%	0%	2.2	0.80	0.80	3.36	3.36	69.0	69.0	20	50
Residential	0%	0%	87%	13%	0%	2.2	0.72	0.72	17.51	17.51	63.3	63.3	20	25
Residential	0%	0%	100%	0%	0%	2.2	0.72	0.72	4.31	4.31	62.5	62.5	20	25
AthleticRecreation	0%	0%	0%	100%	0%	2.2	0.72	0.75	18.61	19.38	69.0	69.0	20	5
Parking	0%	0%	1%	99%	0%	2.2	0.89	0.75	7.23	6.09	68.9	68.9	20	95
Academic	0%	76%	24%	0%	0%	2.2	0.76	0.62	6.08	4.96	57.6	57.6	20	50
Academic	0%	2%	0%	98%	0%	2.2	0.80	0.89	1.89	2.11	68.8	68.8	20	50
AthleticRecreation	0%	19%	0%	81%	0%	2.2	0.70	0.89	0.46	0.58	66.6	66.6	20	5
Academic	0%	0%	0%	100%	0%	2.2	0.80	0.89	1.07	1.19	69.0	69.0	20	50
Academic/Recreation	0%	55%	45%	0%	0%	2.2	0.76	0.76	12.04	12.04	58.9	58.9	20	50
AthleticRecreation	0%	1%	73%	21%	6%	2.2	0.69	0.69	10.17	10.17	64.6	64.6	20	5
AthleticRecreation	0%	0%	66%	34%	0%	2.2	0.69	0.69	5.09	5.09	64.7	64.7	20	5
Residential	0%	0%	21%	67%	12%	2.2	0.75	0.75	32.53	32.53	68.4	68.4	20	25
Academic	0%	53%	0%	0%	47%	2.2	0.79	0.89	2.99	3.37	64.9	64.9	20	50
Academic	0%	65%	0%	0%	35%	2.2	0.78	0.89	2.11	2.41	62.7	62.7	20	50
Academic	0%	27%	43%	30%	0%	2.2	0.78	0.78	4.86	4.86	62.7	62.7	20	50
Academic	0%	98%	0%	0%	2%	2.2	0.76	0.89	4.98	5.83	56.3	56.3	20	50
Academic	0%	33%	30%	36%	0%	2.2	0.78	0.78	9.18	9.18	62.7	62.7	20	50
Academic	0%	6%	0%	23%	71%	2.2	0.81	0.81	1.48	1.48	72.4	72.4	20	50
Academic	0%	0%	0%	100%	0%	2.2	0.80	0.80	4.57	4.57	69.0	69.0	20	50
Academic	0%	80%	0%	0%	20%	2.2	0.77	0.89	1.94	2.25	59.8	59.8	20	50
Academic	0%	0%	0%	96%	4%	2.2	0.80	0.72	2.31	2.08	69.2	69.2	20	50
Academic	0%	8%	74%	18%	0%	2.2	0.78	0.67	4.76	4.09	63.1	63.1	20	50
Academic	0%	0%	20%	63%	17%	2.2	0.80	0.80	5.68	5.68	68.7	68.7	20	50
Academic	0%	0%	0%	100%	0%	2.2	0.80	0.72	1.92	1.73	69.0	69.0	20	50
Academic	0%	0%	0%	100%	0%	2.2	0.80	0.80	2.68	2.68	69.0	69.0	20	50
Academic	0%	0%	0%	100%	0%	2.2	0.80	0.80	4.30	4.30	69.0	69.0	20	50
Academic	0%	86%	12%	2%	0%	2.2	0.76	0.76	11.32	11.32	57.0	57.0	20	50
AthleticRecreation	0%	0%	100%	0%	0%	2.2	0.67	0.67	1.46	1.46	62.5	62.5	20	5
Academic	0%	0%	56%	44%	0%	2.2	0.79	0.69	6.56	5.73	65.3	65.3	20	50
Academic	0%	0%	16%	84%	0%	2.2	0.80	0.89	4.77	5.31	68.0	68.0	20	50
Academic	0%	0%	0%	100%	0%	2.2	0.80	0.80	4.76	4.76	69.0	69.0	20	50
Residential	5%	0%	0%	61%	34%	2.2	0.75	0.75	11.37	11.37	69.2	69.2	20	25
Residential	0%	0%	100%	0%	0%	2.2	0.72	0.72	2.65	2.65	62.5	62.5	20	25
Academic	0%	0%	100%	0%	0%	2.2	0.78	0.67	3.87	3.33	62.5	62.5	20	50
Parking	0%	0%	100%	0%	0%	2.2	0.89	0.89	5.37	5.37	62.5	62.5	20	95
Academic	0%	26%	0%	29%	44%	2.2	0.80	0.80	4.59	4.59	68.2	68.2	20	50
Academic	0%	2%	19%	53%	26%	2.2	0.80	0.80	9.55	9.55	69.1	69.1	20	50
Residential	0%	4%	0%	51%	46%	2.2	0.76	0.76	6.82	6.82	71.2	71.2	20	25
Residential	0%	0%	43%	56%	1%	2.2	0.74	0.74	13.89	13.89	66.3	66.3	20	25
AthleticRecreation	0%	0%	0%	100%	0%	2.2	0.72	0.89	0.49	0.61	69.0	69.0	20	5
Academic	0%	0%	0%	100%	0%	2.2	0.80	0.80	2.20	2.20	69.0	69.0	20	50
Academic	0%	0%	0%	100%	0%	2.2	0.80	0.89	2.07	2.30	69.0	69.0	20	50
Academic	0%	98%	2%	0%	0%	2.2	0.76	0.89	1.38	1.62	56.1	56.1	20	50
Academic	0%	74%	0%	26%	0%	2.2	0.77	0.77	1.66	1.66	59.4	59.4	20	50
Academic	0%	58%	0%	42%	0%	2.2	0.78	0.78	1.89	1.89	61.4	61.4	20	50
Academic	0%	0%	0%	100%	0%	2.2	0.80	0.80	10.82	10.82	69.0	69.0	20	50
Academic	3%	79%	0%	0%	17%	2.2	0.76	0.76	5.49	5.49	58.7	58.7	20	50
Academic	0%	0%	100%	0%	0%	2.2	0.78	0.78	4.21	4.21	62.5	62.5	20	50
Academic	0%	87%	0%	13%	0%	2.2	0.76	0.76	5.10	5.10	57.7	57.7	20	50
Academic	0%	100%	0%	0%	0%	2.2	0.76	0.76	1.09	1.09	56.0	56.0	20	50
Academic	0%	88%	7%	0%	5%	2.2	0.76	0.61	7.59	6.09	57.3	57.3	20	50
Residential	0%	47%	53%	0%	0%	2.2	0.70	0.70	5.76	5.76	59.5	59.5	20	25
Academic	0%	97%	0%	0%	2%	2.2	0.76	0.59	8.20	6.36	56.4	56.4	20	50
AthleticRecreation	0%	3%	73%	24%	0%	2.2	0.68	0.68	10.13	10.13	63.9	63.9	20	5
Parking	0%	20%	80%	0%	0%	2.2	0.89	0.89	7.25	7.25	61.2	61.2	20	95
Support	0%	0%	62%	38%	0%	2.2	0.79	0.79	1.35	1.35	65.0	65.0	20	50
Residential	0%	0%	6%	94%	0%	2.2	0.75	0.75	19.65	19.65	68.6	68.6	20	25
Residential	0%	0%	69%	31%	0%	2.2	0.73	0.73	6.01	6.01	64.5	64.5	20	25
AthleticRecreation	0%	0%	12%	88%	0%	2.2	0.71	0.71	23.00	23.00	68.2	68.2	20	5
Residential	%	59%	0%	41%	0%	2.2	0.71	0.71	9.58	9.58	61.3	61.3	20	25
Academic	%	0%	100%	0%	0%	2.2	0.78	0.78	0.65	0.65	62.5	62.5	20	50

Residential	0%	0%	0%	78%	22%	2.2	0.76	0.89	5.64	6.60	70.3	70.3	20	25
Parking	0%	100%	0%	0%	0%	2.2	0.89	0.89	9.65	9.65	56.0	56.0	20	95
Residential	0%	7%	93%	0%	0%	2.2	0.78	0.78	4.02	4.02	62.0	62.0	2	50
AthleticRecreation	%	0%	100%	0%	0%	2.2	0.67	0.67	0.81	0.81	62.5	62.5	20	5
Academic	0%	0%	100%	0%	0%	2.2	0.78	0.78	4.27	4.27	62.5	62.5	20	50
Academic	0%	0%	100%	0%	0%	2.2	0.78	0.78	5.03	5.03	62.5	62.5	20	50
Academic	0%	41%	59%	0%	0%	2.2	0.77	0.71	5.04	4.65	68.5	59.8	20	50
Academic	0%	0%	100%	0%	0%	2.2	0.78	0.73	3.24	3.03	71.0	62.5	20	50
Academic	0%	46%	54%	0%	0%	2.2	0.77	0.71	3.30	3.04	68.3	59.5	20	50
Academic	0%	0%	100%	0%	0%	2.2	0.78	0.89	3.09	3.52	62.5	62.5	20	50
Academic	0%	83%	0%	17%	0%	2.2	0.76	0.89	15.10	17.69	58.2	58.2	20	50
Academic	0%	53%	47%	0%	0%	2.2	0.76	0.71	13.25	12.38	67.8	59.0	20	50
AthleticRecreation	0%	34%	66%	0%	0%	2.2	0.66	0.72	6.74	7.36	69.0	60.3	20	5
AthleticRecreation	0%	100%	0%	0%	0%	2.2	0.57	0.89	1.90	2.97	56.0	56.0	20	5
Academic	0%	37%	0%	63%	0%	2.2	0.79	0.89	7.27	8.19	64.2	64.2	20	50
AthleticRecreation	0%	0%	0%	100%	0%	2.2	0.72	0.89	3.04	3.76	69.0	69.0	20	5
Academic	0%	32%	0%	68%	0%	2.2	0.79	0.89	6.85	7.72	64.9	64.9	20	50
Academic	0%	0%	100%	0%	0%	2.2	0.78	0.73	9.57	8.96	71.0	62.5	20	50
AthleticRecreation	0%	18%	82%	0%	0%	2.2	0.66	0.72	2.92	3.19	69.9	61.3	20	5
Parking	0%	81%	19%	0%	0%	2.2	0.89	0.70	2.43	1.91	66.1	57.2	20	95
Parking	0%	50%	50%	0%	0%	2.2	0.89	0.71	3.40	2.71	68.0	59.3	20	95
AthleticRecreation	0%	100%	0%	0%	0%	2.2	0.57	0.69	1.22	1.48	65.0	56.0	20	5
AthleticRecreation	0%	43%	57%	0%	0%	2.2	0.65	0.71	1.01	1.11	68.4	59.7	20	5
AthleticRecreation	0%	48%	52%	0%	0%	2.2	0.65	0.71	4.96	5.42	68.1	59.4	20	5
AthleticRecreation	0%	0%	100%	0%	0%	2.2	0.67	0.73	0.37	0.40	71.0	62.5	20	5
AthleticRecreation	0%	0%	100%	0%	0%	2.2	0.67	0.73	0.36	0.39	71.0	62.5	20	5
AthleticRecreation	0%	0%	100%	0%	0%	2.2	0.67	0.73	0.36	0.39	71.0	62.5	20	5
AthleticRecreation	0%	0%	100%	0%	0%	2.2	0.67	0.73	0.45	0.49	71.0	62.5	20	5
AthleticRecreation	0%	0%	100%	0%	0%	2.2	0.67	0.73	0.37	0.40	71.0	62.5	20	5
AthleticRecreation	0%	0%	100%	0%	0%	2.2	0.67	0.73	0.36	0.39	71.0	62.5	20	5
AthleticRecreation	0%	0%	100%	0%	0%	2.2	0.67	0.73	0.27	0.29	71.0	62.5	20	5
Residential	0%	0%	100%	0%	0%	2.2	0.78	0.73	2.49	2.33	71.0	62.5	20	50
AthleticRecreation	0%	0%	100%	0%	0%	2.2	0.67	0.73	1.11	1.21	71.0	62.5	20	5
AthleticRecreation	0%	0%	100%	0%	0%	2.2	0.67	0.73	2.67	2.91	71.0	62.5	20	5
AthleticRecreation	0%	0%	100%	0%	0%	2.2	0.67	0.73	0.82	0.89	71.0	62.5	20	5
AthleticRecreation	0%	0%	100%	0%	0%	2.2	0.67	0.73	0.28	0.31	71.0	62.5	20	5
Support	0%	0%	100%	0%	0%	2.2	0.78	0.73	2.25	2.10	71.0	62.5	20	50
AthleticRecreation	0%	29%	71%	0%	0%	2.2	0.66	0.72	11.41	12.45	69.2	60.6	20	5
AthleticRecreation	0%	72%	28%	0%	0%	2.2	0.63	0.70	9.26	10.29	66.7	57.8	20	5
AthleticRecreation	0%	0%	100%	0%	0%	2.2	0.67	0.73	0.74	0.80	71.0	62.5	20	5
AthleticRecreation	0%	100%	0%	0%	0%	2.2	0.57	0.69	0.63	0.76	65.0	56.0	20	5
AthleticRecreation	0%	0%	100%	0%	0%	2.2	0.67	0.73	0.75	0.82	71.0	62.5	20	5
AthleticRecreation	0%	0%	100%	0%	0%	2.2	0.67	0.73	0.74	0.81	71.0	62.5	20	5
AthleticRecreation	0%	0%	100%	0%	0%	2.2	0.67	0.73	0.85	0.93	71.0	62.5	20	5
Residential	0%	81%	19%	0%	0%	2.2	0.76	0.70	5.95	5.48	66.1	57.2	20	50
Residential	0%	0%	100%	0%	0%	2.2	0.78	0.73	6.11	5.72	71.0	62.5	20	50
Residential	0%	17%	83%	0%	0%	2.2	0.78	0.72	12.44	11.48	70.0	61.4	20	50
Residential	0%	95%	5%	0%	0%	2.2	0.76	0.69	10.22	9.28	65.3	56.3	20	50
Residential	0%	77%	23%	0%	0%	2.2	0.76	0.70	10.40	9.58	66.4	57.5	20	50
AthleticRecreation	0%	71%	29%	0%	0%	2.2	0.63	0.70	0.70	0.78	66.7	57.9	20	5
AthleticRecreation	0%	28%	66%	6%	0%	2.2	0.66	0.72	5.21	5.68	69.7	61.0	20	5
AthleticRecreation	0%	44%	56%	0%	0%	2.2	0.65	0.71	14.94	16.32	68.4	59.7	20	5
AthleticRecreation	0%	41%	59%	0%	0%	2.2	0.65	0.71	7.34	8.02	68.5	59.8	20	5
Residential	0%	0%	100%	0%	0%	2.2	0.78	0.73	3.05	2.86	71.0	62.5	20	50
Residential	0%	0%	100%	0%	0%	2.2	0.78	0.73	3.54	3.31	71.0	62.5	20	50
Residential	0%	0%	100%	0%	0%	2.2	0.78	0.73	3.21	3.00	71.0	62.5	20	50
Residential	0%	0%	100%	0%	0%	2.2	0.78	0.73	1.87	1.75	71.0	62.5	20	50
Academic	0%	63%	37%	0%	0%	2.2	0.76	0.71	1.12	1.05	67.2	58.4	20	50
Academic	0%	8%	92%	0%	0%	2.2	0.78	0.72	1.20	1.10	70.5	62.0	20	50
AthleticRecreation	0%	17%	38%	46%	0%	2.2	0.68	0.74	2.73	2.97	72.7	64.4	20	5
Parking	0%	52%	10%	38%	0%	2.2	0.89	0.72	7.97	6.44	70.1	61.6	20	95
Residential	0%	0%	100%	0%	0%	2.2	0.78	0.73	1.77	1.66	71.0	62.5	20	50
Residential	0%	0%	100%	0%	0%	2.2	0.78	0.73	2.17	2.03	71.0	62.5	20	50
Residential	0%	0%	100%	0%	0%	2.2	0.78	0.73	2.21	2.06	71.0	62.5	20	50
Residential	0%	0%	100%	0%	0%	2.2	0.78	0.73	2.15	2.01	71.0	62.5	20	50
Residential	0%	0%	100%	0%	0%	2.2	0.78	0.73	2.35	2.20	71.0	62.5	20	50
Residential	0%	0%	100%	0%	0%	2.2	0.78	0.73	3.10	2.90	71.0	62.5	20	50
Residential	0%	0%	100%	0%	0%	2.2	0.78	0.73	2.68	2.51	71.0	62.5	20	50
Residential	0%	0%	100%	0%	0%	2.2	0.78	0.73	2.33	2.18	71.0	62.5	20	50

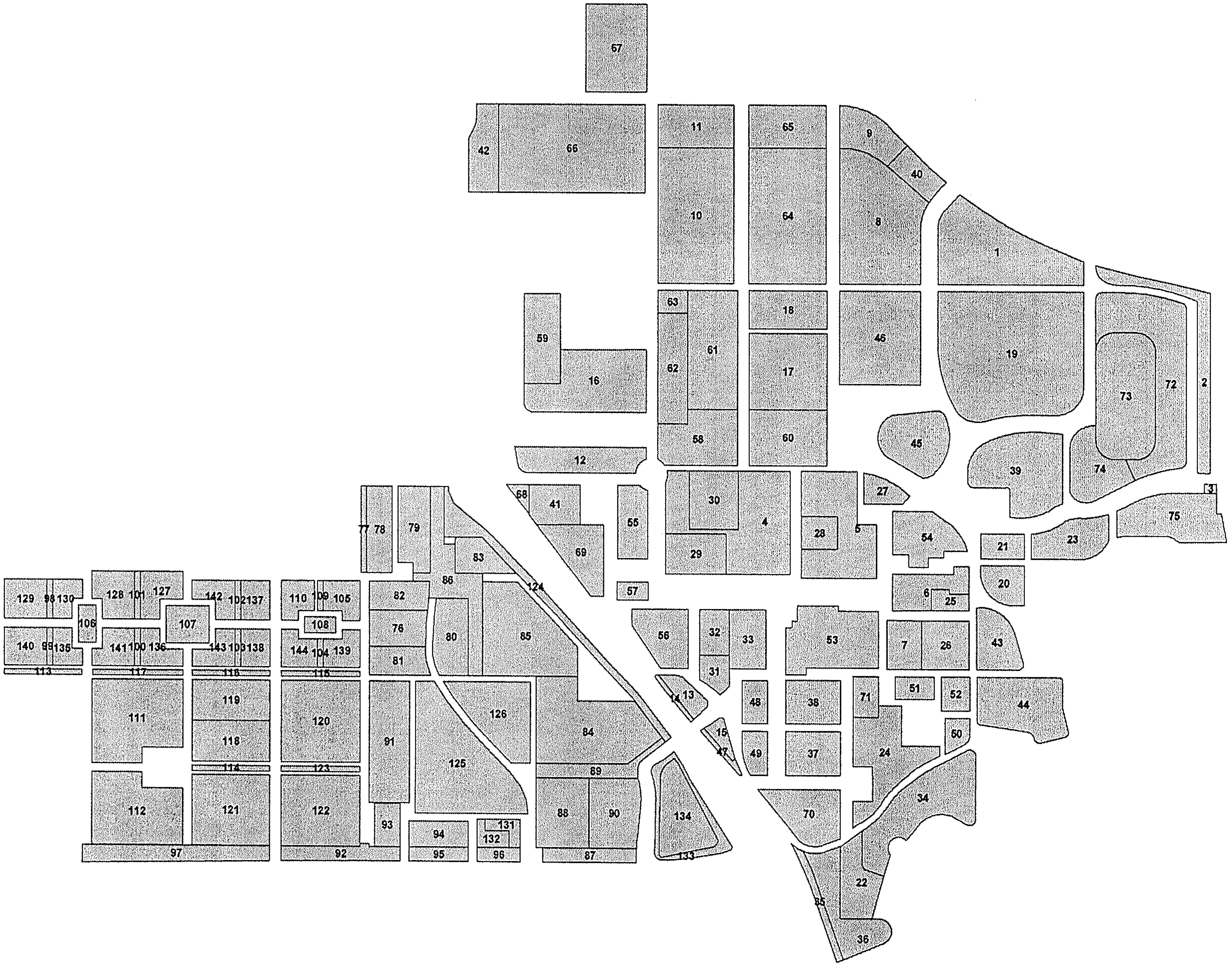
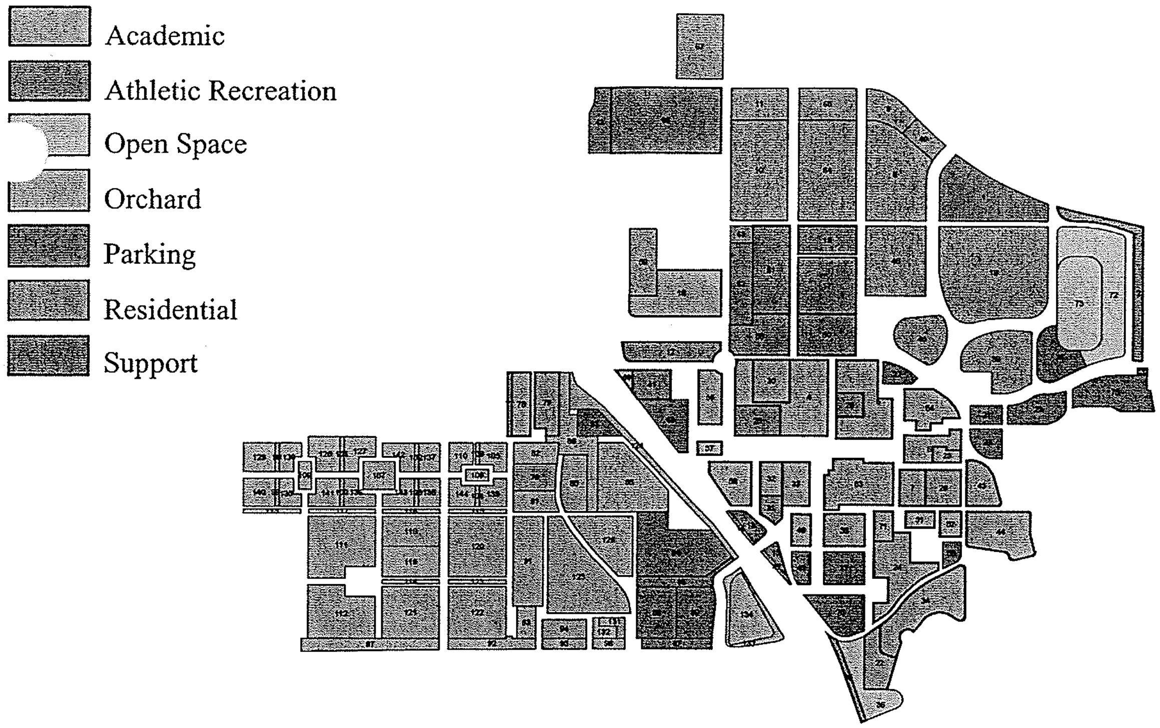


figure 1

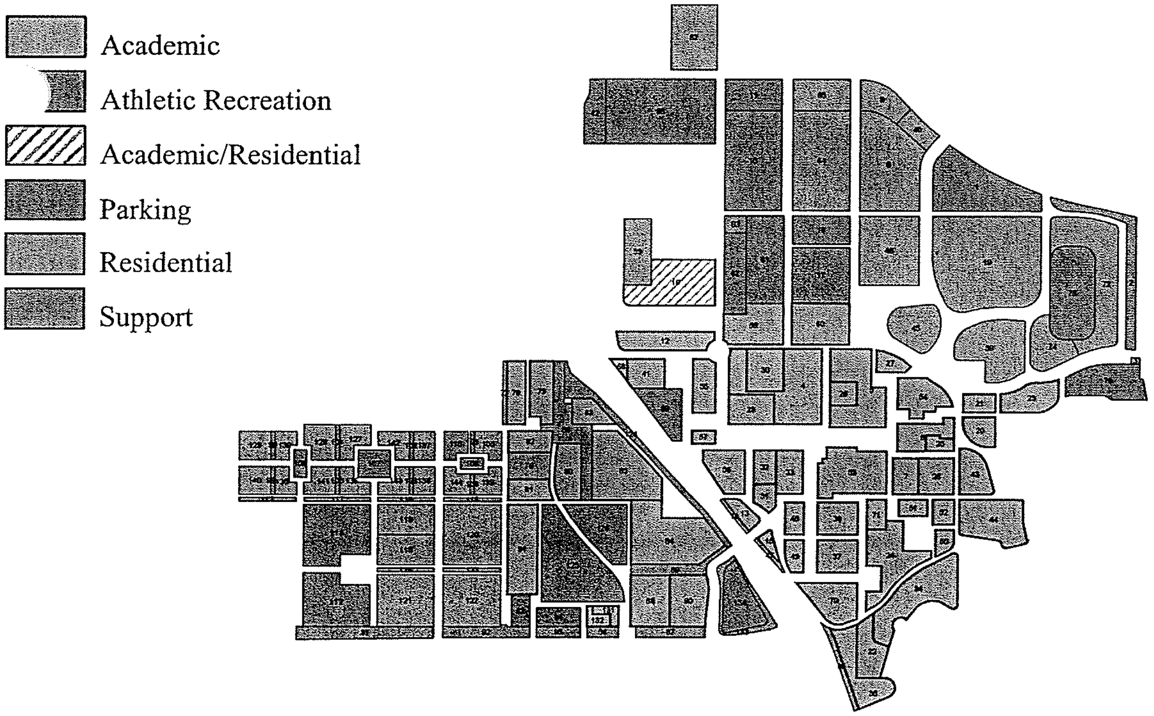
Parcel Reference Map

UCR LRDP Hydrologic Analysis

PWA



(a) Existing Land Use Conditions



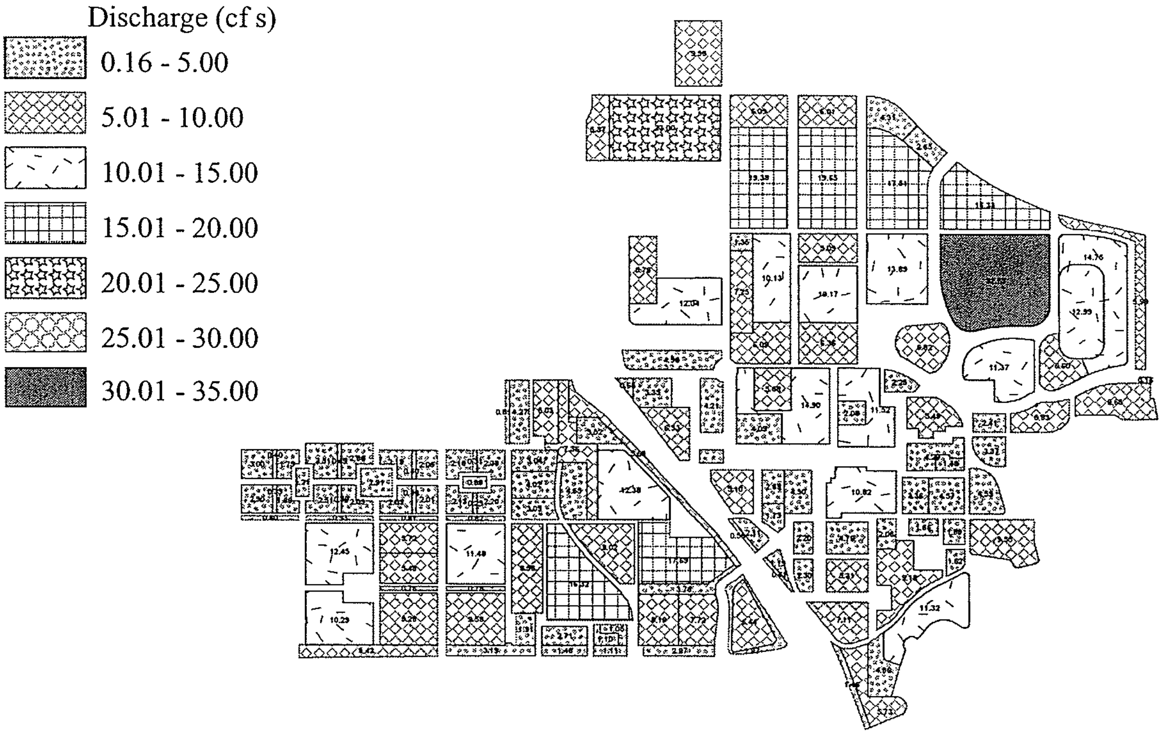
(b) Future Land Use Conditions

figure 2

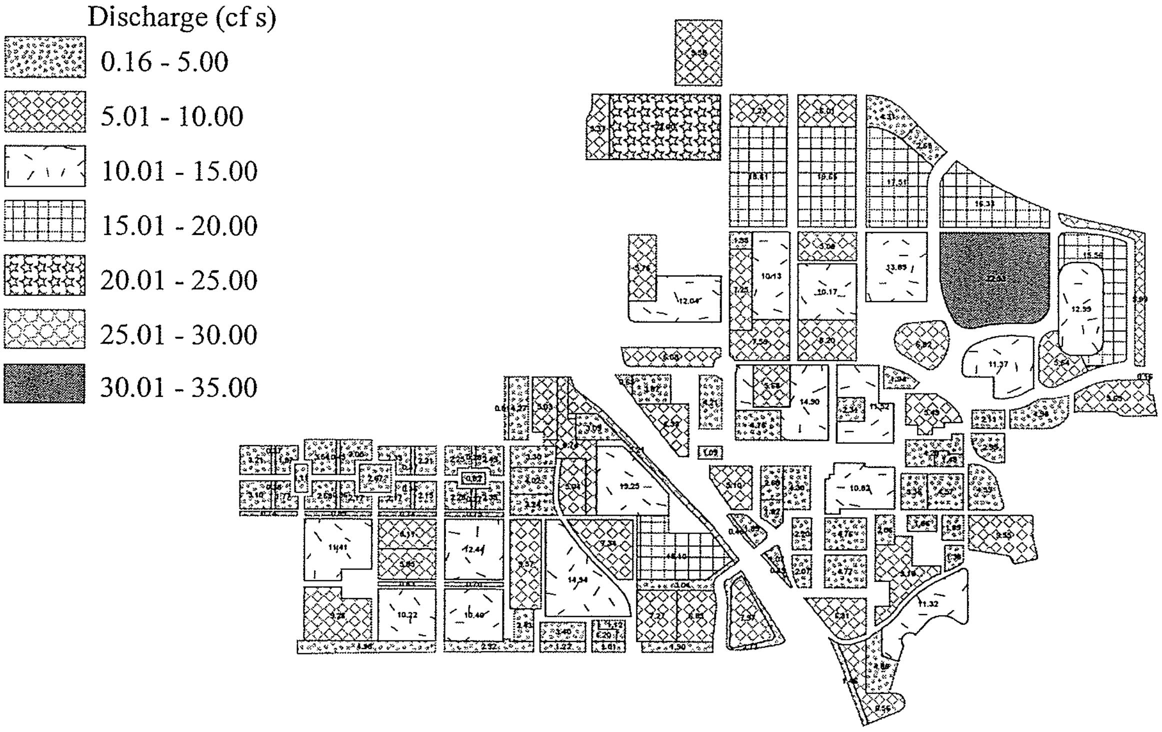
Existing and Future Land Use Conditions for the UCR Campus

UCR LRDP Hydrologic Analysis

PWA



(a) Peak Runoff for Existing Land Use Conditions



(b) Peak Runoff for Future Land Use Conditions

figure 3

Existing and Future Peak Discharge Results

UCR LRDP Hydrologic Analysis

PWA

figure 4

Comparison of Existing and Future Conditions Peak Runoff

UCR LRDP Hydrologic Analysis

Note: Values denoted on map represent estimated changes in peak discharge (cfs)

PWA

5. LIST OF PREPARERS

This report was prepared by the following PWA staff:

Jeffrey Blank, M.S.	GIS, Hydrologic Analysis and Engineering
Kenneth Schwarz, Ph.D.	Project Director, Technical Oversight

6. REFERENCES

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PWA Preliminary Draft Report, "University Arroyo Flood Control and Enhancement Plan: Summary Report of Hydrologic and Hydrodynamic Conditions and Evaluation of Alternative:, January 23, 2001.

Appendix H Traffic Impact Study

UC RIVERSIDE LRDP EIR
TRAFFIC IMPACT STUDY
(DRAFT)

Riverside, California

Prepared For:

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March 18, 2004

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Section 1.0
INTRODUCTION

This report documents the assumptions, methodologies, findings and recommendations of the traffic impact study for the proposed Long Range Development Plan (LRDP) for University of California Riverside (UCR), in the City of Riverside, California. The study analyzed potential project traffic impacts on the surrounding circulation system and identified potential improvements to reduce significant adverse project impacts.

1.1 PROJECT DESCRIPTION

Project Location

The UC Riverside campus is located about three miles east of downtown Riverside (Figure 1-1). The campus is served and divided by the Interstate 215 / State Highway 60 freeway (I-215 / SR-60), which provides access to the campus environs via several ramp systems: Blaine Street, University Avenue, Martin Luther King Boulevard and Watkins Avenue / Central Avenue. The core campus is currently located on the east side of the freeway, with links to the west side uses (agricultural research, the University Extension, University Village) via the University Avenue and Canyon Crest undercrossings.

Project Description

The traffic impact study for the LRDP analyzed the effects of student/faculty/staff population growth through the year 2015 on the roadway network in and around the UCR campus. The analysis considered the addition and re-development of parking areas and student housing areas on campus. The student population in 2015 is projected at 25,000 students. The housing goal of the LRDP is to accommodate fifty percent of all students in on-campus housing. Faculty and staff levels were estimated at approximately 7,450 in 2015. The trips that would be produced by the incremental growth of students/faculty/staff between the time of the current traffic counts and year 2015 were estimated and applied to the roadway network. This analysis determined the impact of the additional trips associated with the future growth of UCR.

Figure 1-1 REGIONAL LOCATION

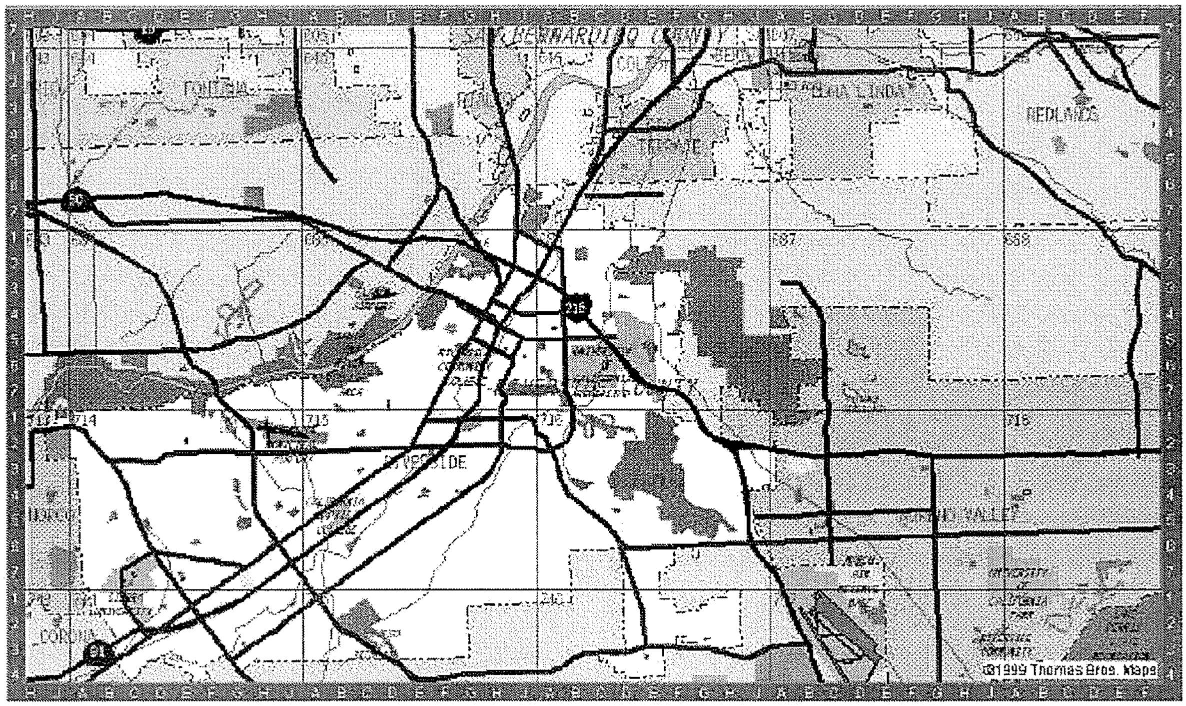
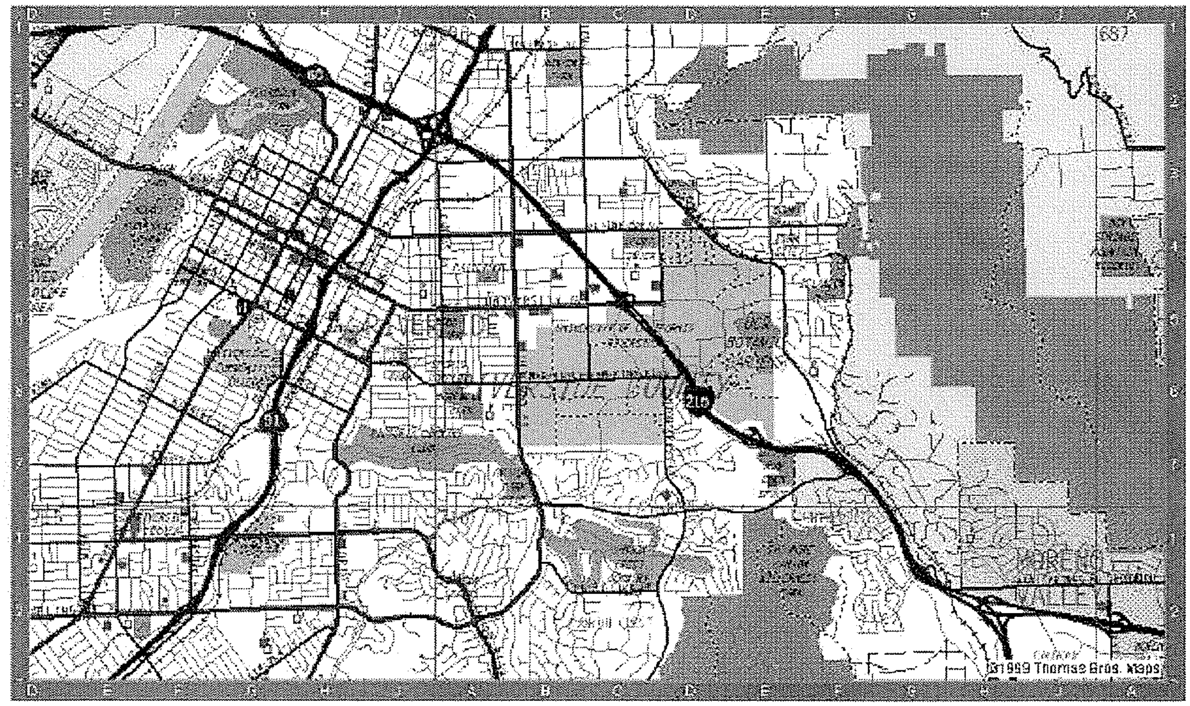


Figure 1-2 PROJECT VICINITY



1.2 SCOPE OF ANALYSIS

This traffic study examined existing traffic conditions, estimated project traffic and analyzed project related traffic impacts for the following future year scenarios:

- 2015 Without the LRDP Project
- 2015 With the LRDP Project

Year 2015 Without the Project represents the 2015 baseline condition and includes cumulative projects that are assumed to be built by 2015. Year 2015 With the Project represents full build out of the LRDP project, referred to as project build-out.

The traffic impact analysis for these scenarios included capacity analysis at identified intersections. Both signalized and unsignalized intersections were analyzed. A peak period volume-capacity analysis was also performed for the freeway system both along I-215/SR-60 in the immediate project vicinity and beyond to the junction of the two freeways in Moreno Valley and to the junction with SR-91 in Riverside.

The study analyzed and recommended improvements to reduce significant adverse project impacts to less than significant levels.

1.3 STUDY AREA

Figure 1-3 shows the study area for the traffic impact analysis, including the intersections evaluated in this analysis, which were established in consultation with the City of Riverside. The study analyzed 35 existing intersections (consisting of 22 signalized intersections and 13 unsignalized intersections), and one new intersection for a total of 36 study intersections as listed in Table 1-1. In 2015, as a result of the SR-91/SR-60/I-215 Project that would create a new interchange at Martin Luther King Boulevard and close the existing interchange at El Cerrito Drive, a new unsignalized ramp intersection would be constructed at Martin Luther King Boulevard and NB Ramps. This new intersection was included in the analysis.

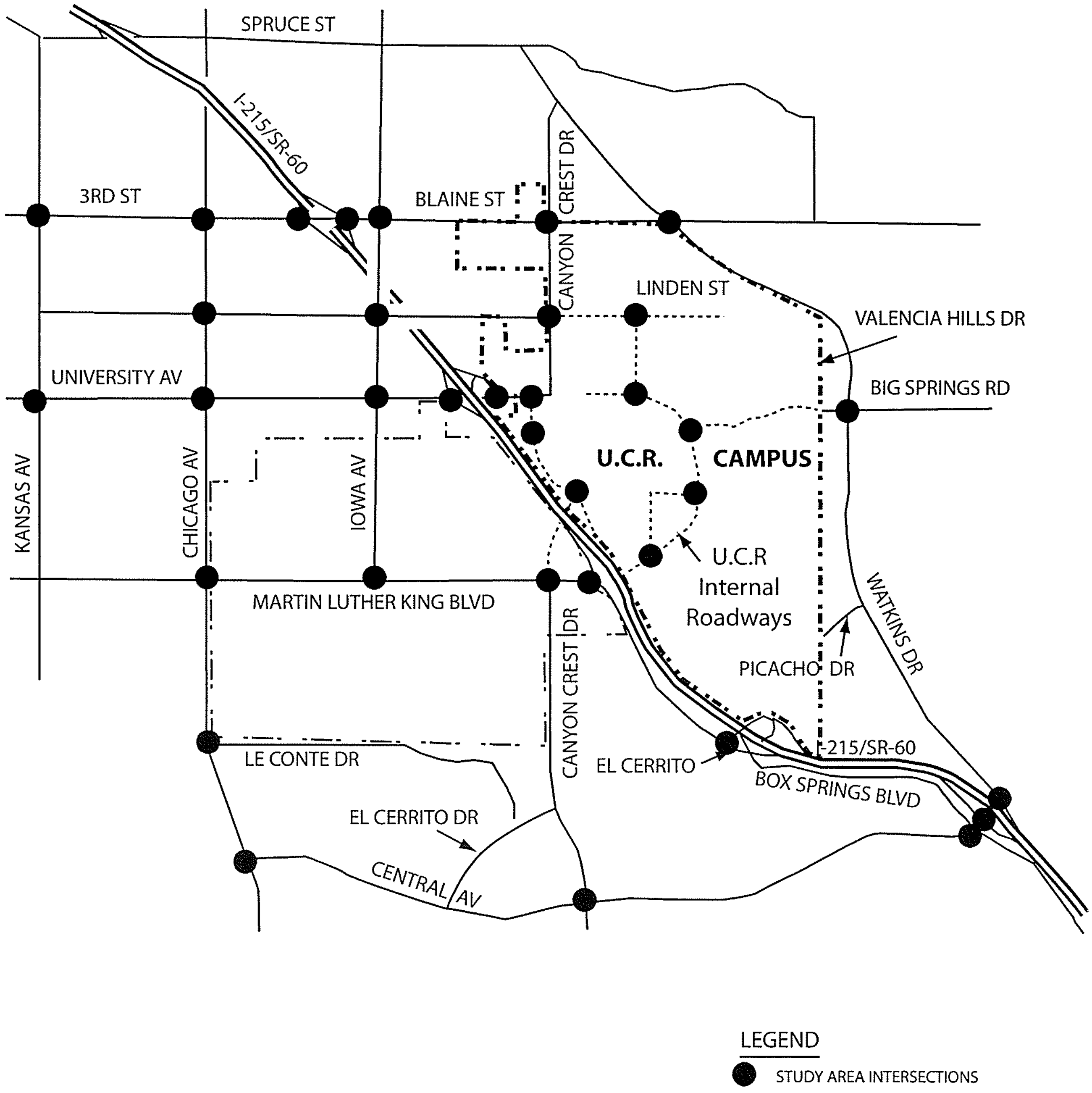


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Figure 1-3
Study Intersection Locations
UC Riverside Long Range Development Plan EIR

Table 1-1
STUDY INTERSECTIONS

Signalized Intersections	**Unsignalized Intersections**
3rd St./Kansas Ave.	Big Springs Rd./Watkins Dr.
3rd St./Chicago Ave.	Martin Luther King Blvd./SR-60 SBR
3rd St./SR-60 SBR	Le Conte Dr./Chicago Ave.
Blaine St./SR-60 NBR	El Cerrito Dr./Sycamore Canyon Blvd
Blaine St./Iowa Ave.	Central Ave./SR-60 SBR
Blaine St./Canyon Crest Dr.	Central Ave./SR-60 NBR
Blaine St./Watkins Dr.	Linden St./Aberdeen Dr.
Linden St./Chicago Ave.	Campus Dr./Aberdeen Dr.
Linden St./Iowa Ave.	Big Springs Rd./Campus Dr.
Linden St./Canyon Crest Dr.	Parking Lot 1/Campus Dr.
University Ave./Kansas Ave.	Campus Dr./Canyon Crest Dr.
University Ave./Chicago Ave.	Campus Dr./Citrus Dr.
University Ave./Iowa Ave.	Eucalyptus Dr./Campus Dr.
University Ave./SR-60 SBR	
University Ave./SR-60 NBR	
University Ave./Campus Dr.	
Martin Luther King Blvd./Chicago Ave.	
Martin Luther King Blvd./Iowa Ave.	
Martin Luther King Blvd./Canyon Crest	
Central Ave./Chicago Ave.	
Central Ave./Canyon Crest Dr.	
Central Ave./Box Springs Blvd.	

Section 2.0
METHODOLOGY

This section describes the procedures and methodologies used to collect existing traffic data and analyze traffic operations on the circulation system.

2.1 TRAFFIC COUNTS

WSA conducted the following traffic counts as part of this study through a subcontract with Counts Unlimited, Inc.:

AM and PM peak hour (2 hours) intersection turning movement counts

- 3rd St./Kansas Ave.
- 3rd St./Chicago Ave.
- 3rd St./I-215 SB Ramp
- 3rd St./I-215 SB Ramp
- Blaine St./Iowa Ave.
- Blaine St./Canyon Crest Dr.
- Blaine St./Watkins Dr.
- Linden St./Chicago Ave.
- Linden St./Iowa Ave.
- Linden St./Canyon Crest Dr.
- University Ave./Kansas Ave.
- University Ave./Chicago Ave.
- University Ave./Iowa Ave.
- University Ave./I-215 SB Ramp
- University Ave./I-215 NB Ramp
- University Ave./Campus Dr.
- Martin Luther King Blvd./Chicago Ave.
- Martin Luther King Blvd./Iowa Ave.
- Martin Luther King Blvd./Canyon Crest Dr.
- Martin Luther King Blvd./I-215 SB Ramp
- Central Ave./Chicago Ave.
- Central Ave./Canyon Crest Dr.
- Central Ave./Box Springs Blvd.
- Big Springs Rd./Watkins Dr.
- El Cerrito Dr./Sycamore Canyon Blvd.
- Linden St./Aberdeen Dr.
- Campus Dr./Aberdeen Dr.
- Big Springs Rd./Campus Dr.
- Campus Dr./Canyon Crest Dr.
- Le Conte Dr./Chicago Ave.
- Central Ave./I-215 SB Ramp
- Central Ave./I-215 NB Ramp
- Campus Dr./Citrus Dr.
- Eucalyptus Dr./Campus Dr.

The results of the traffic surveys are presented in Section 3.0, Existing Conditions. Traffic count sheets are included in Appendix A.

2.2 LEVEL OF SERVICE METHODOLOGY

The level of service (LOS) concept was developed to evaluate the operating conditions of components of a transportation circulation system. The Highway Capacity Manual (HCM)[1] defines LOS as a qualitative measure which describes operational conditions within a traffic stream, generally in terms of such factors as speed and travel time, freedom to maneuver, traffic interruptions, comfort and convenience. LOS is rated from A to F, with LOS A representing the best operating conditions and LOS F representing the worst. Specific criteria are used to define LOS for different types of facilities as discussed below.

Intersection LOS was analyzed using HCM methodologies and default parameters for signalized and unsignalized (stop-controlled) intersections. The HCM defines intersection LOS based on the average control delay per vehicle, as shown in Table 2-1. Control delay represents all forms of traffic delays at intersections, including delays due to deceleration, moving up in queue position, actual stop time, and vehicle acceleration. The City of Riverside considers LOS D or better as "acceptable" levels of operation for intersections.[2]

Table 2-1
LEVEL OF SERVICE CRITERIA FOR INTERSECTIONS

LOS	Description	Average Control Delay (seconds per vehicle)	
		Signalized	Stop-Controlled
A	Very low delay. Most vehicles do not stop at the intersection.	≤ 10	≤ 10
B	More vehicles stop than with LOS A, causing higher delays.	> 10-20	> 10-15
C	The number of vehicles stopping becomes significant, though many still pass through the intersection without stopping.	> 20-35	> 15-25
D	The influence of congestion becomes more noticeable. Many vehicles stop and the proportion of vehicles not stopping declines.	> 35-55	> 25-35
E	Results in delay considered to be unacceptable.	> 55-80	> 35-50
F	Considered unacceptable to most drivers, often occurs with oversaturation, when arriving traffic exceeds the capacity at the intersection.	> 80	> 50

Source: *Highway Capacity Manual 2000.*

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[1] Transportation Research Board, *Highway Capacity Manual*, 2000.
[2] City of Riverside, "Requirements for a Traffic Impact Study," no date.

Freeway segment LOS was determined using Caltrans methodology that involves the use of volume-to-capacity (v/c) ratios based loosely on methods described in previous versions of the HCM. This method is often used by Caltrans because methods described in the 2000 HCM are extremely data intensive and much of the required data is often unavailable or dated. The simplified procedure for calculating freeway level of service involves estimation of the v/c ratio using the following equation:

v/c = (peak hour volume)/(truck factor * number of lanes * lane capacity)

where:

peak hour volume =	number of vehicles traveling in study direction during the peak hour
truck factor =	truck terrain factor to represent influence of heavy vehicles and grades
number of lanes =	number of travel lanes in study direction
lane capacity =	2,250 vehicles/lane/hour for freeways

The resulting v/c is then compared to accepted ranges of v/c values corresponding to various levels of service as shown in Table 2-2. The corresponding level of service represents an approximation of existing or anticipated future freeway operating conditions during the peak hour.

Table 2-2
LEVEL OF SERVICE CRITERIA FOR FREEWAY SEGMENTS

LOS	V/C	Congestion/Delay	Traffic Description
A	< 0.41	None	Free flow.
B	0.42-0.62	None	Free to stable flow, light to moderate volumes.
C	0.63-0.79	None to Minimal	Stable flow, moderate volumes, freedom to maneuver noticeably restricted.
D	0.80-0.92	Minimal to Substantial	Approaches unstable flow, heavy volumes, very limited freedom to maneuver.
E	0.93-1.00	Significant	Extremely unstable flow, maneuverability and psychological comfort extremely poor.
F0	1.01-1.25	Considerable	Forced flow, heavy congestion, long queues from behind breakdown points, stop and go.
F1	1.26-1.35	Severe	Very heavy congestion, very long queues.
F2	1.36-1.45	Very Severe	Extremely heavy congestion, longer queues, more numerous breakdown points, longer stop periods.
F3	>1.46	Extremely Severe	Gridlock.

Section 3.0
EXISTING CONDITIONS

This section describes the existing traffic conditions in the study area. A description of roadways and the analysis of existing traffic conditions are presented.

3.1 EXISTING ROADWAY SYSTEM

The University of California, Riverside (UCR) campus is located in the City of Riverside, and is bisected by the Interstate 215/State Route 60 freeway. A discussion of the main roadways within and adjacent to the campus is provided below. Figure 1 presents the UCR campus in relation to the surrounding roadway system Project study intersection locations are also shown in Figure 3-1.

On-Campus Roadways:

Aberdeen Drive – Aberdeen Drive is a two-lane divided roadway with bike lanes. No parking is allowed on this access road on the north side of campus.

Linden Street – On the UCR campus, Linden Street is a two-lane undivided roadway with bike lanes and a 40-mph speed limit. Parking is allowed on some segments of this local-access road on the north side of campus.

Campus Drive Loop – Campus Drive is subdivided into four segments: North, East, South, and West, but operationally it is in fact a two-way loop road encircling the entire campus academic core. West Campus Drive is a 4-lane divided roadway near the information kiosk, but the remainder of the loop is a two-lane undivided roadway providing access to parking lots in and adjacent to the academic core. There is no through connection from North Campus Drive to University Avenue and Canyon Crest on the west side of campus. No parking is allowed on Campus Drive itself. The road is posted as a bike route, but no pavement striping is provided. West Campus Drive has a sidewalk on both sides of the street, while South and East Campus Drive have sidewalks on only one side, and North Campus Drive has no sidewalk. The speed limit on Campus Drive is 15 mph.

Citrus Drive – Citrus Drive is a North-South two-lane undivided roadway between Eucalyptus Drive and South Campus Drive. Perpendicular parking along the south side of this street includes both metered spaces and unmetered preferred spaces. Citrus Drive provides access to UCR's Graduate School of Management.

Eucalyptus Drive - Eucalyptus Drive is an East-West two-lane undivided roadway linking West Campus Drive and East Campus Drive. There is a sidewalk on each side of the street, but no bicycle lanes and no parking. Eucalyptus Drive provides access to the service/delivery area of Rivera Library.

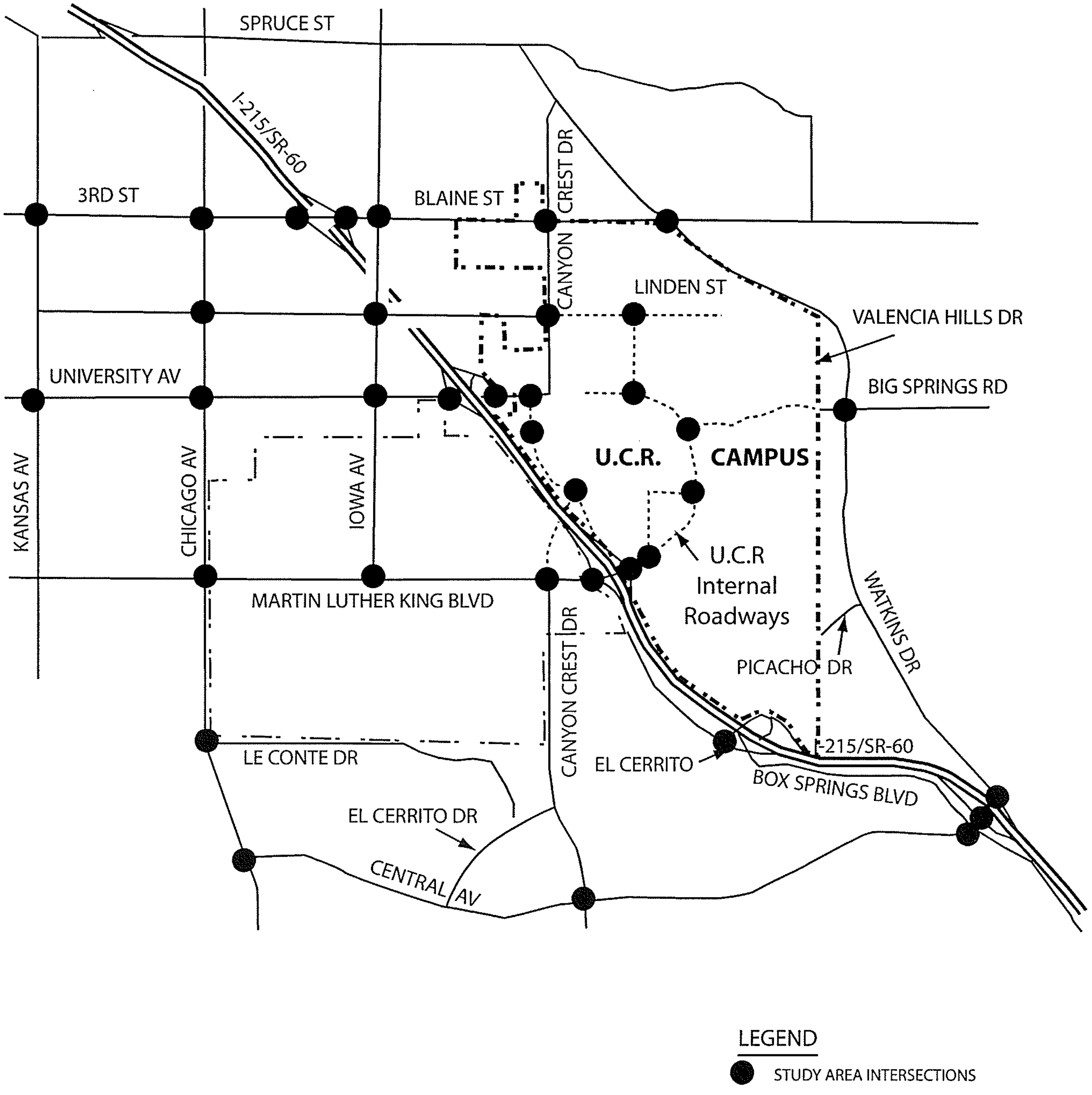

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Figure 3-1
Study Area and Intersection Locations
UC Riverside Long Range Development Plan EIR

Big Springs Road – Big Springs Road is an East-West two-lane divided roadway linking East Campus Drive and Watkins Road. Big Springs Road provides an entranceway to the UCR campus from the East, with bicycle lanes and no parking along its entire length.

Iowa Street – On the UCR campus, Iowa Avenue is a four-lane divided arterial with an 88-foot curb-curb width, a 45-mph speed limit and bicycle lanes. South of University Avenue, Iowa Street has two lanes, undivided.

Martin Luther King Boulevard – On the UCR campus, Martin Luther King Boulevard is a four-lane divided arterial with an 88-foot curb-curb width, a 50-mph speed limit and bicycle lanes.

Canyon Crest Drive – Canyon Crest Drive is a four-lane undivided arterial with a 88-foot curb-curb width, a 45 mph speed limit and bicycle lanes south of Martin Luther King Boulevard. Canyon Crest becomes a four-lane divided roadway about ½ mile south of Martin Luther King Boulevard.

Off-Campus Roadways:

Spruce Street - Spruce Street is an East-West roadway extending from Downtown Riverside to Watkins Drive. Spruce Street is constructed as a major/primary arterial with four vehicle lanes (alternating divided/undivided), and a speed limit of 40 mph. East of Iowa Avenue, Spruce Street becomes a 2-lane undivided roadway with a speed limit of 25 mph. There are no bicycle lanes on Spruce Street.

Blaine Street. - Blaine Street is an East-West roadway extending from Downtown Riverside (as 3rd Street) to the UCR campus at Watkins Drive. Blaine Street is constructed to its General Plan cross-section as a Major Arterial, with four vehicle lanes, bike lanes and no curbside parking within its 88-foot curb-curb width. The speed limit on Blaine Street is 40 mph. Blaine Street has a full diamond interchange with the I-215/SR-60 Freeway.

Linden Street – Linden Street is an East-West roadway extending from Kansas Avenue to the UCR campus. West of Canyon Crest Drive, Linden Street is a public roadway, while east of that point it is within UCR's jurisdiction. Linden Street is currently constructed as a Secondary Street, with two undivided vehicle lanes within its 66-foot curb-curb width. Linden Street has bike lanes and curbside parking along portions of its length within the City's jurisdiction. The speed limit on Linden Street is 35-40 mph.

University Ave. – University Avenue is an East-West roadway extending from Downtown Riverside to the UCR campus. University Avenue is constructed to its General Plan cross-section as a Major Arterial, with four vehicle lanes within its 88-foot curb-curb width. University Avenue has bike lanes and curbside parking along portions of its length within the City's jurisdiction. The Speed limit on University Avenue is 35-40 mph. University Avenue has a full diamond interchange with the I-215/SR-60 Freeway.

Martin Luther King Boulevard. – Martin Luther King Boulevard is an East-West roadway extending from Downtown Riverside (as 14th Street) to the UCR campus at Canyon Crest Drive.

The roadway is constructed to its General Plan cross-section as a Major Arterial, with four vehicle lanes, bike lanes and curbside parking within its 110-foot curb-curb width. The speed limit is 35 mph west of Chicago Ave. and 50 mph east of Chicago Ave. Martin Luther King Boulevard has a partial interchange with the I-215/SR-60 Freeway and a full diamond interchange with the SR-91 Freeway.

Central Ave. – Central Avenue is an East-West roadway extending from Chicago Avenue to the I-215/SR-60 Freeway. Central Avenue is constructed to its General Plan cross-section as a Major Arterial, with four vehicle lanes, bike lanes and curbside parking within its 88-foot curb-curb width. The speed limit on Central is 45 - 55 mph. Central Avenue has a full diamond interchange with the I-215/SR-60 Freeway at Watkins Drive.

Kansas Street – Kansas Street is an undivided North-South roadway located west of Chicago Avenue with 1 lane each way and a speed limit of 35 mph. North of Blaine Street, Kansas Street has 2 lanes each way with a speed limit of 35 mph. North of the railroad tracks the roadway reverts to 1 lane each way. There are no bicycle lanes on Kansas Street. Curbside parking is permitted on most segments.

Chicago Ave. – Chicago Avenue is one of the primary North-South roadways in the eastern part of the City. In the study area it extends from beyond Central Avenue to past the I-215/SR-60 Freeway near Spruce Street (Chicago Avenue has no freeway interchange). Chicago Avenue is constructed to its General Plan cross-section as a Major Arterial, with four vehicle lanes within its 110-foot divided curb-curb width north of University Avenue. Chicago Avenue has a speed limit of 40 mph.

Iowa Ave. - Iowa Avenue is a North-South roadway extending from Martin Luther King Boulevard on the UCR campus to beyond Spruce Street. On the UCR campus, Iowa Avenue is a two lane secondary street with a 66-foot curb-curb width, a 45-mph speed limit and no bicycle lanes. Within the City jurisdiction, Iowa Avenue is a 110-foot Major Arterial with four vehicle lanes, bike lanes on some segments, and curbside parking on some segments north of University Avenue. Iowa Avenue has no freeway interchange

Canyon Crest Dr. – Canyon Crest Drive is one of the primary North-South access roadways from the City jurisdiction through the UCR campus, with West Campus Drive forming a link between the discontinuous north and south segments of the roadway. Within the City jurisdiction south of Martin Luther King Boulevard, Canyon Crest Drive is constructed to its General Plan cross-section as a Major Arterial, with four vehicle lanes within its 110-foot divided curb-curb width and a speed limit of 45 mph. There is no bicycle lane on Canyon Crest south of Central Avenue. North of University Avenue, Canyon Crest Drive is a Major Arterial, with four undivided vehicle lanes, bike lanes and no curbside parking within its 88-foot curb-curb width.

Watkins Drive – Watkins Drive is a Northwest-Southeast roadway forming the northeastern boundary of the UCR campus. Watkins Drive is constructed as a Secondary Arterial, with two undivided vehicle lanes, bike lanes, and a 45-mph speed limit. South of Blaine Street, Watkins Drive is a 4-lane undivided roadway with bike lanes within its 88-foot curb-curb width. Watkins Drive is a 2-lane divided roadway south of Valencia Drive, with bicycle lanes and a 35-mph speed limit. Parallel parking is allowed on both sides of the street. Watkins Drive is reduced to a 2-lane undivided roadway in the Box Springs area with bike lanes and no parking. Watkins has a full diamond interchange with the I-215/SR-60 Freeway at Central Avenue.

Big Springs Drive – is a 2-lane undivided roadway extending through the eastern part of the UCR campus and entering the City's jurisdiction at Watkins Drive. Big Springs Drive then extends into the Box Springs area, ending at the BNSF railroad tracks. There is parking on both sides of the road and a speed limit of 35 mph.

I-215/SR-60 – Interstate 215/State Route 60 forms the western boundary of the main UCR campus. The freeway has 3 mixed-flow and 1 HOV lane in each direction at this point, with a major interchange at University Avenue.

SR-91 – State Route 91 has a major interchange with I-215 and SR-60 near the University campus. This freeway has 3 mixed-flow lanes in each direction at this point, with HOV lanes west of the downtown area. SR-91 has a major interchange at University Avenue.

3.2 EXISTING TRAFFIC CONDITIONS

Existing traffic conditions in the project area were outlined in terms of lane geometrics, traffic control, and traffic volumes at the project intersections shown in Figure 3-1. A field review was conducted to determine the lane geometrics and traffic control. As discussed in Section 2, traffic volumes were collected for the AM and PM peak hours at all study intersections in May and June of 2001. Figure 3-2 presents the intersection geometrics and AM and PM peak hour traffic volumes for the signalized study intersections. Figure 3-3 presents the intersection geometrics and AM and PM peak hour traffic volumes for the unsignalized intersections. Following the compilation of lane geometrics and volumes, the levels of service (LOS) were calculated at each intersection using the methodology previously described.

The resultant existing AM and PM peak hour levels of service are summarized in Tables 3-1 and 3-2. Table 3-1 presents the LOS of the signalized intersections. Table 3-2 presents the LOS of the unsignalized intersections.

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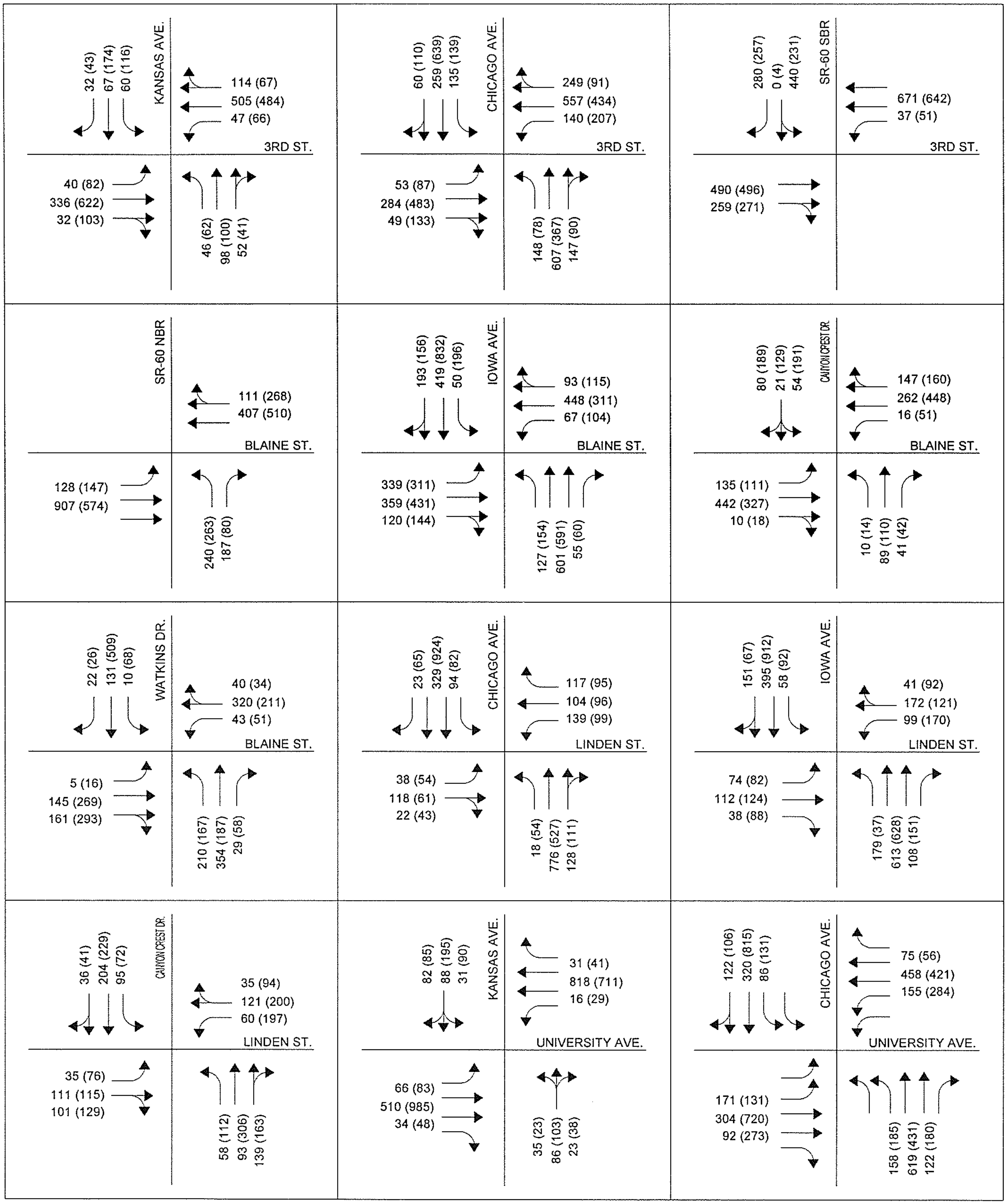

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Figure 3-2A
Signalized Intersection Configuration
and AM/(PM) Peak Hour Volumes
UC Riverside Long Range Development Plan EIR

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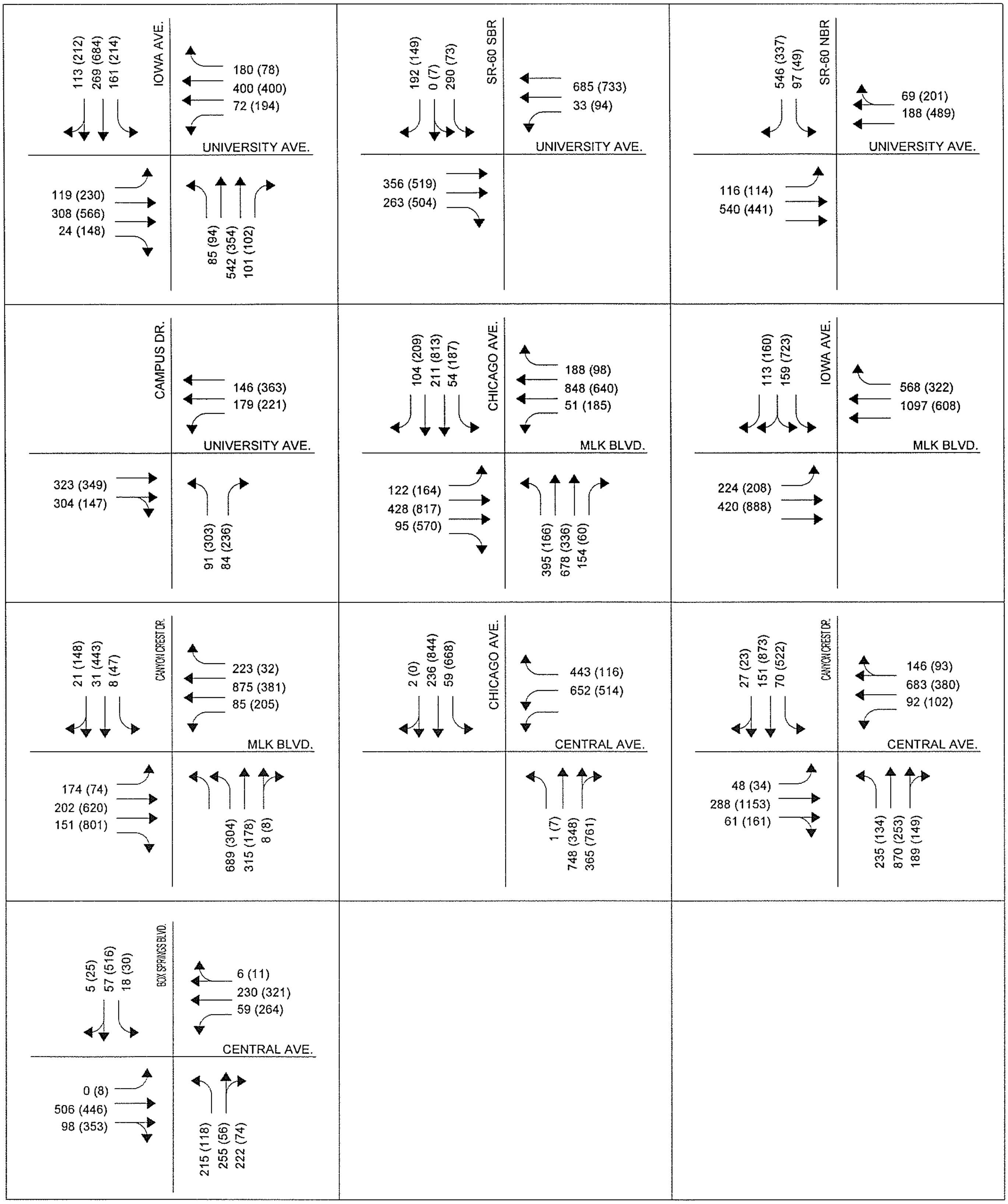

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Figure 3-2B
Signalized Intersection Configuration
and AM/(PM) Peak Hour Volumes
UC Riverside Long Range Development Plan EIR

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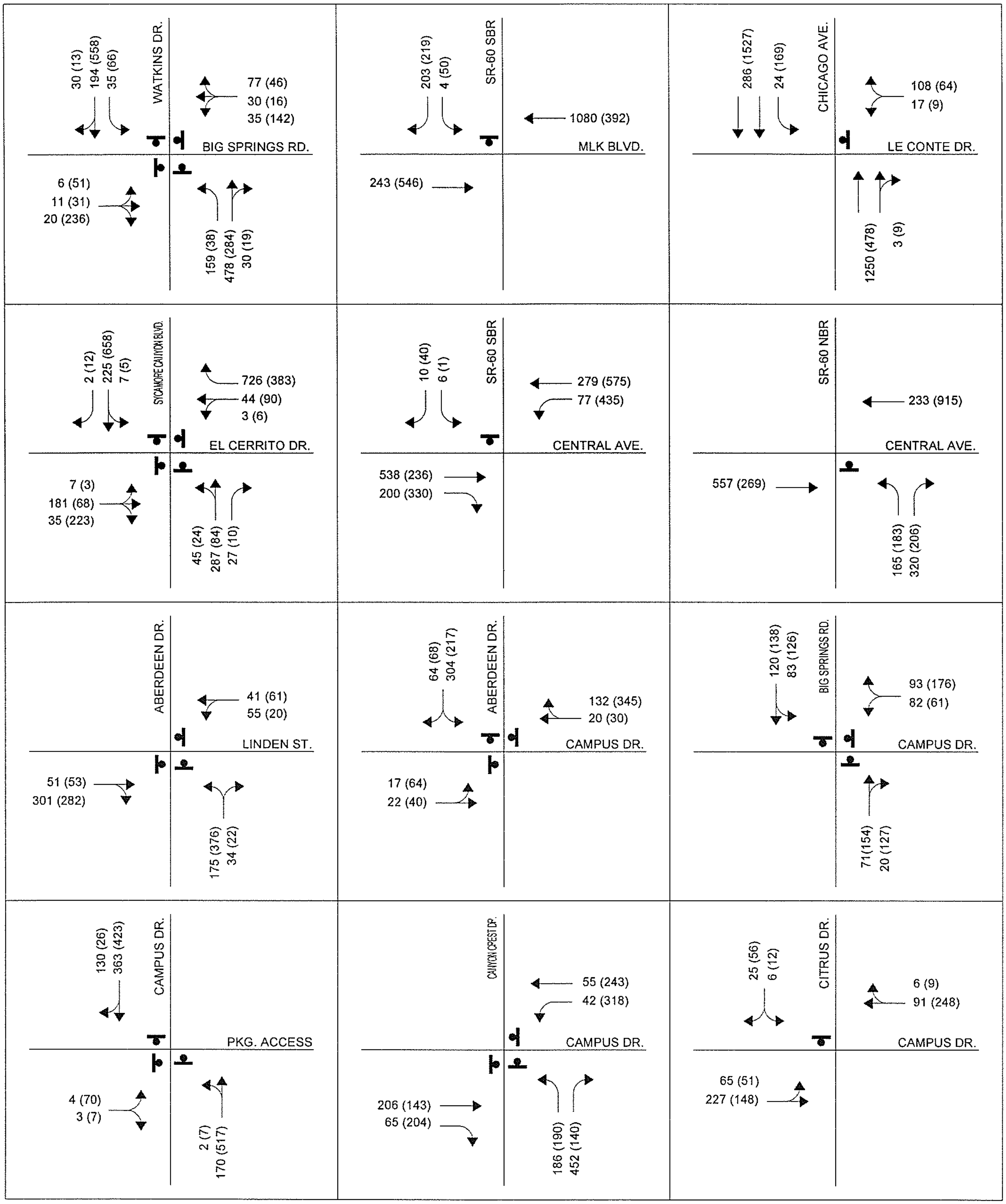

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Figure 3-3A
Unsignalized Intersection Configuration
and AM/(PM) Peak Hour Volumes
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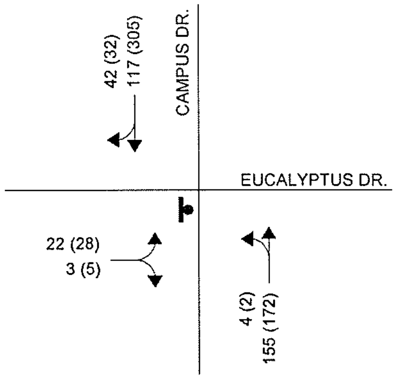

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Figure 3-3B
Unsignalized Intersection Configuration
and AM/(PM) Peak Hour Volumes
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Table 3-1
Existing Signalized Intersection LOS

Intersection	Peak Hour	Existing	
		LOS	Delay
3rst St./Kansas Ave.	AM	B	11.7
	PM	B	13.5
3rd St./Chicago Ave.	AM	C	33.5
	PM	C	29.4
3rd St./I-215 SBR	AM	C	20.1
	PM	B	15.4
3rd St./I-215 NBR	AM	B	14.8
	PM	B	19.7
Blaine St./Iowa Ave.	AM	D	43.5
	PM	D	45.2
Blaine St./Canyon Crest Dr.	AM	B	16.6
	PM	D	35.4
Blaine St./Watkins Dr.	AM	C	30.6
	PM	D	40.4
Linden St./Chicago Ave.	AM	B	13.4
	PM	A	8.6
Linden St./Iowa Ave.	AM	B	17.8
	PM	B	16.6
Linden St./Canyon Crest Dr.	AM	C	30.1
	PM	D	36.7
University Ave./Kansas Ave.	AM	A	7.8
	PM	B	12.4
University Ave./Chicago Ave.	AM	C	22.8
	PM	C	34.0
University Ave./Iowa Ave.	AM	C	25.9
	PM	D	36.1
University Ave./I-215 SBR	AM	B	14.1
	PM	B	13.9
University Ave./I-215 NBR	AM	D	46.4
	PM	B	15.2
University Ave./Campus Dr.	AM	B	14.0
	PM	B	17.9
Martin Luther King Blvd./Chicago Ave.	AM	C	33.3
	PM	D	39.6
Martin Luther King Blvd./Iowa Ave.	AM	B	16.2
	PM	B	18.5
Martin Luther King Blvd./Canyon Crest	AM	D	39.1
	PM	D	50.1
Central Ave./Chicago Ave.	AM	C	21.7
	PM	D	43.1
Central Ave./Canyon Crest Dr.	AM	D	38.3
	PM	**F**	**88.5**
Central Ave./Box Springs Blvd.	AM	C	30.2
	PM	**E**	**75.0**

Table 3-2
Existing Unsignalized Intersection LOS

		Peak	Existing	
Intersection	Control	Hour	LOS	Delay
Big Springs Rd./Watkins Dr.	AWS	AM	D	27.8
		PM	**F**	**>50**
El Cerrito Dr./Sycamore Canyon	AWS	AM	**F**	**>50**
		PM	**F**	**>50**
Linden St./Aberdeen Dr.	AWS	AM	B	12.9
		PM	C	17.2
Campus Dr./Aberdeen Dr.	AWS	AM	B	11.9
		PM	B	14.2
Big Springs Rd./Campus Dr.	AWS	AM	A	9.3
		PM	B	12.1
Parking Access/Campus Dr.	AWS	AM	C	16.3
		PM	D	29.6
Campus Dr./Canyon Crest Dr.	AWS	AM	B	14.4
		PM	B	13.7
Martin Luther King Blvd./I-215 SBR	Minor	AM	**SB: F**	**>50**
		PM	SB: C	16.0
Le Conte Dr./Chicago Ave.	Minor	AM	WB: D	30.4
		PM	WB: C	22.0
Central Ave./I-215 SBR	Minor	AM	SB: C	23.4
		PM	SB: C	15.8
Central Ave./I-215 NBR	Minor	AM	NB: C	21.9
		PM	**NB: F**	**>50**
Campus Dr./Citrus Dr.	Minor	AM	SB: A	9.8
		PM	SB: B	11.4
Eucalyptus Dr./Campus Dr.	Minor	AM	EB: B	11.2
		PM	EB: B	14.2

As shown, all locations operate at LOS D or better in both the AM and PM peak hours, with the following exceptions:

Signalized Intersections:

- The intersection of Central Avenue/Canyon Crest Drive operates at LOS F in the PM peak hour.
- The intersection of Central Avenue/Box Springs Boulevard operates at LOS E in the PM peak hour.

Unsignalized Intersections:

- The intersection of Big Springs Road/Watkins Drive operates at LOS F in the PM peak hour.
- The intersection of El Cerrito Drive/Sycamore Canyon Boulevard operates at LOS F in the AM and PM peak hours.

The following individual movements at their respective minor-stop controlled intersections also experience levels of service of E or F. It should be noted that the entire intersection delay is typically much lower than presented for the individual movement since the major movements are not required to stop, and therefore are not subject to delays.

- The southbound approach of the Martin Luther King Boulevard/I-215 Southbound Ramp intersection operates at LOS F in the AM peak hour. The southbound approach consists of vehicles exiting the I-215 freeway.
- The northbound approach of the Central Avenue/I-215 Northbound Ramp intersection operates at LOS F in the PM peak hour. The northbound approach consists of vehicles exiting the I-215 freeway.

3.3 EXISTING FREEWAY CONDITIONS

Existing freeway segment conditions were outlined in the project area. A field review was conducted to determine the number of travel lanes in each direction of the study freeway segments and compared to volume and truck percentage data published by Caltrans. Table 3-3 presents the existing freeway segment levels of service.

As presented in Table 3-3, the majority of I-215, within the project vicinity, operates at LOS E or worse during both the AM and PM peak hours, in the peak direction of travel (AM-northbound/PM-southbound). West of the I-215/SR-91 Interchange, Highway 60 operates at acceptable service levels, based on v/c ratio thresholds. Occasional congestion at this location could be due to weaving associated with the interchange. State Route 91, west of the I-215/Hwy 60 Interchange operates at LOS E or worse in both the AM and PM peak hours, eastbound and westbound. The locations operating at LOS E or worse are described below:

Interstate 215:

- South of Highway 60, the roadway segment operates unacceptably (LOS E or worse) in the northbound direction during the AM peak hour.
- Between Highway 60 and Central Avenue, the roadway segment operates unacceptably in the northbound direction during the AM and PM peak hours. The segment operates unacceptably in the southbound direction during the PM peak hour.
- Between Central Avenue and Martin Luther King Boulevard, the roadway segment operates unacceptably in the northbound direction during the AM and PM peak hours. The segment operates unacceptably in the southbound direction during the PM peak hour.
- Between Martin Luther King Boulevard and University Avenue, the roadway segment operates unacceptably in the northbound direction during the AM and PM peak hours. The segment operates unacceptably in the southbound direction during the PM peak hour.
- Between University Avenue and 3rd Street, the roadway segment operates unacceptably in the northbound direction during the AM peak hour. The segment operates unacceptably in the southbound direction during the PM peak hour.
- Between 3rd Street and Spruce Street, the roadway segment operates unacceptably in the northbound direction during the AM peak hour. The segment operates unacceptably in the southbound direction during the PM peak hour.

- Between Spruce Street and the SR-91/Hwy 60 interchange, the roadway segment operates unacceptably in the northbound direction during the AM peak hour. The segment operates unacceptably in the southbound direction during the PM peak hour.
- North of the SR-91/Hwy 60 interchange, the roadway segment operates unacceptably in the northbound direction during the AM and PM peak hours. The segment operates unacceptably in the southbound direction during the PM peak hour.

Highway 60:

- East of Interstate 215, the roadway segment operates unacceptably in the eastbound direction during the AM peak hour. The segment operates unacceptably in the westbound direction during the AM and PM peak hours.

State Route 91:

- West of the I-215/Hwy 60 interchange, the roadway segment operates unacceptably in the eastbound direction during the AM and PM peak hours. The segment operates unacceptably in the westbound direction during the AM and PM peak hours.

Table 3-3
Existing Freeway Segment LOS

Freeway Segment	Peak Hour	Existing		
		Volume	LOS	Delay
I-215 NB, s/o 60	AM	4425	**F0**	**1.14**
	PM	3160	D	0.82
I-215 SB s/o 60	AM	2475	B	0.43
	PM	3740	C	0.65
I-215 NB, b/w 60 & Central	AM	9826	**F3**	**1.69**
	PM	6891	**F0**	**1.19**
I-215 SB, b/w 60 & Central	AM	5774	C	0.75
	PM	8709	**F0**	**1.13**
I-215 NB, b/w Central & MLK	AM	9511	**F3**	**1.64**
	PM	6670	**F0**	**1.15**
I-215 SB, b/w Central & MLK	AM	5589	C	0.72
	PM	8430	**F0**	**1.09**
I-215 NB, b/w MLK & University	AM	9134	**F3**	**1.58**
	PM	6405	**F0**	**1.10**
I-215 SB, b/w MLK & University	AM	5366	C	0.69
	PM	8095	**F0**	**1.05**
I-215 NB, b/w University & 3rd	AM	9071	**F2**	**1.36**
	PM	6360	D	0.81
I-215 SB, b/w University & 3rd	AM	5329	D	0.80
	PM	8040	**F0**	**1.03**
I-215 NB, b/w 3rd & Spruce	AM	9260	**F0**	**1.11**
	PM	6493	C	0.66
I-215 SB, b/w 3rd & Spruce	AM	5440	D	0.82
	PM	8207	**F0**	**1.05**
I-215 NB, b/w Spruce & 91/60	AM	9197	**F2**	**1.38**
	PM	6449	D	0.82
I-215 SB, b/w Spruce & 91/60	AM	5403	D	0.81
	PM	8151	**F0**	**1.04**
I-215 NB, n/o 91/60	AM	7132	**F0**	**1.21**
	PM	5602	**E**	**0.95**
I-215 SB, n/o 91/60	AM	5268	D	0.90
	PM	6798	**F0**	**1.16**
60 EB, e/o 215	AM	5845	**F3**	**1.50**
	PM	3227	D	0.83
60 WB, e/o 215	AM	4055	**F0**	**1.04**
	PM	6673	**F3**	**1.72**
60 EB, w/o 91/215	AM	3595	B	0.46
	PM	5679	C	0.73
60 WB, w/o 91/215	AM	5905	C	0.75
	PM	3821	B	0.49
91 EB, w/o 215/60	AM	5946	**F0**	**1.01**
	PM	6671	**F0**	**1.14**
91 WB, w/o 215/60	AM	6454	**F0**	**1.10**
	PM	5729	**E**	**0.98**

Section 4.0
2015 TRAFFIC CONDITIONS WITHOUT LRDP PROJECT

This section describes the assumptions, traffic forecasts and level of service analysis of the 2015 background traffic conditions without the LRDP project.

4.1 REGIONAL BACKGROUND TRAFFIC GROWTH

Regional background traffic in the vicinity of the study area would continue to grow at a certain rate with or without the LRDP. To determine the regional background traffic growth rate, the SCAG Model Socio-Economic Data (SED) by traffic analysis zones (TAZ) in the vicinity of the study area was examined. The TAZ representing the UCR area was excluded from the analysis of background traffic growth rate because traffic growth associated with the LRDP would be accounted for separately in the analysis (as discussed in Section 5.0).

SCAG Model SED data was available for the following years: 1997 (model base year), 2010 and 2025. SED variables examined included population, housing and employment. Existing (2001) and 2015 population, housing and employment levels were estimated by interpolation. The 2001-2015 growth was then estimated. Table 4-1 shows the TAZ SED data. Based on this analysis, the 2001-2015 growth was estimated to reach approximately 31.7 percent, or an equivalent annual growth rate of 1.7 percent per annum. This corresponds to a growth factor of 1.266. The growth factor was applied to existing traffic at off campus intersections to determine 2015 background traffic.

On-campus intersections were not adjusted for traffic growth because the incremental traffic growth associated with the LRDP was already accounted for in the trip generation input.

Traffic at intersections providing access to the campus (e.g., University Avenue / Campus Drive, Canyon Crest Drive / Martin Luther King Boulevard, and Big Springs Road / Watkins Drive) were adjusted for regional background growth only on selected movements with relatively few campus-related traffic. For example, at Canyon Crest Drive (north-south) / Martin Luther King Boulevard (east-west) intersection, movements with predominantly regional background traffic (e.g., eastbound through and right turns, westbound through and left turns, northbound left and right turns) were adjusted for regional background traffic growth. Movements associated with campus traffic (eastbound left turn, westbound right turn, northbound through and all southbound traffic movements) were not adjusted for regional traffic growth.

Table 4-1
Projected Growth in Population, Housing and Employment
UC Riverside Study Area

POPULATION

TAZ	1997	2001	2010	2015	01-15 Growth	2025
2865	5,885	6,331	7,335	7,678	21.27%	8,452
2866	4,758	5,023	5,620	5,800	15.46%	6,158
2934	5,662	6,269	7,634	8,150	30.01%	9,493
2937	2,339	2,856	4,020	4,519	58.21%	5,957
2939	1,794	2,000	2,464	2,653	32.64%	3,110
2940	8,874	9,509	10,938	11,467	20.59%	12,609
2941	5,567	5,934	6,760	7,001	17.98%	7,538
Subtotal*	32,540	35,067	40,751	42,749	21.91%	47,360
County	1,367,248	1,551,265	1,965,287	2,221,925	43.23%	2,735,278

HOUSING

TAZ	1997	2001	2010	2015	01-15 Growth	2025
2865	1,571	1,682	1,933	2,069	22.98%	2,375
2866	1,304	1,358	1,481	1,551	14.17%	1,702
2934	2,171	2,346	2,741	2,946	25.55%	3,438
2937	336	510	903	1,108	117.06%	1,612
2939	788	862	1,027	1,118	29.77%	1,340
2940	3,948	4,154	4,618	4,883	17.54%	5,496
2941	1,950	2,043	2,251	2,364	15.73%	2,600
Subtotal*	11,732	12,446	14,051	14,931	19.97%	16,951
County	447,985	504,507	631,676	720,452	42.80%	898,030

EMPLOYMENT

TAZ	1997	2001	2010	2015	01-15 Growth	2025
2865	4,327	4,887	6,147	6,654	36.16%	7,299
2866	923	1,085	1,451	1,579	45.47%	1,754
2934	252	444	875	1,039	134.17%	1,353
2937	1,407	2,584	5,232	6,509	151.90%	8,958
2939	2,453	2,690	3,224	3,427	27.39%	3,675
2940	1,362	1,536	1,928	2,063	34.30%	2,245
2941	704	927	1,429	1,611	73.77%	1,909
Subtotal*	10,021	11,570	15,054	16,373	41.52%	18,235
County	434,602	534,671	759,819	835,013	56.17%	985,424
Overall Growth					**31.71%** **1.7% p.a.**	

* Excluding TAZ 2937 - UCR

** (2001 and 2015 numbers are interpolated)

4.2 FUTURE ROADWAY NETWORK

A major freeway widening and interchange redesign is programmed on SR-60/SR-91/I-215 that has or will affect the roadway network and traffic conditions in the vicinity of the study area. This project has the following features:[1]

- The project will increase the number of lanes on all three routes as well as reconstruct the 60/91/215 freeway-to-freeway interchanges.
- Construction will begin in fall 2003 and be complete in fall 2006.
- HOV (carpool) lanes will be added in both directions between University Avenue and Box Springs Road.
- A new interchange will be constructed at Martin Luther King Boulevard between Canyon Crest Drive and El Cerrito Drive.
- On I-215, the El Cerrito Drive interchange and existing ramps at Spruce Street will be permanently closed.
- Seven existing interchanges will be reconstructed or reconfigured: On I-215, Blaine Street, University Avenue, Central Avenue and Box Springs Road will be modified (either ramp widening or reconfigure the interchange design).
- 19 bridges will be widened, 5 bridges reconstructed, and 4 new bridges will be built including two direct freeway-to-freeway connectors (SB I-215 to EB SR-60 and WB I-215 to SB SR-91) that are more than a mile long each.
- Reconstructed bridges include Spruce Street overcrossing on SR-91 and Blaine Street, Iowa Avenue, Linden Street and Box Springs Road overcrossings on I-215.
- A separate truck bypass ramp will be constructed on SB I-215 through the Box Springs Grade area. The truck bypass ramp will be exclusively for slow-moving trucks separating them from vehicular traffic going up the grade.
- Five existing freeway bridges will be widened to include University Avenue undercrossing, Canyon Crest Drive undercrossing, Box Springs Road overhead, I-215/SR-60 separation, and Day Street undercrossing.

Due to the permanent closure of the El Cerrito Drive interchange and the construction of a new interchange at Martin Luther King Boulevard, it is expected that traffic redistribution will occur in the vicinity of these interchanges. Based on existing turning movements at the affected ramp intersections, existing traffic was manually reassigned to the new roadway network configuration. Existing traffic using El Cerrito Drive interchange was rerouted to either the new Martin Luther King Boulevard interchange or the existing Central Avenue interchange, based on the most logical route that travelers are expected to make.

The background traffic growth factor discussed previously was then applied to the reassigned existing traffic to determine the 2015 background traffic under the 60/91/215 Project configuration.

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[1] Based on information and drawings provided by Caltrans Public Affairs to WSA dated June 24, 2002.

Figures 4-1 and 4-2 show the 2015 background traffic volumes in the study area. Figure 4-1 presents traffic volumes assuming Iowa Avenue, between University Avenue and Martin Luther King Boulevard as a two-lane section. Figure 4-2 assumes Iowa Avenue as a four-lane section.

4.3 TRAFFIC ANALYSIS

Intersection level of service (LOS) analysis was conducted for the study intersections under the 2015 background traffic (without LRDP project) conditions. Tables 4-2 through 4-5 summarize the intersection LOS under the background scenario. Level of service analysis was conducted for two possible configurations of Iowa Avenue, between University Avenue and Martin Luther King Boulevard. The first scenario assumes that this segment of Iowa Avenue remains a two-lane roadway and the second scenario assumes an alternative four-lane cross section. In the base condition where Iowa Avenue remains a two-lane roadway, a greater portion of the north-south vehicular flow would be served by the adjacent roadways such as Chicago Avenue and I-215. Figure 4-3 shows the location of the intersections impacted in the background condition.

Two-Lane Iowa Avenue, Between University Avenue and Martin Luther King Boulevard

In the background (without project) condition, nine intersections would operate at unacceptable levels of service (i.e. LOS E or F) as shown in Tables 4-2 and 4-3. These locations are listed below:

- The signalized intersection of Blaine Street/Iowa Avenue would operate at LOS E in the PM peak hour.
- The signalized intersection of University Avenue/Chicago Avenue would operate at LOS E in the PM peak hour.
- The signalized intersection of Martin Luther King Boulevard/Chicago Avenue would operate at LOS E in the PM peak hour.
- The signalized intersection of Martin Luther King Boulevard/Canyon Crest would operate at LOS F in the PM peak hour.
- The signalized intersection of Central Avenue/Canyon Crest Drive would operate at LOS E in the PM peak hour.
- The signalized intersection of Central Avenue/Box Springs Boulevard would operate at LOS E in the PM peak hour.
- The stop-controlled intersection of Big Springs Road/Watkins Drive would operate at LOS E and F in the AM and PM peak hours, respectively.
- The stop-controlled westbound approach on Le Conte Drive at its intersection with Chicago Avenue would operate at LOS F in the AM peak hour.
- The stop-controlled northbound I-215 off-ramp at Central Avenue would operate at LOS F during the AM and PM peak hours.

Four-Lane Iowa Avenue, Between University Avenue and Martin Luther King Boulevard

In the background (without project) condition, with a four-lane Iowa Avenue assumed between University Avenue and Martin Luther King Boulevard, seven intersections would operate at unacceptable levels of service (i.e. LOS E or F) as shown in Tables 4-4 and 4-5. These locations are listed below:

- The signalized intersection of Blaine Street/Iowa Avenue would operate at LOS E in the PM peak hour.
- The signalized intersection of Martin Luther King Boulevard/Canyon Crest would operate at LOS F in the PM peak hour.
- The signalized intersection of Central Avenue/Canyon Crest Drive would operate at LOS E in the PM peak hour.
- The signalized intersection of Central Avenue/Box Springs Boulevard would operate at LOS E in the PM peak hour.
- The stop-controlled intersection of Big Springs Road/Watkins Drive would operate at LOS E and F in the AM and PM peak hours, respectively.
- The stop-controlled westbound approach on Le Conte Drive at its intersection with Chicago Avenue would operate at LOS F in the AM peak hour.
- The stop-controlled northbound I-215 off-ramp at Central Avenue would operate at LOS F during the AM and PM peak hours.

All of these intersections are also impacted with Iowa Avenue as a two-lane roadway. With Iowa Avenue as a two-lane road, the Chicago Avenue intersections at University Avenue and Martin Luther King Boulevard are also impacted.

Mitigation measures that would bring intersections operating at LOS E or F in the background condition to acceptable levels are presented in Section 6.

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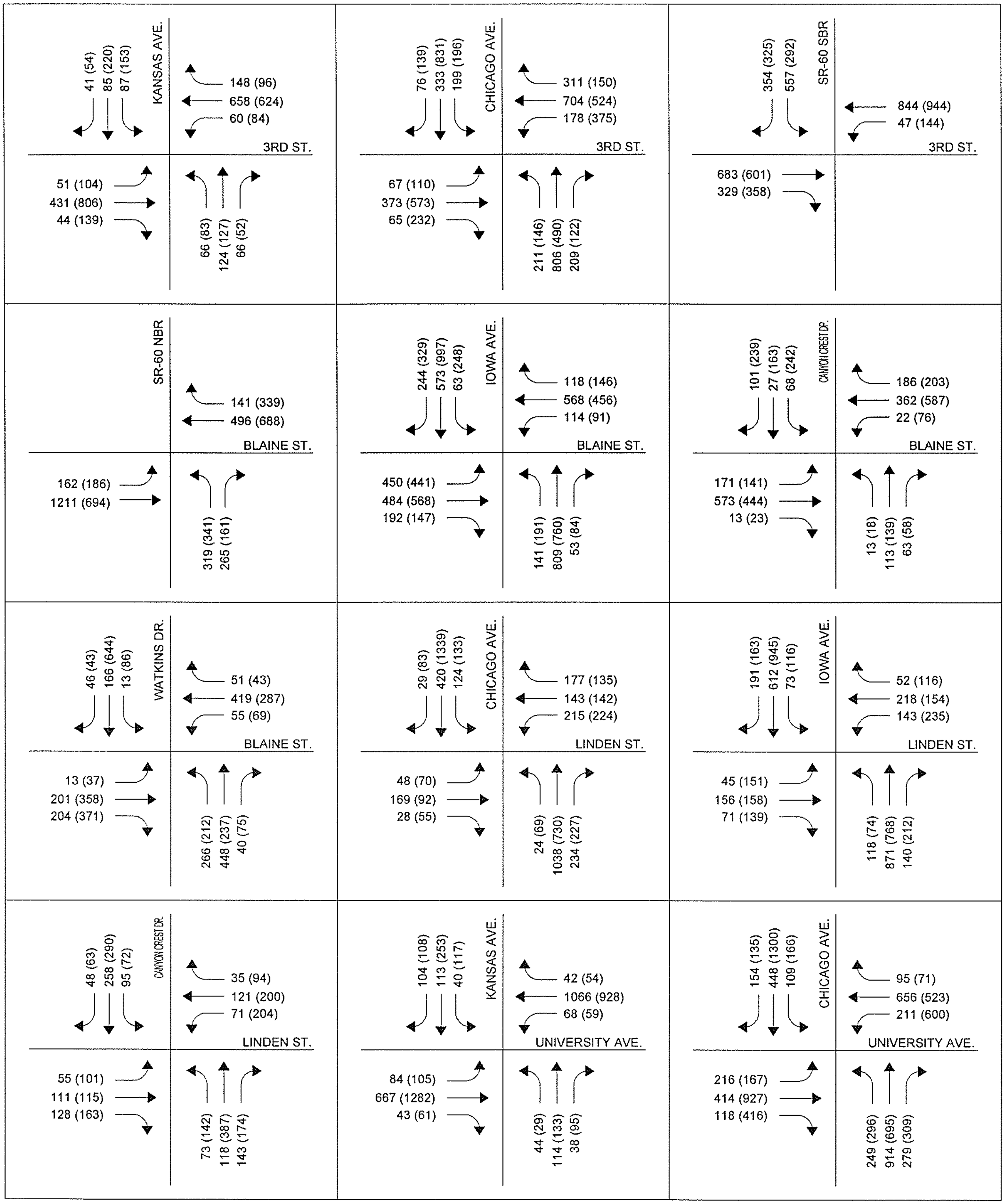

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Figure 4-1A
2015 Background (Without LRDP) - AM/(PM) Peak Hour Volumes
Signalized Intersections - 2-Lane Iowa Condition
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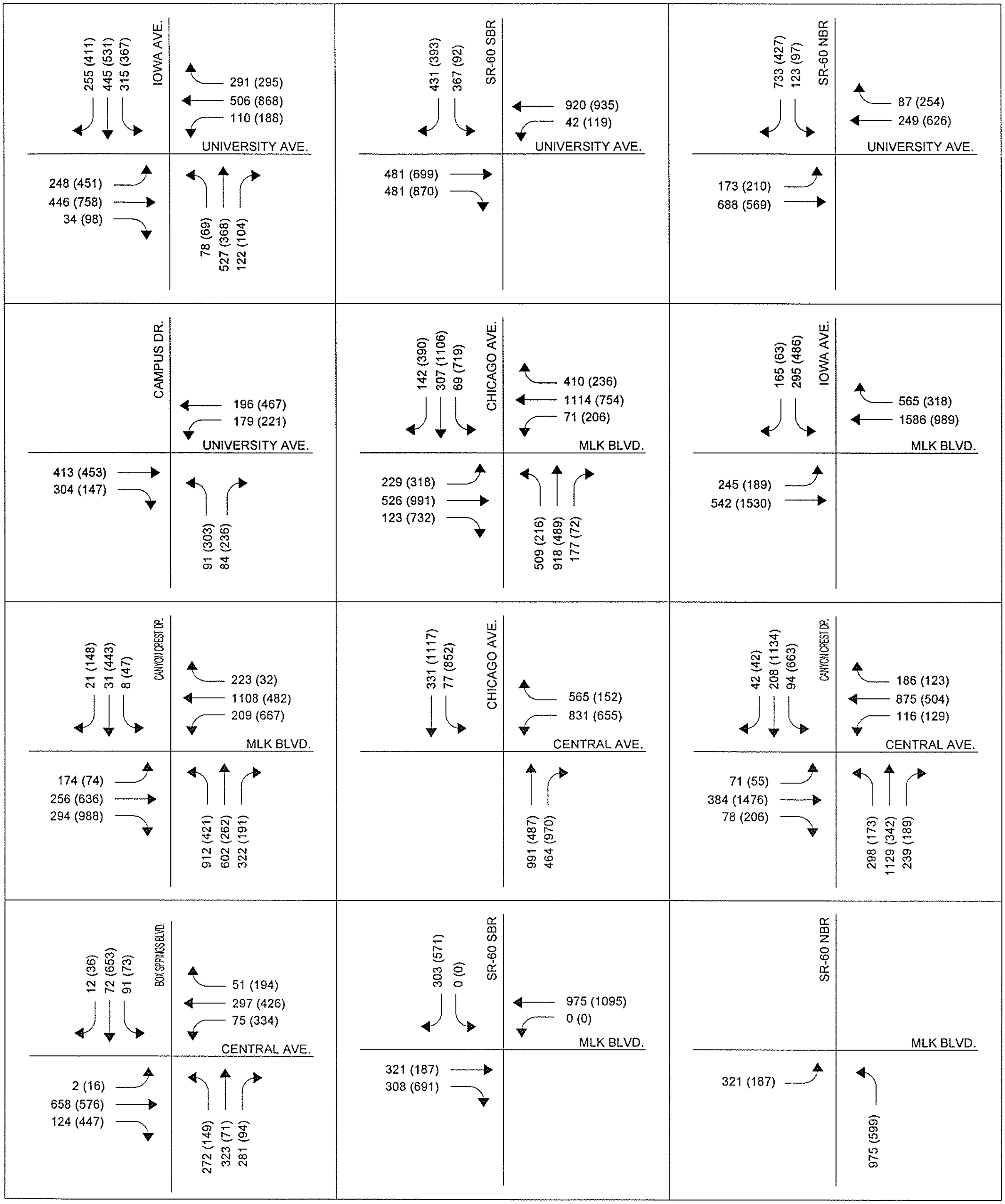

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Figure 4-1B
2015 Background (Without LRDP) - AM/(PM) Peak Hour Volumes
Signalized Intersections - 2-Lane Iowa Condition
UC Riverside Long Range Development Plan EIR

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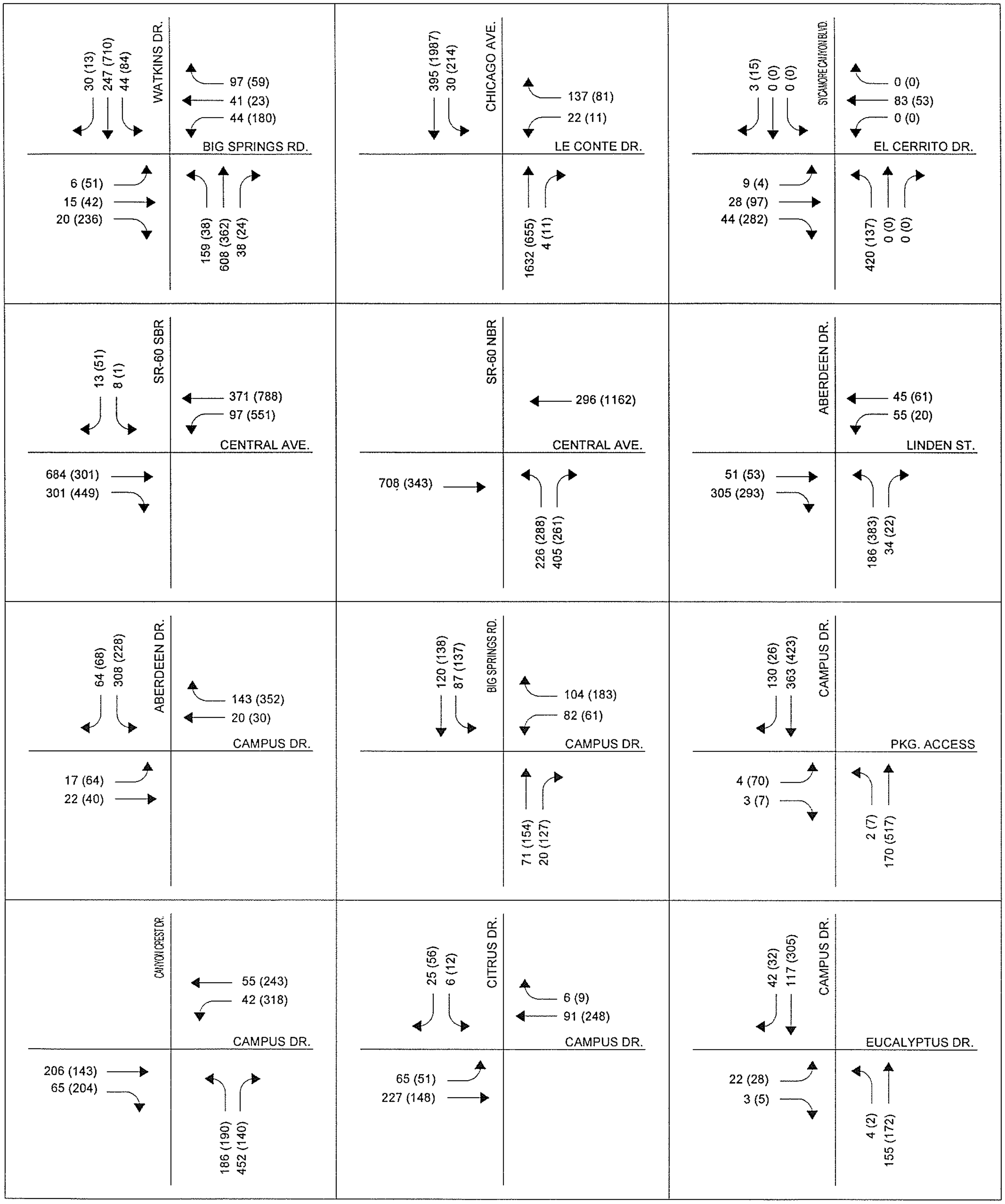

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Figure 4-1C
2015 Background (Without LRDP) - AM/(PM) Peak Hour Volumes
Unsignalized Intersections - 2-Lane Iowa Condition
UC Riverside Long Range Development Plan EIR

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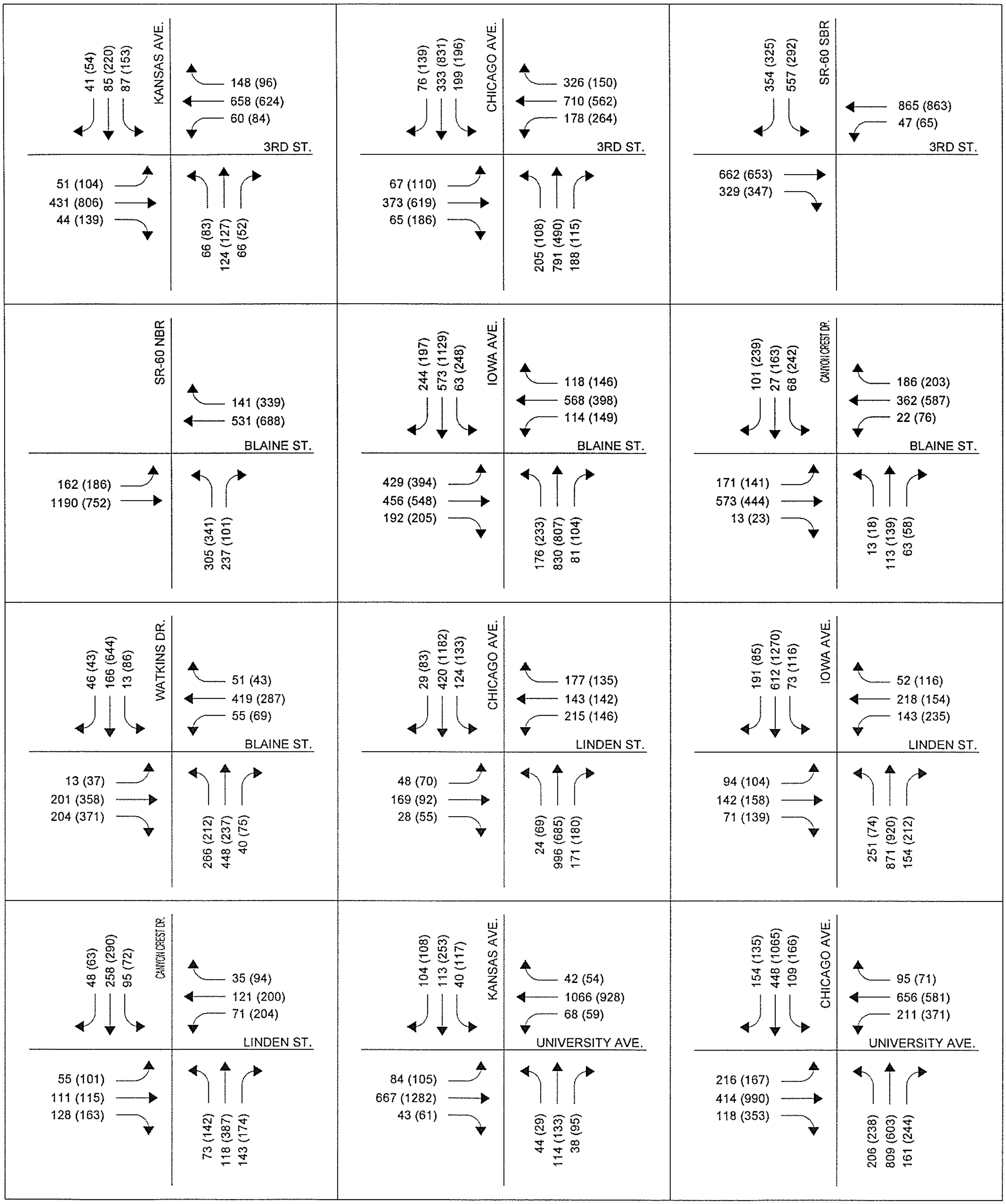

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Figure 4-2A
2015 Background (Without LRDP) - AM/(PM) Peak Hour Volumes
Signalized Intersections - 4-Lane Iowa Condition
UC Riverside Long Range Development Plan EIR

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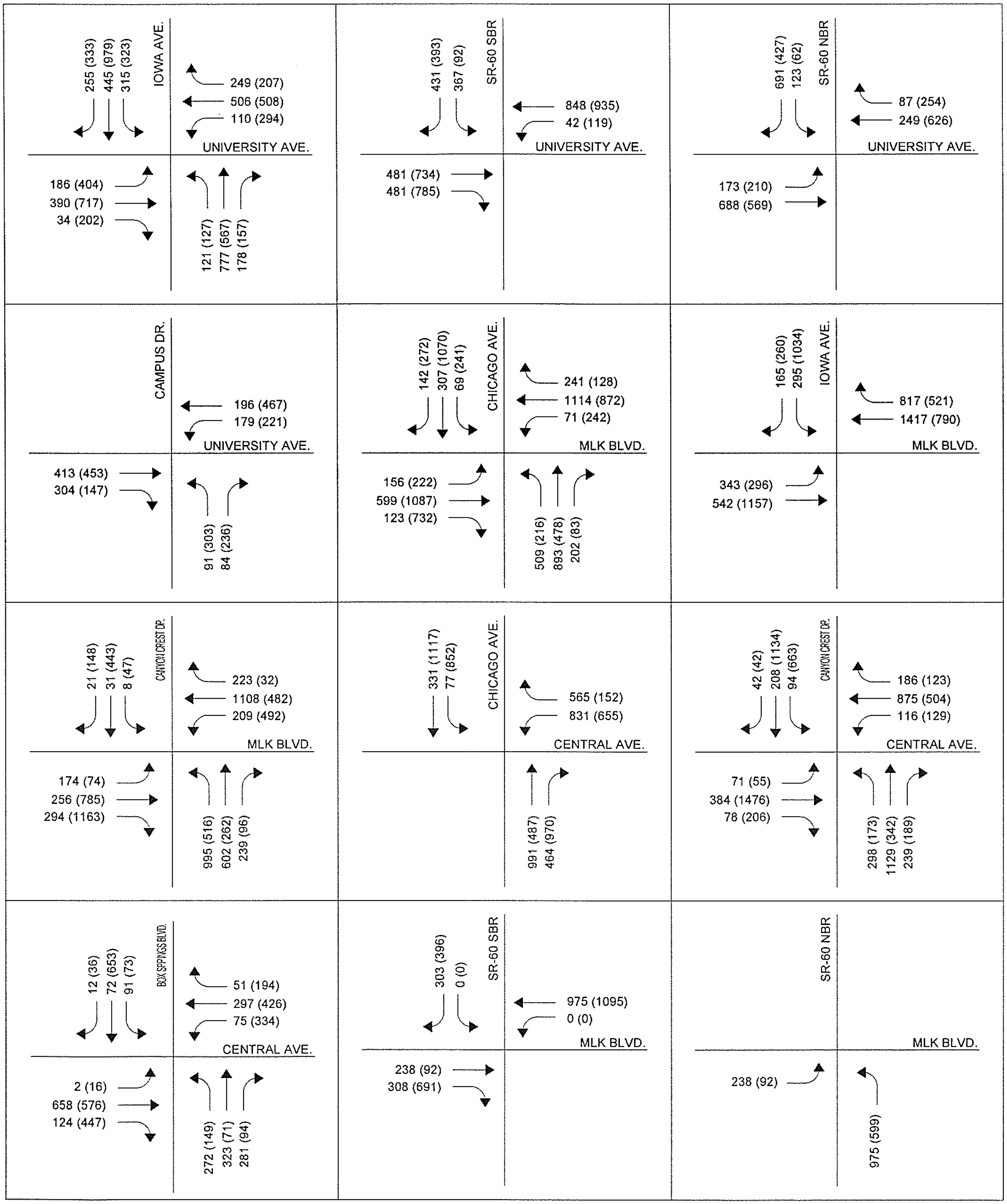

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Figure 4-2B
2015 Background (Without LRDP) - AM/(PM) Peak Hour Volumes
Signalized Intersections - 4-Lane Iowa Condition
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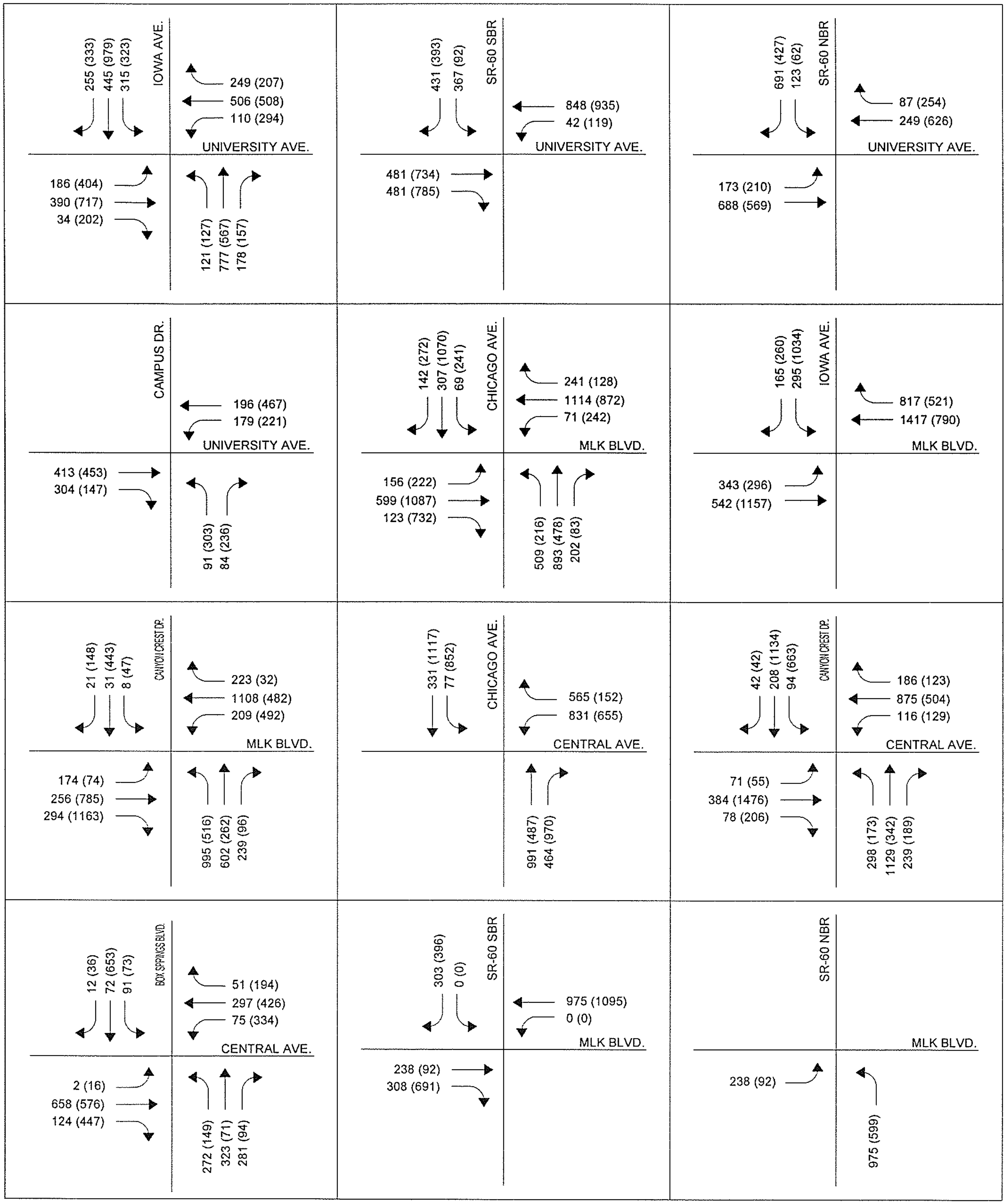

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Figure 4-2B
2015 Background (Without LRDP) - AM/(PM) Peak Hour Volumes
Signalized Intersections - 4-Lane Iowa Condition
UC Riverside Long Range Development Plan EIR

Table 4-2
2015 Signalized Intersection LOS Summary Without LRDP

Intersection	Peak Hour	2015 Background	
		LOS	Delay
3rst St./Kansas Ave.	AM	C	21.5
	PM	C	26.2
3rd St./Chicago Ave.	AM	D	39.5
	PM	D	45.5
3rd St./I-215 SBR	AM	C	24.0
	PM	C	21.6
3rd St./I-215 NBR	AM	C	20.5
	PM	C	22.3
Blaine St./Iowa Ave.	AM	D	42.7
	PM	**E**	**60.1**
Blaine St./Canyon Crest Dr.	AM	C	22.0
	PM	C	34.6
Blaine St./Watkins Dr.	AM	C	32.7
	PM	C	27.0
Linden St./Chicago Ave.	AM	B	16.8
	PM	B	15.0
Linden St./Iowa Ave.	AM	C	23.3
	PM	C	24.5
Linden St./Canyon Crest Dr.	AM	C	26.0
	PM	C	28.9
University Ave./Kansas Ave.	AM	B	13.1
	PM	C	20.3
University Ave./Chicago Ave.	AM	C	31.6
	PM	**E**	**64.2**
University Ave./Iowa Ave.	AM	D	36.7
	PM	D	51.0
University Ave./I-215 SBR	AM	C	21.0
	PM	A	9.1
University Ave./I-215 NBR	AM	C	29.7
	PM	C	26.6
University Ave./Campus Dr.	AM	B	18.6
	PM	C	23.7
Martin Luther King Blvd./Chicago Ave.	AM	D	46.5
	PM	**E**	**67.0**
Martin Luther King Blvd./Iowa Ave.	AM	B	18.2
	PM	B	16.9
Martin Luther King Blvd./Canyon Crest	AM	C	31.3
	PM	**F**	**91.8**
Martin Luther King Blvd./I-215 SBR	AM	B	15.7
	PM	C	24.1
Martin Luther King Blvd./I-215 NBR	AM	B	12.7
	PM	B	11.4
Central Ave./Chicago Ave.	AM	C	21.8
	PM	D	43.3
Central Ave./Canyon Crest Dr.	AM	D	37.3
	PM	**E**	**79.4**
Central Ave./Box Springs Blvd.	AM	C	33.1
	PM	**E**	**65.9**

Assumes existing 2-lane section on Iowa Avenue, between Univeristy Avenue and Martin Luther King Blvd.

Table 4-3
2015 Unsignalized Intersection LOS Summary Without LRDP

Intersection	Control	Peak Hour	2015 Background	
			LOS	Delay
Big Springs Rd./Watkins Dr.	AWS	AM	**E**	**35.2**
		PM	**F**	**129.6**
El Cerrito Dr./Sycamore Canyon	AWS	AM	C	15.2
		PM	B	11.3
Linden St./Aberdeen Dr.	AWS	AM	A	9.8
		PM	B	12.6
Campus Dr./Aberdeen Dr.	AWS	AM	B	10.2
		PM	B	10.8
Big Springs Rd./Campus Dr.	AWS	AM	A	8.7
		PM	B	10.4
Parking Access/Campus Dr.	AWS	AM	B	10.7
		PM	C	15.2
Campus Dr./Canyon Crest Dr.	AWS	AM	B	12.9
		PM	B	13.4
Le Conte Dr./Chicago Ave.	Minor	AM	**WB: F**	**70.6**
		PM	WB: D	33.3
Central Ave./I-215 SBR	Minor	AM	SB: C	18.7
		PM	SB: C	20.7
Central Ave./I-215 NBR	Minor	AM	**NB: F**	**60.3**
		PM	**NB: F**	**320.0**
Campus Dr./Citrus Dr.	Minor	AM	SB: A	9.5
		PM	SB: B	10.5
Eucalyptus Dr./Campus Dr.	Minor	AM	EB: B	10.3
		PM	EB: B	11.9

Assumes existing 2-lane section on Iowa Avenue, between Univeristy Avenue and Martin Luther King Blvd.

Table 4-4
2015 Signalized Intersection LOS Summary Without LRDP With Alternative 4-Lane Iowa Avenue Section

Intersection	Peak Hour	2015 Background	
		LOS	Delay
3rst St./Kansas Ave.	AM	C	21.5
	PM	C	26.2
3rd St./Chicago Ave.	AM	D	39.2
	PM	D	39.0
3rd St./I-215 SBR	AM	C	23.9
	PM	B	19.7
3rd St./I-215 NBR	AM	B	20.0
	PM	C	21.8
Blaine St./Iowa Ave.	AM	D	43.3
	PM	**E**	**56.8**
Blaine St./Canyon Crest Dr.	AM	C	22.0
	PM	C	34.6
Blaine St./Watkins Dr.	AM	C	32.7
	PM	C	27.0
Linden St./Chicago Ave.	AM	B	16.5
	PM	B	12.7
Linden St./Iowa Ave.	AM	C	23.3
	PM	C	24.2
Linden St./Canyon Crest Dr.	AM	C	26.0
	PM	C	28.9
University Ave./Kansas Ave.	AM	B	13.1
	PM	C	20.3
University Ave./Chicago Ave.	AM	C	32.5
	PM	D	38.5
University Ave./Iowa Ave.	AM	D	38.5
	PM	D	50.8
University Ave./I-215 SBR	AM	C	21.0
	PM	A	9.0
University Ave./I-215 NBR	AM	C	28.9
	PM	C	26.7
University Ave./Campus Dr.	AM	B	18.6
	PM	C	23.7
Martin Luther King Blvd./Chicago Ave.	AM	D	36.4
	PM	D	52.3
Martin Luther King Blvd./Iowa Ave.	AM	C	21.3
	PM	C	25.2
Martin Luther King Blvd./Canyon Crest	AM	C	34.0
	PM	**F**	**104.7**
Martin Luther King Blvd./I-215 SBR	AM	B	15.8
	PM	B	18.7
Martin Luther King Blvd./I-215 NBR	AM	B	10.5
	PM	A	7.1
Central Ave./Chicago Ave.	AM	C	21.8
	PM	D	43.3
Central Ave./Canyon Crest Dr.	AM	D	37.3
	PM	**E**	**79.4**
Central Ave./Box Springs Blvd.	AM	C	33.1
	PM	**E**	**65.9**

Assumes 4-lane section on Iowa Avenue, between Univeristy Avenue and Martin Luther King Blvd.

Table 4-5
2015 Unsignalized Intersection LOS Summary Without LRDP With Alternative 4-Lane Iowa Avenue Section

Intersection	Control	Peak Hour	2015 Background LOS	2015 Background Delay
Big Springs Rd./Watkins Dr.	AWS	AM	**E**	**35.2**
		PM	**F**	**129.6**
El Cerrito Dr./Sycamore Canyon	AWS	AM	C	15.2
		PM	B	11.3
Linden St./Aberdeen Dr.	AWS	AM	A	9.8
		PM	B	12.6
Campus Dr./Aberdeen Dr.	AWS	AM	B	10.2
		PM	B	10.8
Big Springs Rd./Campus Dr.	AWS	AM	A	8.7
		PM	B	10.4
Parking Access/Campus Dr.	AWS	AM	B	10.7
		PM	C	15.2
Campus Dr./Canyon Crest Dr.	AWS	AM	B	12.9
		PM	B	13.4
Le Conte Dr./Chicago Ave.	Minor	AM	**WB: F**	**70.6**
		PM	WB: D	33.3
Central Ave./I-215 SBR	Minor	AM	SB: C	18.7
		PM	SB: C	20.7
Central Ave./I-215 NBR	Minor	AM	**NB: F**	**60.3**
		PM	**NB: F**	**320.0**
Campus Dr./Citrus Dr.	Minor	AM	SB: A	9.5
		PM	SB: B	10.5
Eucalyptus Dr./Campus Dr.	Minor	AM	EB: B	10.3
		PM	EB: B	11.9

Assumes 4-lane section on Iowa Avenue, between Univeristy Avenue and Martin Luther King Blvd.

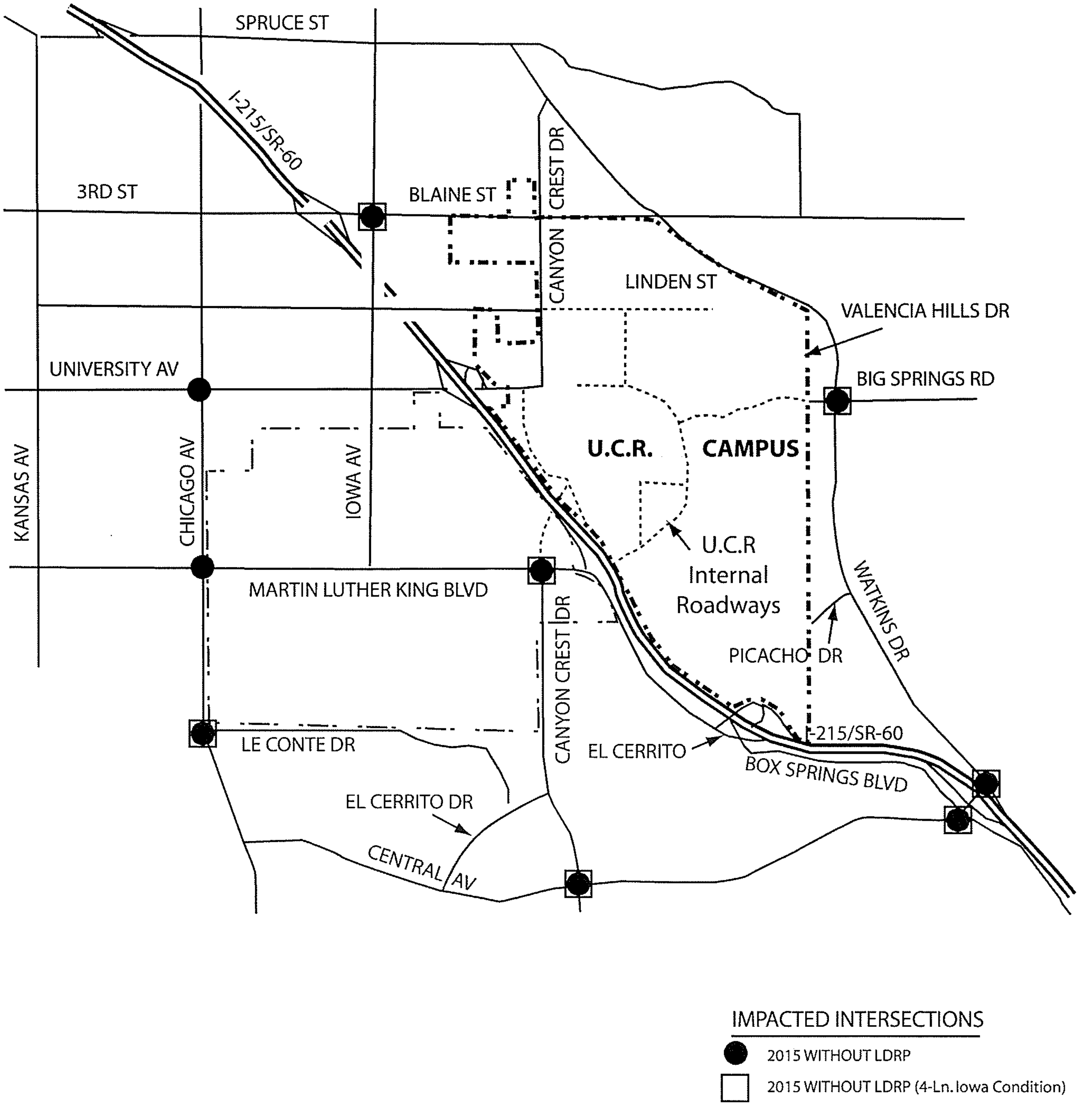

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Figure 4-3
2015 Background (Without LRDP) - Impacted Intersections
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4.4 FREEWAY SEGMENT ANALYSIS

Freeway segment level of service (LOS) analysis was conducted for the study freeway segments under the 2015 background traffic (without LRDP project) conditions. Level of service analysis was conducted for two possible configurations of Iowa Avenue, between University Avenue and Martin Luther King Boulevard. The first scenario assumes that this segment of Iowa Avenue remains a two-lane roadway. The level of service summary for the two-lane scenario is shown in Table 4-6. The second scenario assumes an alternative four-lane cross section. The level of service summary for the four-lane scenario is presented in Table 4-7 In the base condition where Iowa Avenue remains a two-lane roadway, a greater portion of the north-south vehicular flow would be served by the adjacent roadways such as Chicago Avenue and I-215.

As presented in Tables 4-6 and 4-7, portions of I-215, State Route 91, and Highway 60, within the project vicinity, would continue to operate at LOS E or worse in both the AM and PM peak hours, northbound and southbound. In both the two-and four-lane Iowa Avenue scenarios, the following sections would operate unacceptably:

Interstate 215:

- South of Highway 60, the roadway segment would continue to operate unacceptably in the northbound direction during the AM peak hour.
- Between Highway 60 and Central Avenue, the roadway segment would continue to operate unacceptably in the northbound direction during the AM and PM peak hours. The segment would continue to operate unacceptably in the southbound direction during the PM peak hour.
- Between Central Avenue and Martin Luther King Boulevard, the roadway segment would continue to operate unacceptably in the northbound direction during the AM peak hour. The segment would continue to operate unacceptably in the southbound direction during the PM peak hour. A planned carpool and truck passing lane in the section would improve operating conditions for other periods.
- Between Martin Luther King Boulevard and University Avenue, the roadway segment would continue to operate unacceptably in the northbound direction during the AM peak hour. A planned carpool lane in the section would improve operating conditions for other periods.
- Between University Avenue and 3rd Street, the roadway segment would continue to operate unacceptably in the northbound direction during the AM peak hour. The segment would continue to operate unacceptably in the southbound direction during the PM peak hour.
- Between 3rd Street and Spruce Street, the roadway segment would continue to operate unacceptably in the northbound direction during the AM peak hour. The segment would continue to operate unacceptably in the southbound direction during the PM peak hour.
- Between Spruce Street and the SR-91/Hwy 60 interchange, the roadway segment would continue to operate unacceptably in the northbound direction during the AM peak hour. The segment would continue to operate unacceptably in the southbound direction during the PM peak hour.
- North of the SR-91/Hwy 60 interchange, the roadway segment would continue to operate unacceptably in the northbound direction during the AM and PM peak hours. The

segment would continue to operate unacceptably in the southbound direction during the PM peak hour.

Highway 60:

- East of Interstate 215, the roadway segment would continue to operate unacceptably in the eastbound direction during the AM peak hour. The segment would continue to operate unacceptably in the westbound direction during the AM and PM peak hours.

State Route 91:

- West of the I-215/Hwy 60 interchange, the roadway segment would continue to operate unacceptably in the eastbound direction during the AM and PM peak hours. The segment would continue to operate unacceptably in the westbound direction during the AM and PM peak hours.

Table 4-6
2015 Freeway Segment LOS Summary Without LRDP

Freeway Segment	Peak Hour	2015 Background		
		Volume	LOS	Delay
I-215 NB, s/o 60	AM	4721	**F0**	**1.22**
	PM	3372	D	0.87
I-215 SB s/o 60	AM	2641	B	0.46
	PM	3991	C	0.69
I-215 NB, b/w 60 & Central	AM	10484	**F1**	**1.36**
	PM	7353	**E**	**0.95**
I-215 SB, b/w 60 & Central	AM	6161	C	0.64
	PM	9292	**E**	**0.96**
I-215 NB, b/w Central & MLK	AM	10148	**F1**	**1.31**
	PM	7117	D	0.92
I-215 SB, b/w Central & MLK	AM	5963	B	0.62
	PM	8995	**E**	**0.93**
I-215 NB, b/w MLK & University	AM	9829	**F1**	**1.27**
	PM	6929	D	0.90
I-215 SB, b/w MLK & University	AM	5725	B	0.59
	PM	8812	D	0.91
I-215 NB, b/w University & 3rd	AM	9721	**F3**	**1.46**
	PM	6846	D	0.87
I-215 SB, b/w University & 3rd	AM	5686	D	0.85
	PM	8669	**F0**	**1.11**
I-215 NB, b/w 3^{rd} & Spruce	AM	9880	**F0**	**1.19**
	PM	6928	C	0.71
I-215 SB, b/w 3^{rd} & Spruce	AM	5804	D	0.87
	PM	8757	**F0**	**1.12**
I-215 NB, b/w Spruce & 91/60	AM	9813	**F3**	**1.47**
	PM	6881	D	0.88
I-215 SB, b/w Spruce & 91/60	AM	5765	D	0.86
	PM	8697	**F0**	**1.11**
I-215 NB, n/o 91/60	AM	7610	**F1**	**1.30**
	PM	5977	**F0**	**1.02**
I-215 SB, n/o 91/60	AM	5621	**E**	**0.96**
	PM	7253	**F0**	**1.24**
60 EB, e/o 215	AM	6237	**F3**	**1.60**
	PM	3443	D	0.89
60 WB, e/o 215	AM	4327	**F0**	**1.11**
	PM	7120	**F3**	**1.83**
60 EB, w/o 91/215	AM	3836	B	0.49
	PM	6059	C	0.77
60 WB, w/o 91/215	AM	6301	D	0.80
	PM	4077	B	0.52
91 EB, w/o 215/60	AM	6344	**F0**	**1.08**
	PM	7118	**F0**	**1.21**
91 WB, w/o 215/60	AM	6886	**F0**	**1.17**
	PM	6113	**F0**	**1.04**

Table 4-7
2015 Freeway Segment LOS Summary Without LRDP With Alternative 4-Lane Iowa Avenue Section

Freeway Segment	Peak Hour	2015 Background		
		Volume	LOS	Delay
I-215 NB, s/o 60	AM	4721	**F0**	**1.22**
	PM	3372	D	0.87
I-215 SB s/o 60	AM	2641	B	0.46
	PM	3991	C	0.69
I-215 NB, b/w 60 & Central	AM	10484	**F1**	**1.36**
	PM	7353	**E**	**0.95**
I-215 SB, b/w 60 & Central	AM	6161	C	0.64
	PM	9292	**E**	**0.96**
I-215 NB, b/w Central & MLK	AM	10148	**F1**	**1.31**
	PM	7117	D	0.92
I-215 SB, b/w Central & MLK	AM	5963	B	0.62
	PM	8995	**E**	**0.93**
I-215 NB, b/w MLK & University	AM	9746	**F1**	**1.26**
	PM	6834	D	0.88
I-215 SB, b/w MLK & University	AM	5725	B	0.59
	PM	8637	D	0.89
I-215 NB, b/w University & 3rd	AM	9679	**F2**	**1.45**
	PM	6786	D	0.87
I-215 SB, b/w University & 3rd	AM	5686	D	0.85
	PM	8579	**F0**	**1.10**
I-215 NB, b/w 3rd & Spruce	AM	9880	**F0**	**1.19**
	PM	6928	C	0.71
I-215 SB, b/w 3rd & Spruce	AM	5804	D	0.87
	PM	8757	**F0**	**1.12**
I-215 NB, b/w Spruce & 91/60	AM	9813	**F3**	**1.47**
	PM	6881	D	0.88
I-215 SB, b/w Spruce & 91/60	AM	5765	D	0.86
	PM	8697	**F0**	**1.11**
I-215 NB, n/o 91/60	AM	7610	**F1**	**1.30**
	PM	5977	**F0**	**1.02**
I-215 SB, n/o 91/60	AM	5621	**E**	**0.96**
	PM	7253	**F0**	**1.24**
60 EB, e/o 215	AM	6237	**F3**	**1.60**
	PM	3443	D	0.89
60 WB, e/o 215	AM	4327	**F0**	**1.11**
	PM	7120	**F3**	**1.83**
60 EB, w/o 91/215	AM	3836	B	0.49
	PM	6059	C	0.77
60 WB, w/o 91/215	AM	6301	D	0.80
	PM	4077	B	0.52
91 EB, w/o 215/60	AM	6344	**F0**	**1.08**
	PM	7118	**F0**	**1.21**
91 WB, w/o 215/60	AM	6886	**F0**	**1.17**
	PM	6113	**F0**	**1.04**

Assumes 4-lane section on Iowa Avenue, between Univeristy Avenue and Martin Luther King Blvd.

Section 5.0
2015 TRAFFIC CONDITIONS WITH LRDP PROJECT

This section describes the assumptions, forecast and traffic analysis of 2015 traffic conditions with the LRDP project. A comparison of with and without LRDP project conditions resulted in identification of LRDP project-related traffic impacts.

5.1 LRDP PROJECT TRIP GENERATION

Vehicle trip generation rates were specifically developed for UCR based on campus population data and vehicular traffic counts at selected "cordon" locations.[1] The existing (2001) campus population used in the trip generation rate development was based on the most recent data provided by UCR staff as summarized in Table 5-1. The table also shows the projected 2015 UCR population. The future population assumes that approximately 50% of the student population is housed on campus.

Table 5-1
UCR Campus Population

Category	2000-2001 Academic Year Population	2015-2016 Academic Year Projected Population
Resident Students	3,249	12,500
Married / Family Housing	268	714
Residence Hall Housing	2,366	5,906
On-Campus Apartments	615	5,880
Commuting Students	10,186	12,500
Commuting Faculty / Staff	3,537	7,426
Total	16,972	32,426

Source: UCR Staff

Cordon traffic counts were conducted at all UCR access points to capture all vehicular traffic entering and leaving the UCR campus. This traffic consists predominantly of commuting students, faculty and staff. However, it also includes visitor and delivery trips. In addition, cordon counts were conducted along roadways serving a particular student residence area (e.g., married/family housing, residence halls, on-campus apartments) to capture the traffic associated with each area. Cordon counts were then correlated with campus population data to determine the trip generation rates by population category as shown in Table 5-2. One drawback of the cordon method is that it did not allow for the estimation of separate trip rates for commuting students and commuting faculty/staff. As such, the trip rate provided in Table 5-2 is a composite rate for the combination of student and faculty/staff commuters.

Trip generation rates were estimated for the AM and PM peak hours as well as for the daily period. The peak hour trip generation rates were also estimated for on-campus peak hours (7:30-

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[1] Memorandum dated June 27, 2002 from Ellen Polling (Fehr & Peers Associates) to Bob Davis (Wilbur Smith Associates) Re: UCR LRDP Trip Generation Rate Development.

[2] E-mail to Ellen Polling dated July 6, 2001.

8:30 AM and 4:30-5:30 PM) as well as the off-campus peak hours (7:45-8:45 AM and 4:45-5:45 PM). Off-campus peak hour trip rates were generally higher, therefore more conservative, than on-campus. This analysis used the off-campus peak hour trip rates because the intersections analyzed were predominantly off-campus. The table also shows the directional (inbound and outbound) trip generation rates. It is assumed that the daily trip generation is equally split in both directions.

Table 5-2
UCR Trip Generation Rates
(Vehicle trips per student)

	AM Peak Hour		PM Peak Hour		Daily
Category	Inbound	Outbound	Inbound	Outbound	
Resident Students					
Married / Family Housing	0.300	0.394	0.337	0.388	9.153
Residence Hall Housing	0.021	0.026	0.053	0.067	2.153
On-Campus Apartments	0.039	0.049	0.099	0.125	4.004
Commuting Students / Faculty / Staff	0.184	0.049	0.116	0.194	3.407

Source: Adjusted Fehr & Peers estimate.

Subsequent to the initial cordon trip survey, it was decided that a more accurate assessment of trip generation for the LRDP could be realized if separate trip rates were developed for commuter students and for faculty/staff. A more detailed survey was designed and conducted in April, 2003 that involved a survey of selected parking lots throughout the campus that are specifically assigned to either students or faculty/staff. This data sample was then factored to the total population of both commuting student and faculty/staff. This supplemental survey accomplished two goals. First, it allowed for a separate verification of the total current commuter population trip generation characteristics and secondly, allowed for individual trip rates to be derived for commuter students and faculty/staff. The resulting trip generation rate estimates are summarized in Table 5-3.

Table 5-3
Refined UCR Trip Generation Rates
(Vehicle trips per student)

	AM Peak Hour		PM Peak Hour		Daily
Category	Inbound	Outbound	Inbound	Outbound	
Commuting Students	0.065	0.015	0.014	0.054	1.108
Commuting Faculty / Staff	0.384	0.106	0.287	0.430	7.277

Source: Field Surveys and Refined Fehr & Peers estimate.

Trip generation rates were assumed to be stable over time. Trip generation rates derived from existing data were therefore applied to projected 2015 campus population (previously shown in Table 5-1) to estimate the 2015 UCR trip generation with the LRDP project as shown in Table 5-3. The table also shows the existing UCR trip generation as well as the estimated net increase from 2001 to 2015.

A study is currently underway at UCR to develop a campus-wide transportation management strategy plan. The primary objective of this plan will be to reduce vehicular traffic in terms of commuting vehicles and general vehicular circulation within and around the campus. The plan will promote alternative transportation modes including transit, shuttles, bicycles and pedestrian. Based on experience at other university campuses throughout the state that have implemented transportation demand management (TDM) plans, it is reasonable to expect that an active management plan can achieve at least a 10 to 15 percent reduction in vehicular traffic. Since this traffic analysis is addressing long-range conditions on campus, it was assumed that the ongoing transportation management strategy plan would be implemented and that a conservatively estimated 10 percent reduction in campus oriented vehicular traffic would be realized. Due to difficulties in applying this reduction to existing resident student traffic on campus, the 10 percent reduction was only applied to the net increase in resident student traffic.

The total traffic in the study area roadway network consists of the regional background traffic plus the traffic associated with the LRDP. However, since the regional background traffic was based on traffic counts that already included existing UCR traffic, only the incremental traffic associated with the LRDP was added to the regional background traffic to avoid double counting of UCR trips, as presented in Table 5-4.

Table 5-4
UCR Vehicle Trip Generation

	Existing (2001)			**Future (2015)**			**Net Increase (2001-2015)**		
Category	**AM Peak**	**PM Peak**	**Daily**	**AM Peak**	**PM Peak**	**Daily**	**AM Peak**	**PM Peak**	**Daily**
Resident Students									
Married / Family Housing	186	194	2,453	496	518	6,535	310	173	4,082
Residence Hall Housing	112	284	5,094	278	709	12,716	166	425	7,622
On-Campus Apartments	54	138	2,462	517	1,317	23,544	463	1,179	21,081
Resident Students Subtotal	352	616	10,009	1,291	2,544	42,795	939	1,927	32,785
Est. 10% Resident TDM Reduction				(94)	(193)	(3,278)	(94)	(193)	(3,278)
Net Adj. Resident Students				1,197	3,351	39,517	845	1,734	29,507
Commuters									
Students	815	693	11,286	1,000	850	13,850	185	157	2,564
Faculty / Staff	1,733	2,536	25,739	3,639	5,324	54,039	1,906	2,788	28,300
Commuter Subtotal	2,548	3,229	37,025	4,639	6,174	67,889	2,091	2,946	30,864
Est. 10% Commuter TDM Reduction				(464)	(617)	(6,789)	(464)	(617)	(6,789)
Net Adj. Commuters				4,175	5,557	61,100	1,627	2,329	24,075
Total	**2,900**	**3,845**	**47,034**	**5,372**	**7,908**	**110,617**	**2,472**	**4,063**	**53,582**

Source: WSA estimates.

5.2 LRDP PROJECT TRIP DISTRIBUTION

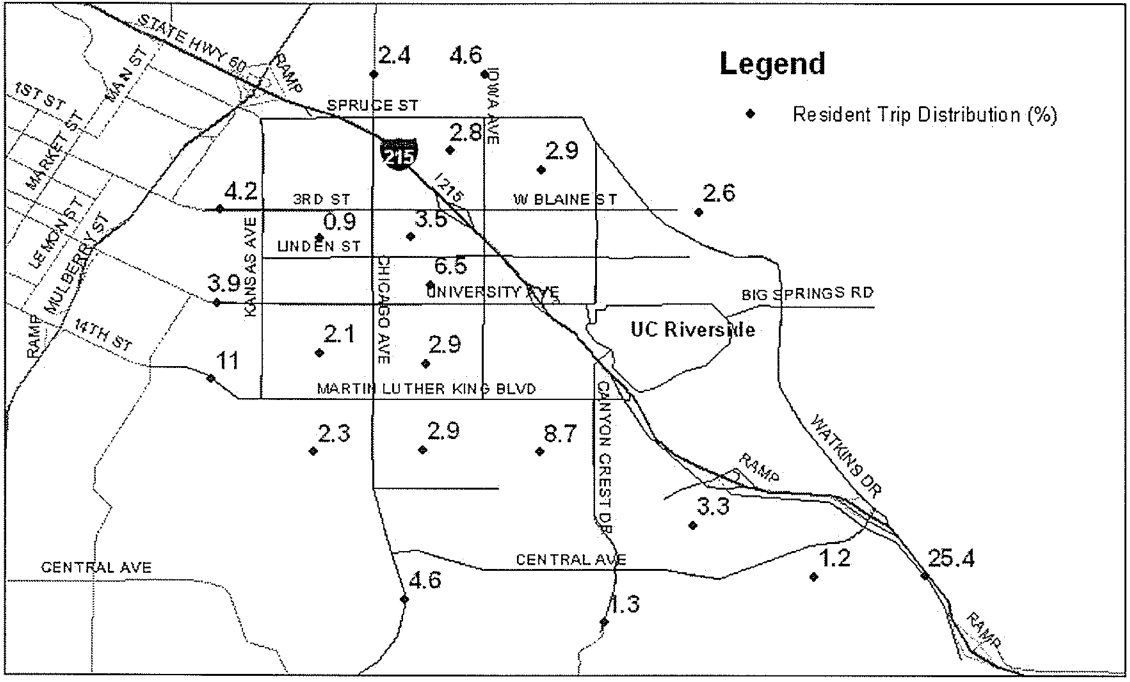
The UCR campus population was assumed to consist of two groups of people with different trip distribution patterns: resident students and commuting students/faculty/staff. Trip distribution patterns for each of these groups were derived separately as discussed below. Visitor and delivery traffic were not analyzed separately due to insufficient data regarding these trips. However, the traffic counts used in developing the UCR commuter trip generation rates already account for these trips.

Resident Trip Distribution

Resident student trips are expected to be generated from existing and future on-campus housing facilities. Majority of the resident student school trips are expected to be made on foot or bicycle. Vehicle trips generated from on-campus housing are assumed to be associated with the student/spouse going to work and/or driving children to school in case of married students, or with social/recreational trips in case of non-married students. The geographic distribution of these trips is assumed to be similar to the regional distribution of employment. Employment distribution was obtained from SCAG's socio-economic data (SED) by TAZ. Figure 5-1 shows the SCAG employment distribution. The incremental traffic generated by on-campus residential facilities was distributed throughout the study area using this pattern.

Under the LRDP, the existing Canyon Crest Family Housing would be demolished in phases to give way to new residence halls and undergraduate apartments. The existing traffic associated with the demolished housing facility was subtracted from the incremental residential traffic.

Figure 5-1
Resident Trip Distribution

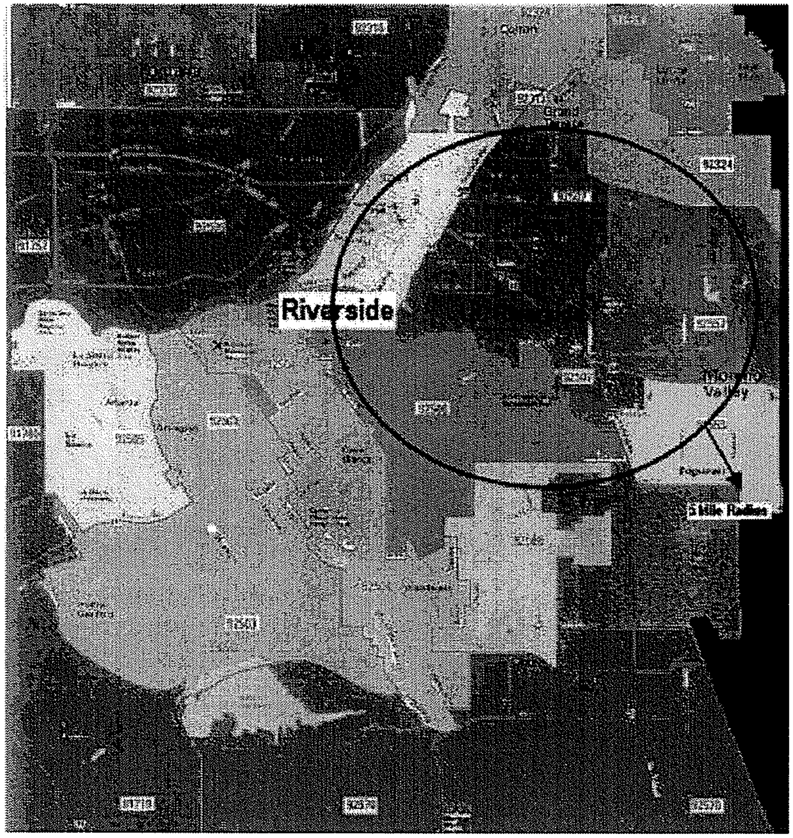


Source: Based on SCAG employment distribution.

Commuter Trip Distribution

Commuter trips are expected to come from off-campus residential areas and terminate at on-campus parking facilities, and vice-versa. The distribution of commuter trips was based initially on a zipcode analysis of UCR demographic data provided by UCR staff, as shown in Figure 5-2. As shown, approximately 80 percent of off-campus students live within zipcode 92507. However, this zipcode (roughly bounded by SR-91 to the west, San Bernardino/Riverside county boundary to the north, Box Springs Mountain Reserve to the east, and approximately Central Avenue to the south) encompasses the whole study area. Therefore, the 92507 zipcode percentage was further distributed into smaller areas based on 2000 population by census tracts. Figure 5-3 shows the resulting distribution.

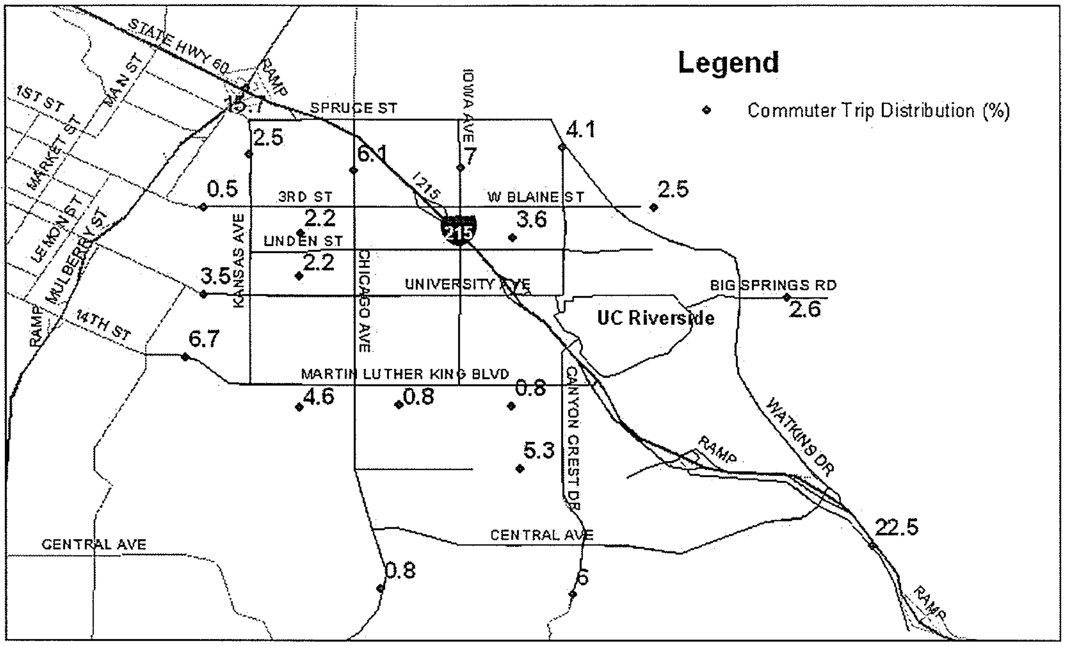
Figure 5-2
UCR Student Zipcode Distribution



Zipcode	Students	Percent
92507	6,528	78.62%
92506	281	3.38%
92557	260	3.13%
92503	177	2.13%
92553	165	1.99%
92504	143	1.72%
92509	124	1.49%
92508	109	1.31%
92501	93	1.12%
92324	92	1.11%
92505	90	1.08%
92313	43	0.52%
92354	42	0.51%
92337	40	0.48%
91752	35	0.42%
92570	34	0.41%
92316	31	0.37%
92408	12	0.14%
91719	2	0.02%
91760	1	0.01%
92518	1	0.01%
Total	**8,303**	**100.00%**

Source: University Demographic Data Disk

Figure 5-3
Commuter Trip Distribution



The increment in commuter traffic associated with the LRDP was distributed among the existing and proposed on-campus parking facilities in direct proportion to the number of new or additional parking spaces, as shown in Table 5-5. Existing traffic to/from parking facilities that would be demolished under LRDP was added to the commuter traffic increment that was redistributed to other new or improved parking facilities. The parking lots to be demolished include P6, P16 and P30.

2015 Project (with LRDP) traffic volumes are presented in Figures 5-4 and 5-5. Figure 5-4 presents traffic volumes with the current two-lane Iowa Avenue condition. Figure 5-5 presents traffic volumes with the alternative four-lane Iowa Avenue configuration.

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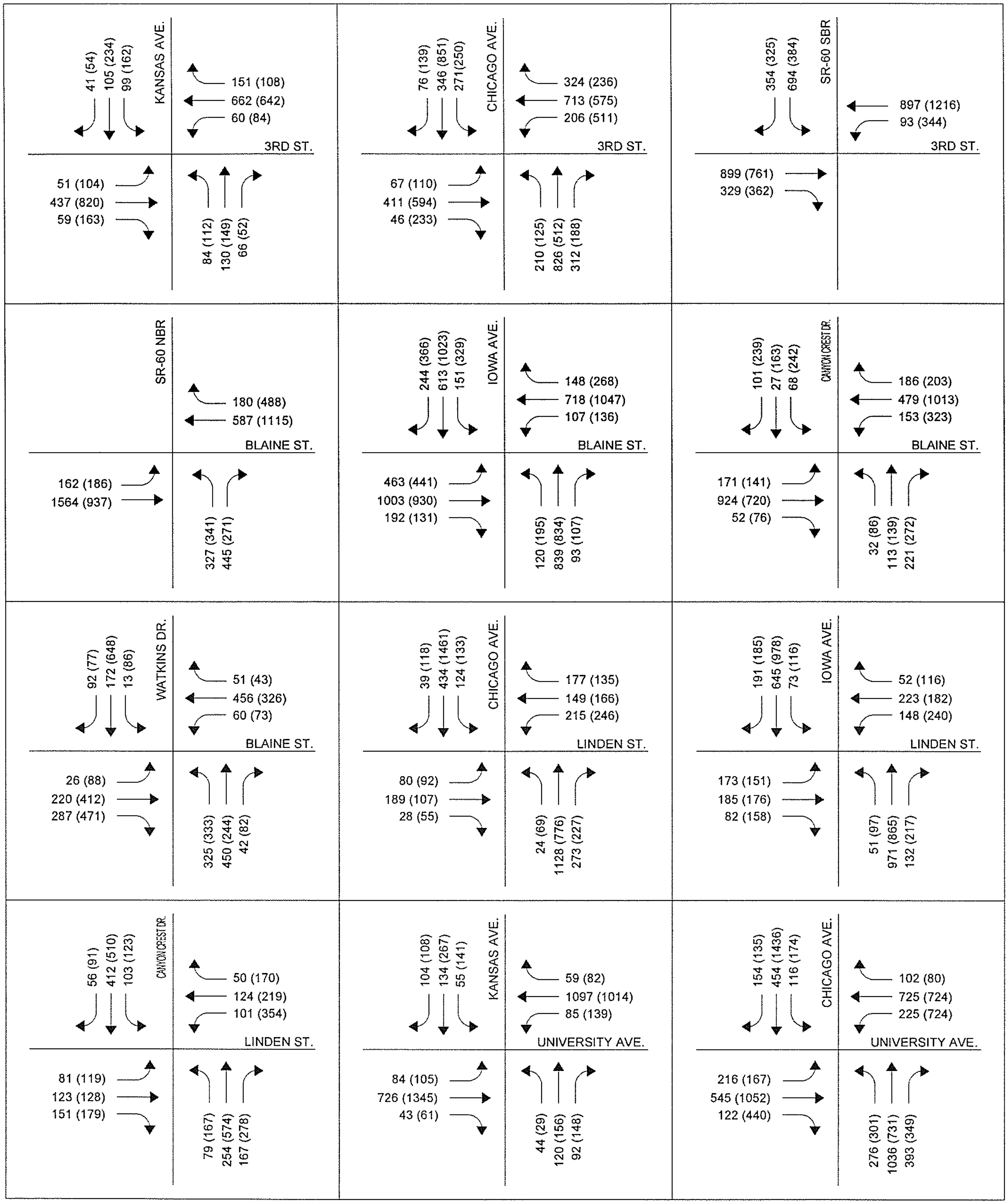

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Figure 5-4A
2015 Project (With LRDP) - AM/(PM) Peak Hour Volumes
Signalized Intersections - 2-Lane Iowa Condition
UC Riverside Long Range Development Plan EIR

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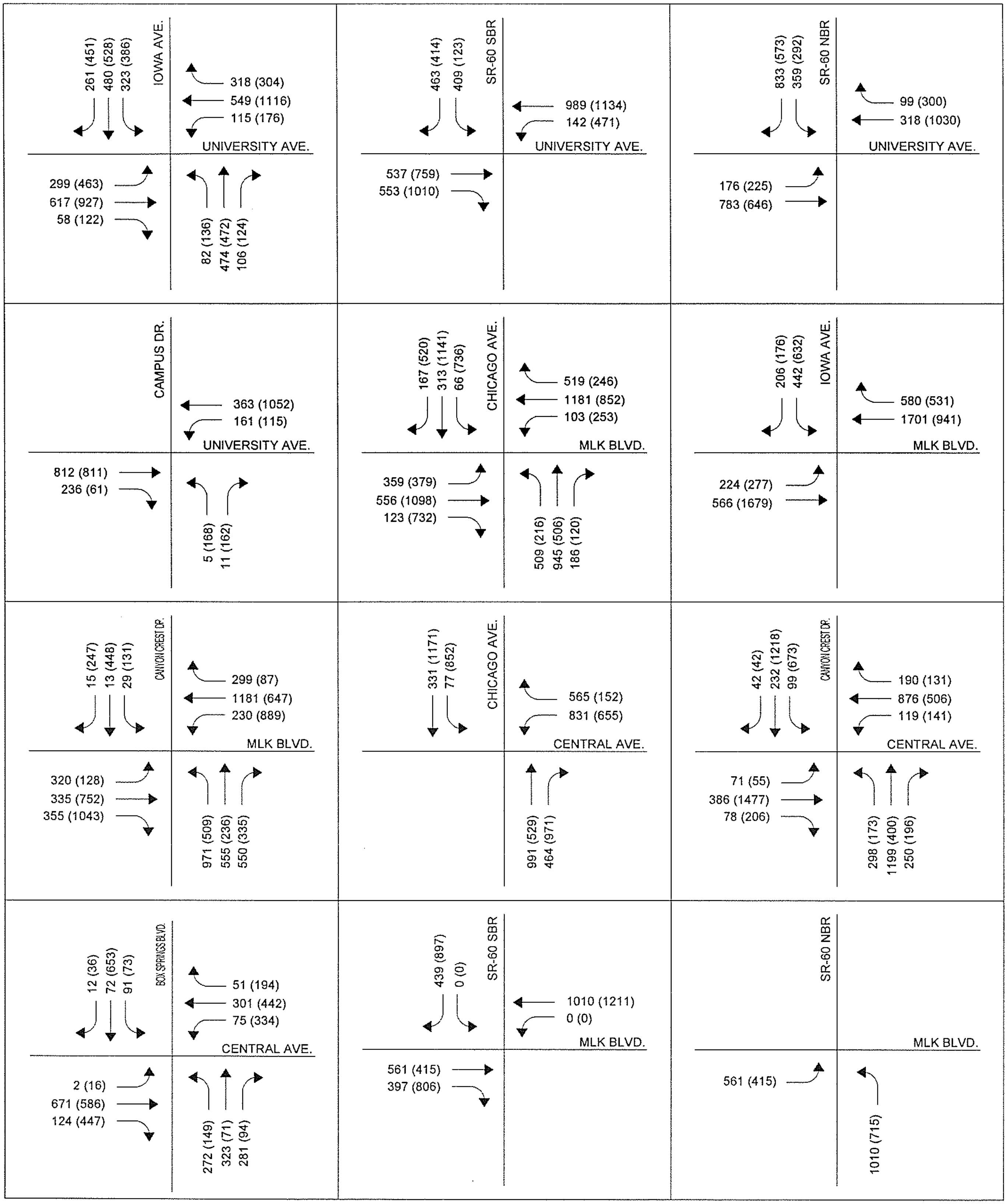

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Figure 5-4B
2015 Project (With LRDP) - AM/(PM) Peak Hour Volumes
Signalized Intersections - 2-Lane Iowa Condition
UC Riverside Long Range Development Plan EIR

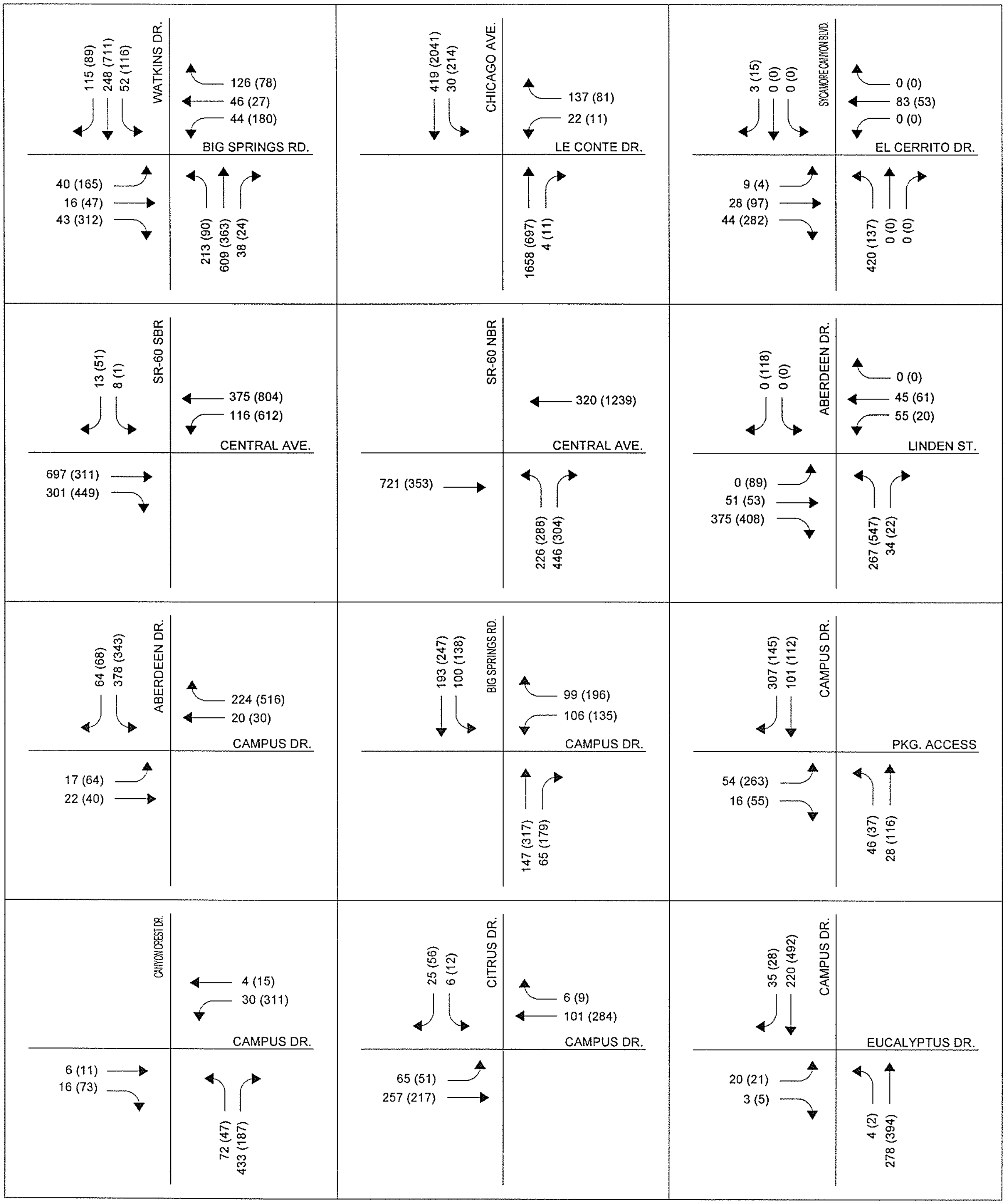

Figure 5-4C
2015 Project (With LRDP) - AM/(PM) Peak Hour Volumes
Unsignalized Intersections - 2-Lane Iowa Condition
UC Riverside Long Range Development Plan EIR

DRAFT

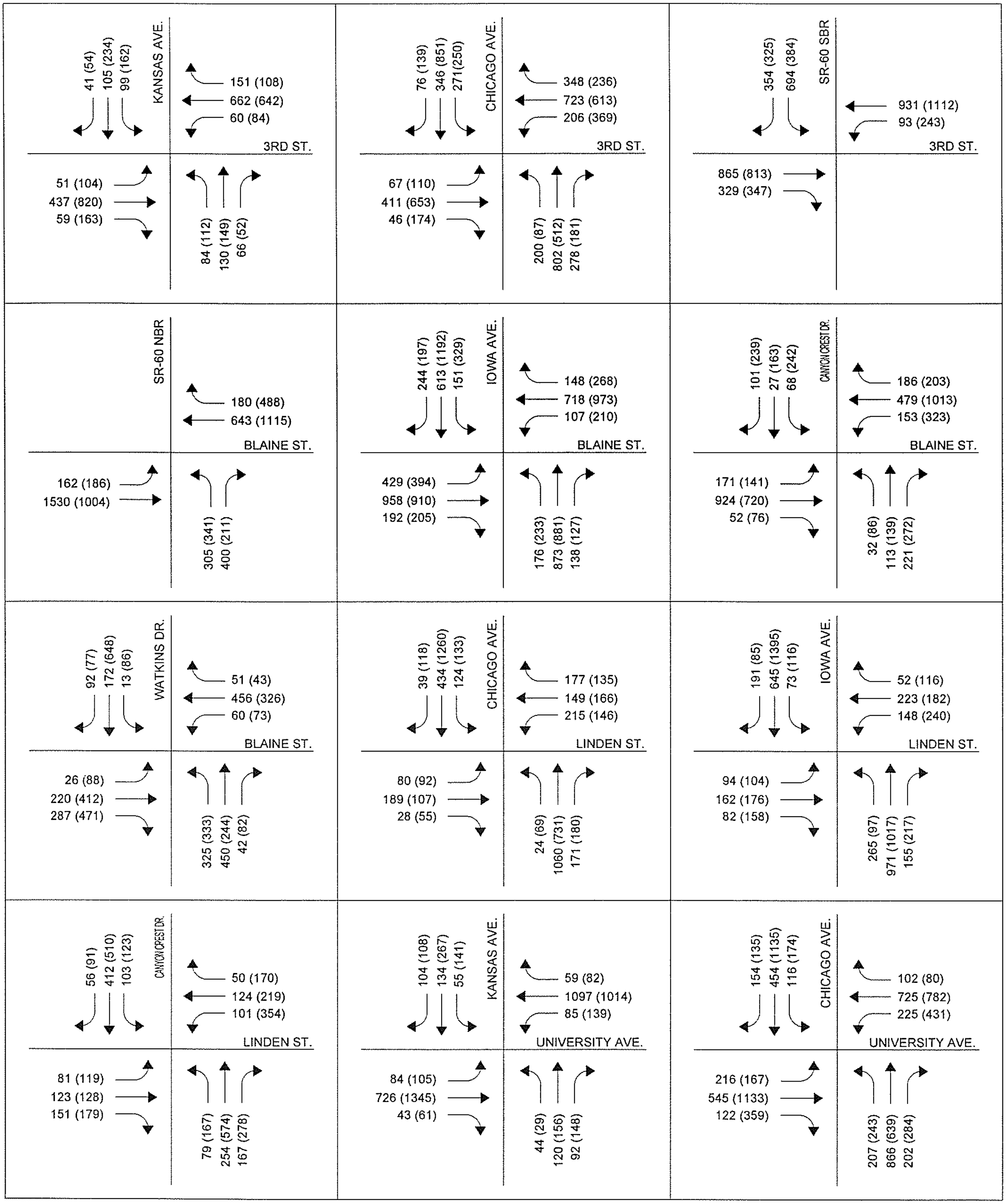

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Figure 5-5A
2015 Project (With LRDP) - AM/(PM) Peak Hour Volumes
Signalized Intersections - 4-Lane Iowa Condition
UC Riverside Long Range Development Plan EIR

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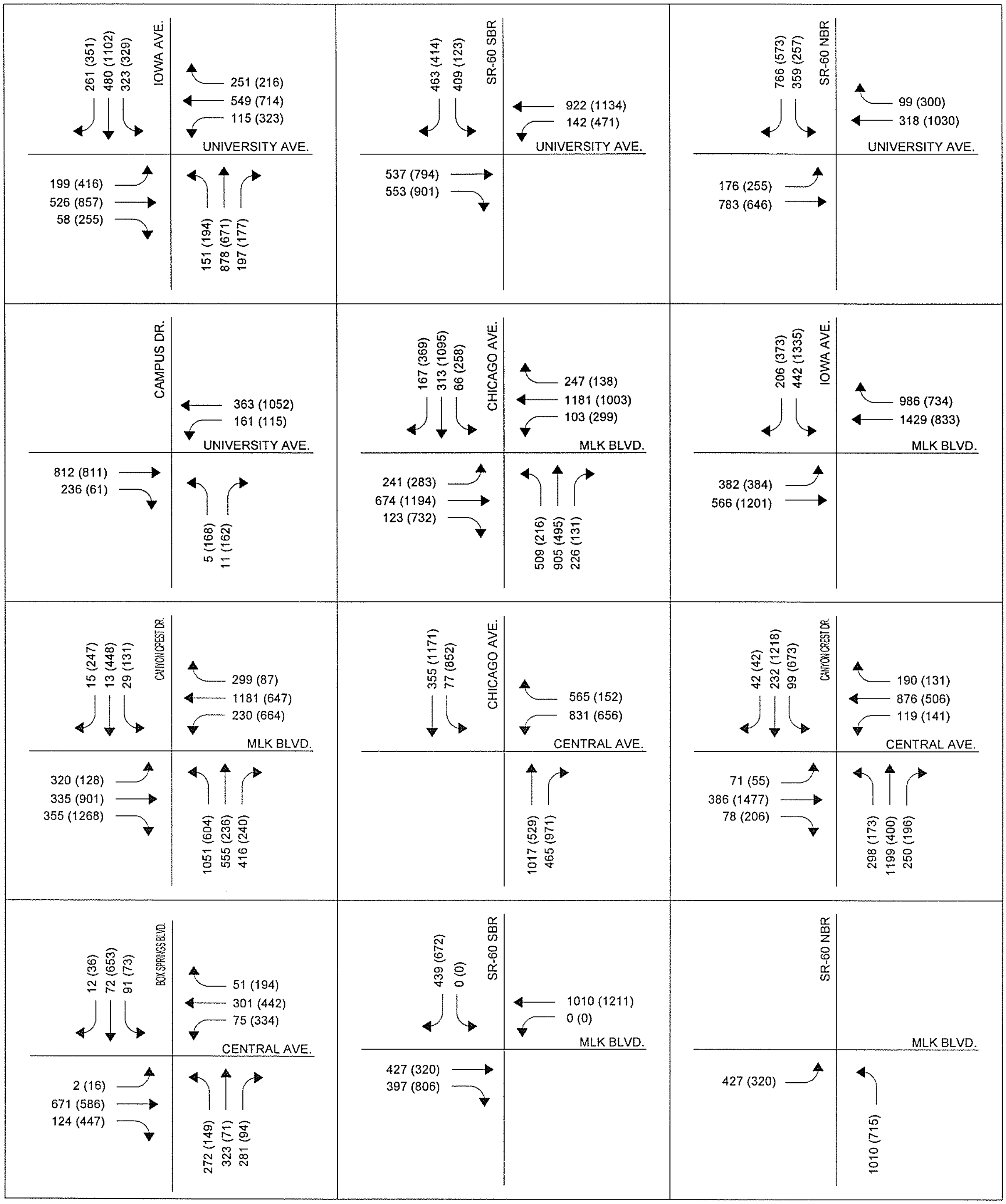

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Figure 5-5B
2015 Project (With LRDP) - AM/(PM) Peak Hour Volumes
Signalized Intersections - 4-Lane Iowa Condition
UC Riverside Long Range Development Plan EIR

DRAFT

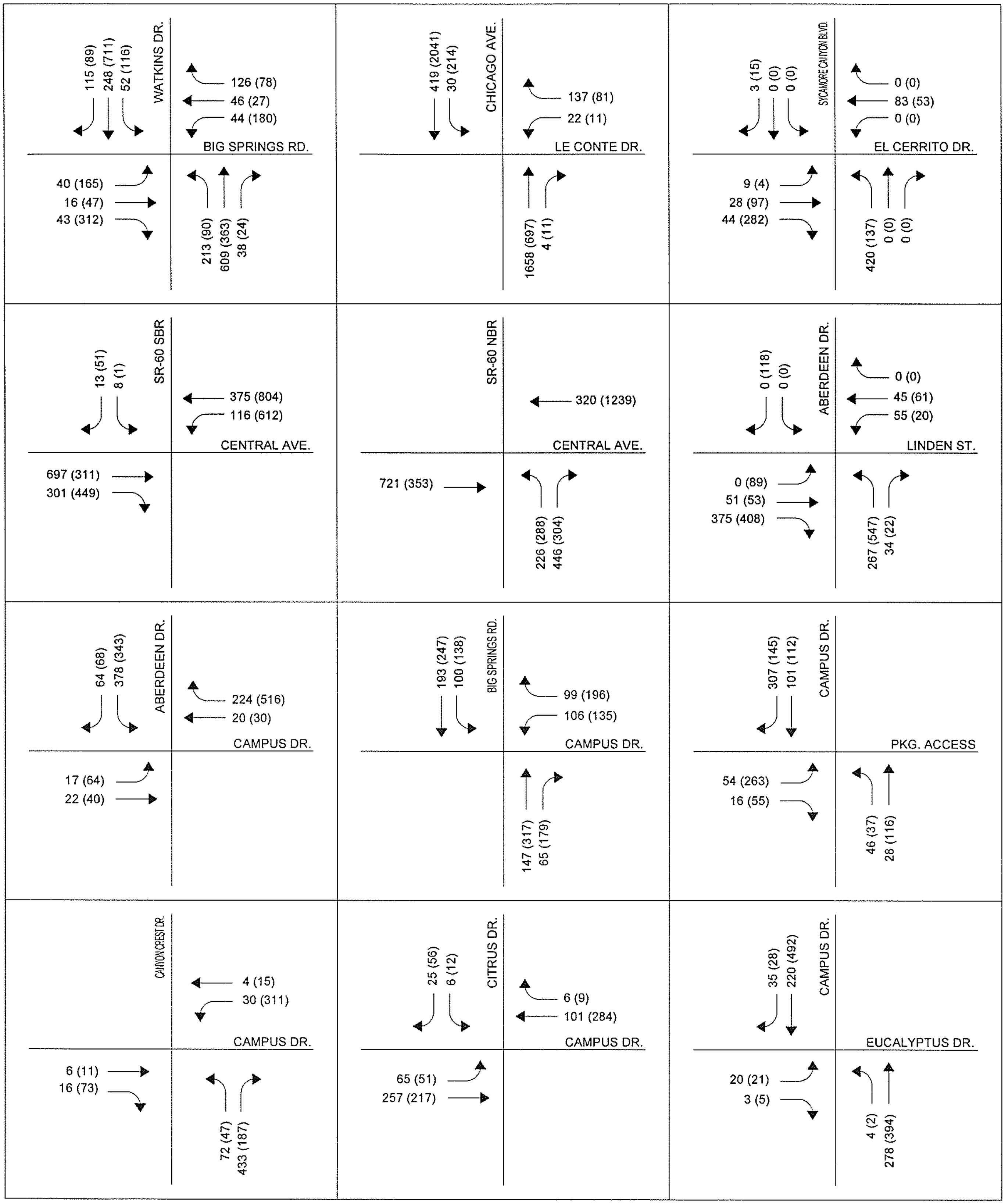

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Figure 5-5C
2015 Project (With LRDP) - AM/(PM) Peak Hour Volumes
Unsignalized Intersections - 4-Lane Iowa Condition
UC Riverside Long Range Development Plan EIR

Table 5-5
Parking Space Distribution

Parking Lot/Structure	Existing Spaces	New Structure Spaces
New Parking Structure		
MLK/Canyon Crest Drive		1,280 spaces
MLK		680 spaces
MLK		840 spaces
University Ave (Conference Center)		300 spaces
Blaine Street/Canyon Crest Drive		1,520 spaces
Blaine Street		1,120 spaces
Canyon Crest Drive/Linden Street (P24)	377 spaces	1,480 spaces
Big Springs Road (P13)	1,010 spaces	1,680 spaces
Demolished Parking Lots		
P6	754 spaces	
P16	109 spaces	
P30	2,092 spaces	

Source: BMS, F&P

5.3 TRAFFIC IMPACTS

Intersection level of service (LOS) analysis was conducted for the study intersections under the 2015 project traffic (with LRDP) conditions. Tables 5-6 through 5-9 summarize the intersection LOS under the project scenario. Level of service analysis was conducted assuming Iowa Avenue, between University Avenue and Martin Luther King Boulevard, as both a two- and four-lane roadway. Figure 5-6 shows the location of the intersections impacted in the project condition.

Two-Lane Iowa Avenue, Between University Avenue and Martin Luther King Boulevard

In the project (with LRDP) condition, twelve intersections would operate at unacceptable levels of service (i.e. LOS E or F) as shown in Tables 5-6 and 5-7. Of these, nine intersections would be impacted without LRDP traffic, as presented in Section 4. These locations are listed below:

- The signalized intersection of 3rd Street/Chicago Avenue would operate at LOS E in the PM peak hour.
- The signalized intersection of Blaine Street/Iowa Avenue would operate at LOS F in the PM peak hour.
- The signalized intersection of University Avenue/Chicago Avenue would operate at LOS F in the PM peak hour.
- The signalized intersection of University Avenue/Iowa Avenue would operate at LOS E in the PM peak hour.
- The signalized intersection of Martin Luther King Boulevard/Chicago Avenue would operate at LOS E and F in the AM and PM peak hours, respectively.
- The signalized intersection of Martin Luther King Boulevard/Canyon Crest would operate at LOS F in the PM peak hour.
- The signalized intersection of Central Avenue/Canyon Crest Drive would operate at LOS F in the PM peak hour.

- The signalized intersection of Central Avenue/Box Springs Boulevard would operate at LOS E in the PM peak hour.
- The stop-controlled intersection of Big Springs Road/Watkins Drive would operate at LOS E and F in the AM and PM peak hours, respectively.
- The stop-controlled intersection of Linden Street/Aberdeen Drive would operate at LOS E in the PM peak hour.
- The stop-controlled westbound approach on Le Conte Drive at its intersection with Chicago Avenue would operate at LOS F and E in the AM and PM peak hours, respectively
- The stop-controlled northbound I-215 off-ramp at Central Avenue would operate at LOS F during the AM and PM peak hours.

Four-Lane Iowa Avenue Alternative, Between University Avenue and Martin Luther King Boulevard

In the project (with LRDP) condition, with a four-lane Iowa Avenue assumed between University Avenue and Martin Luther King Boulevard, ten intersections would operate at unacceptable levels of service (i.e. LOS E or F) as shown in Tables 5-8 and 5-9. Of these, seven intersections would be impacted without LRDP traffic, as presented in Section 4. These locations are listed below:

- The signalized intersection of Blaine Street/Iowa Avenue would operate at LOS F in the PM peak hour.
- The signalized intersection of University Avenue/Iowa Avenue would operate at LOS F in the PM peak hour.
- The signalized intersection of Martin Luther King Boulevard/Chicago Avenue would operate at LOS E in the PM peak hour.
- The signalized intersection of Martin Luther King Boulevard/Canyon Crest would operate at LOS F in the PM peak hour.
- The signalized intersection of Central Avenue/Canyon Crest Drive would operate at LOS F in the PM peak hour.
- The signalized intersection of Central Avenue/Box Springs Boulevard would operate at LOS E in the PM peak hour.
- The stop-controlled intersection of Big Springs Road/Watkins Drive would operate at LOS E and F in the AM and PM peak hours, respectively.
- The stop-controlled intersection of Linden Street/Aberdeen Drive would operate at LOS E in the PM peak hour.
- The stop-controlled westbound approach on Le Conte Drive at its intersection with Chicago Avenue would operate at LOS F and E in the AM and PM peak hours, respectively
- The stop-controlled northbound I-215 off-ramp at Central Avenue would operate at LOS F during the AM and PM peak hours.

Mitigation measures that would bring intersections operating at LOS E or F in the project condition to acceptable levels are presented in Section 6.

Table 5-6
2015 Signalized Intersection LOS Summary Without and With LRDP

	Peak	2015 Background		2015 W/ Project	
Intersection	Hour	LOS	Delay	LOS	Delay
3rst St./Kansas Ave.	AM	C	21.5	C	22.4
	PM	C	26.2	C	28.9
3rd St./Chicago Ave.	AM	D	39.5	D	51.9
	PM	D	45.5	**E**	**59.9**
3rd St./I-215 SBR	AM	C	24.0	C	31.3
	PM	C	21.6	C	29.3
3rd St./I-215 NBR	AM	C	20.5	C	25.0
	PM	C	22.3	C	25.5
Blaine St./Iowa Ave.	AM	D	42.7	D	50.9
	PM	**E**	**60.1**	**F**	**110.3**
Blaine St./Canyon Crest Dr.	AM	C	22.0	C	24.1
	PM	C	34.6	D	53.0
Blaine St./Watkins Dr.	AM	C	32.7	C	34.2
	PM	C	27.0	D	45.4
Linden St./Chicago Ave.	AM	B	16.8	B	18.4
	PM	B	15.0	B	16.3
Linden St./Iowa Ave.	AM	C	23.3	C	21.7
	PM	C	24.5	C	25.5
Linden St./Canyon Crest Dr.	AM	C	26.0	C	26.2
	PM	C	28.9	C	34.1
University Ave./Kansas Ave.	AM	B	13.1	B	14.6
	PM	C	20.3	C	34.1
University Ave./Chicago Ave.	AM	C	31.6	C	32.9
	PM	**E**	**64.2**	**F**	**87.3**
University Ave./Iowa Ave.	AM	D	36.7	D	38.1
	PM	D	51.0	**E**	**70.0**
University Ave./I-215 SBR	AM	C	21.0	C	24.7
	PM	A	9.1	D	43.4
University Ave./I-215 NBR	AM	C	29.7	C	32.4
	PM	C	26.6	D	42.7
University Ave./Campus Dr.	AM	B	18.6	B	11.5
	PM	C	23.7	B	15.1
Martin Luther King Blvd./Chicago Ave.	AM	D	46.5	**E**	**56.3**
	PM	**E**	**67.0**	**F**	**85.9**
Martin Luther King Blvd./Iowa Ave.	AM	B	18.2	C	21.5
	PM	B	16.9	C	20.6
Martin Luther King Blvd./Canyon Crest	AM	C	31.3	D	53.3
	PM	**F**	**91.8**	**F**	**110.7**
Martin Luther King Blvd./I-215 SBR	AM	B	15.7	C	20.1
	PM	C	24.1	D	46.5
Martin Luther King Blvd./I-215 NBR	AM	B	12.7	B	16.7
	PM	B	11.4	B	15.6
Central Ave./Chicago Ave.	AM	C	21.8	C	21.0
	PM	D	43.3	D	45.9
Central Ave./Canyon Crest Dr.	AM	D	37.3	D	39.8
	PM	**E**	**79.4**	**F**	**88.1**
Central Ave./Box Springs Blvd.	AM	C	33.1	C	33.2
	PM	**E**	**65.9**	**E**	**66.7**

Assumes existing 2-lane section on Iowa Avenue, between Univeristy Avenue and Martin Luther King Blvd.

Table 5-7
2015 Unsignalized Intersection LOS Summary Without and With LRDP

		Peak	2015 Background		2015 W/ Project	
Intersection	Control	Hour	LOS	Delay	LOS	Delay
Big Springs Rd./Watkins Dr.	AWS	AM	**E**	**35.2**	**E**	**47.8**
		PM	**F**	**129.6**	**F**	**208.3**
El Cerrito Dr./Sycamore Canyon	AWS	AM	C	15.2	C	15.2
		PM	B	11.3	B	11.3
Linden St./Aberdeen Dr.	AWS	AM	A	9.8	B	11.6
		PM	B	12.6	**E**	**41.6**
Campus Dr./Aberdeen Dr.	AWS	AM	B	10.2	B	12.0
		PM	B	10.8	C	17.2
Big Springs Rd./Campus Dr.	AWS	AM	A	8.7	A	10.0
		PM	B	10.4	C	18.1
Parking Access/Campus Dr.	AWS	AM	B	10.7	A	9.1
		PM	C	15.2	B	10.6
Campus Dr./Canyon Crest Dr.	AWS	AM	B	12.9	A	9.9
		PM	B	13.4	B	11.3
Le Conte Dr./Chicago Ave.	Minor	AM	**WB: F**	**70.6**	**WB: F**	**77.9**
		PM	WB: D	33.3	**WB: E**	**38.1**
Central Ave./I-215 SBR	Minor	AM	SB: C	18.7	SB: C	20.0
		PM	SB: C	20.7	SB: C	23.5
Central Ave./I-215 NBR	Minor	AM	**NB: F**	**60.3**	**NB: F**	**81.3**
		PM	**NB: F**	**320.0**	**NB: F**	**361.4**
Campus Dr./Citrus Dr.	Minor	AM	SB: A	9.5	SB: A	9.6
		PM	SB: B	10.5	SB: B	11.0
Eucalyptus Dr./Campus Dr.	Minor	AM	EB: B	10.3	EB: B	12.0
		PM	EB: B	11.9	EB: C	16.6

Assumes existing 2-lane section on Iowa Avenue, between Univeristy Avenue and Martin Luther King Blvd.

Table 5-8
2015 Signalized Intersection LOS Summary Without and With LRDP With Alternative 4-Lane Iowa Avenue Section

Intersection	Peak Hour	2015 Background		2015 W/ Project	
		LOS	Delay	LOS	Delay
3rst St./Kansas Ave.	AM	C	21.5	C	22.4
	PM	C	26.2	C	28.9
3rd St./Chicago Ave.	AM	D	39.2	D	50.5
	PM	D	39.0	D	46.5
3rd St./I-215 SBR	AM	C	23.9	C	30.6
	PM	B	19.7	C	26.4
3rd St./I-215 NBR	AM	B	20.0	C	23.4
	PM	C	21.8	C	24.4
Blaine St./Iowa Ave.	AM	D	43.3	D	51.4
	PM	**E**	**56.8**	**F**	**107.4**
Blaine St./Canyon Crest Dr.	AM	C	22.0	C	24.1
	PM	C	34.6	D	53.0
Blaine St./Watkins Dr.	AM	C	32.7	C	34.2
	PM	C	27.0	D	45.4
Linden St./Chicago Ave.	AM	B	16.5	B	17.1
	PM	B	12.7	B	13.0
Linden St./Iowa Ave.	AM	C	23.3	C	23.6
	PM	C	24.2	C	25.8
Linden St./Canyon Crest Dr.	AM	C	26.0	C	26.2
	PM	C	28.9	C	34.1
University Ave./Kansas Ave.	AM	B	13.1	B	14.6
	PM	C	20.3	C	34.1
University Ave./Chicago Ave.	AM	C	32.5	C	33.4
	PM	D	38.5	D	50.6
University Ave./Iowa Ave.	AM	D	38.5	D	39.1
	PM	D	50.8	**F**	**82.7**
University Ave./I-215 SBR	AM	C	21.0	C	24.8
	PM	A	9.0	C	34.0
University Ave./I-215 NBR	AM	C	28.9	C	30.1
	PM	C	26.7	D	42.9
University Ave./Campus Dr.	AM	B	18.6	B	11.5
	PM	C	23.7	B	15.1
Martin Luther King Blvd./Chicago Ave.	AM	D	36.4	D	44.4
	PM	D	52.3	**E**	**64.5**
Martin Luther King Blvd./Iowa Ave.	AM	C	21.3	C	28.7
	PM	C	25.2	D	36.3
Martin Luther King Blvd./Canyon Crest	AM	C	34.0	D	53.1
	PM	**F**	**104.7**	**F**	**116.6**
Martin Luther King Blvd./I-215 SBR	AM	B	15.8	C	20.1
	PM	B	18.7	C	28.2
Martin Luther King Blvd./I-215 NBR	AM	B	10.5	B	14.7
	PM	A	7.1	B	14.1
Central Ave./Chicago Ave.	AM	C	21.8	C	21.0
	PM	D	43.3	D	45.9
Central Ave./Canyon Crest Dr.	AM	D	37.3	D	39.8
	PM	**E**	**79.4**	**F**	**88.1**
Central Ave./Box Springs Blvd.	AM	C	33.1	C	33.2
	PM	**E**	**65.9**	**E**	**66.7**

Assumes 4-lane section on Iowa Avenue, between Univeristy Avenue and Martin Luther King Blvd.

Table 5-9
2015 Unsignalized Intersection LOS Summary Without and With LRDP With Alternative 4-Lane Iowa Avenue Section

		Peak	2015 Background		2015 W/ Project	
Intersection	Control	Hour	LOS	Delay	LOS	Delay
Big Springs Rd./Watkins Dr.	AWS	AM	**E**	**35.2**	**E**	**47.8**
		PM	**F**	**129.6**	**F**	**208.3**
El Cerrito Dr./Sycamore Canyon	AWS	AM	C	15.2	C	15.2
		PM	B	11.3	B	11.3
Linden St./Aberdeen Dr.	AWS	AM	A	9.8	B	11.6
		PM	B	12.6	**E**	**41.6**
Campus Dr./Aberdeen Dr.	AWS	AM	B	10.2	B	12.0
		PM	B	10.8	C	17.2
Big Springs Rd./Campus Dr.	AWS	AM	A	8.7	A	10.0
		PM	B	10.4	C	18.1
Parking Access/Campus Dr.	AWS	AM	B	10.7	A	9.1
		PM	C	15.2	B	10.6
Campus Dr./Canyon Crest Dr.	AWS	AM	B	12.9	A	9.9
		PM	B	13.4	B	11.3
Le Conte Dr./Chicago Ave.	Minor	AM	**WB: F**	**70.6**	**WB: F**	**77.9**
		PM	WB: D	33.3	**WB: E**	**38.1**
Central Ave./I-215 SBR	Minor	AM	SB: C	18.7	SB: C	20.0
		PM	SB: C	20.7	SB: C	23.5
Central Ave./I-215 NBR	Minor	AM	**NB: F**	**60.3**	**NB: F**	**81.3**
		PM	**NB: F**	**320.0**	**NB: F**	**361.4**
Campus Dr./Citrus Dr.	Minor	AM	SB: A	9.5	SB: A	9.6
		PM	SB: B	10.5	SB: B	11.0
Eucalyptus Dr./Campus Dr.	Minor	AM	EB: B	10.3	EB: B	12.0
		PM	EB: B	11.9	EB: C	16.6

Assumes 4-lane section on Iowa Avenue, between Univeristy Avenue and Martin Luther King Blvd.

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[3] "Two-way" and "One-way" refer to the operation of Washington Avenue and 10th Street as a two-way or one-way couplet, respectively.

[4] Orange County Transportation Authority, *1998 Orange County Congestion Management Program.*

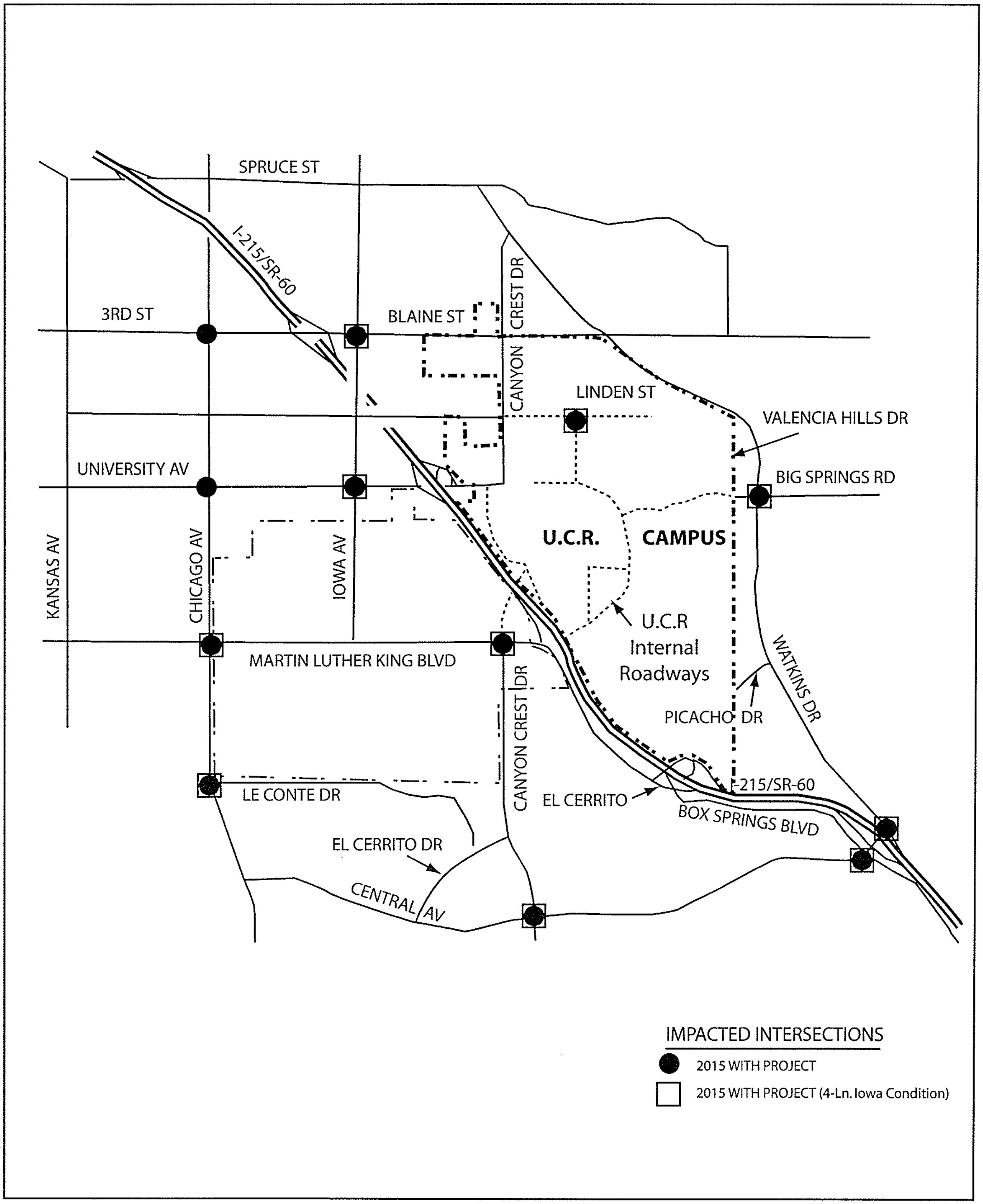

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Figure 5-6
2015 Project - Impacted Intersections
UC Riverside Long Range Development Plan EIR

5.4 FREEWAY SEGMENT IMPACTS

Freeway segment level of service (LOS) analysis was conducted for the study freeway segments under the 2015 project traffic (with LRDP) conditions. Tables 5-10 and 5-11 summarize the segment LOS under the project scenario. Level of service analysis was conducted assuming Iowa Avenue, between University Avenue and Martin Luther King Boulevard, as both a two- and four-lane roadway. The two-lane scenario LOS summary is presented in Table 5-10. The four-lane LOS summary is presented in Table 5-11. For both scenarios, operating conditions of all segments operating unacceptably under background conditions would continue to do so with project traffic added. The following locations would drop from LOS D to LOS E with the addition of project traffic, under the two- and four-lane scenarios:

- The segment of Interstate 215, between Martin Luther King Boulevard and University Avenue, would operate unacceptably in the northbound and southbound directions during the PM peak hour with the addition of project traffic. Without and with project traffic, the segment would operate unacceptably in the northbound direction during the AM peak hour.
- The segment of Highway 60, east of Interstate 215, would operate unacceptably in the eastbound direction during the PM peak hour with the addition of project traffic. Without and with project traffic, the segment would operate unacceptably in the westbound direction during the AM and PM peak hours. Without and with project traffic, the segment would operate unacceptably in the eastbound direction during the AM peak hour.

Table 5-10
2015 Freeway Segment LOS Summary With LRDP

Freeway Segment	Peak Hour	2015 Background			2015 W/ Project		
		Volume	LOS	Delay	Volume	LOS	Delay
I-215 NB, s/o 60	AM	4721	**F0**	**1.22**	4892	**F1**	**1.27**
	PM	3372	D	0.87	3553	D	0.92
I-215 SB s/o 60	AM	2641	B	0.46	2731	B	0.47
	PM	3991	C	0.69	4242	C	0.73
I-215 NB, b/w 60 & Central	AM	10484	**F1**	**1.36**	10865	**F2**	**1.41**
	PM	7353	**E**	**0.95**	7756	**F**	**1.00**
I-215 SB, b/w 60 & Central	AM	6161	C	0.64	6360	C	0.66
	PM	9292	**E**	**0.96**	9850	**F0**	**1.02**
I-215 NB, b/w Central & MLK	AM	10148	**F1**	**1.31**	10488	**F2**	**1.36**
	PM	7117	D	0.92	7478	**E**	**0.97**
I-215 SB, b/w Central & MLK	AM	5963	B	0.62	6143	C	0.64
	PM	8995	**E**	**0.93**	9492	**E**	**0.98**
I-215 NB, b/w MLK & University	AM	9829	**F1**	**1.27**	10374	**F1**	**1.34**
	PM	6929	D	0.90	7401	**E**	**0.96**
I-215 SB, b/w MLK & University	AM	5725	B	0.59	5952	B	0.62
	PM	8812	D	0.91	9520	**E**	**0.99**
I-215 NB, b/w University & 3rd	AM	9721	**F3**	**1.46**	9925	**F3**	**1.49**
	PM	6846	D	0.87	7026	D	0.90
I-215 SB, b/w University & 3rd	AM	5686	D	0.85	5796	D	0.87
	PM	8669	**F0**	**1.11**	8924	**F0**	**1.14**
I-215 NB, b/w 3rd & Spruce	AM	9880	**F0**	**1.19**	9936	**F0**	**1.19**
	PM	6928	C	0.71	7147	C	0.73
I-215 SB, b/w 3rd & Spruce	AM	5804	D	0.87	6004	D	0.90
	PM	8757	**F0**	**1.12**	8901	**F0**	**1.14**
I-215 NB, b/w Spruce & 91/60	AM	9813	**F3**	**1.47**	9869	**F3**	**1.48**
	PM	6881	D	0.88	7100	D	0.91
I-215 SB, b/w Spruce & 91/60	AM	5765	D	0.86	5965	D	0.89
	PM	8697	**F0**	**1.11**	8841	**F0**	**1.13**
I-215 NB, n/o 91/60	AM	7610	**F1**	**1.30**	7624	**F1**	**1.30**
	PM	5977	**F0**	**1.02**	6032	**F0**	**1.03**
I-215 SB, n/o 91/60	AM	5621	**E**	**0.96**	5671	**E**	**0.97**
	PM	7253	**F0**	**1.24**	7289	**F0**	**1.24**
60 EB, e/o 215	AM	6237	**F3**	**1.60**	6346	**F3**	**1.63**
	PM	3443	D	0.89	3750	**E**	**0.96**
60 WB, e/o 215	AM	4327	**F0**	**1.11**	4537	**F0**	**1.17**
	PM	7120	**F3**	**1.83**	7342	**F3**	**1.89**
60 EB, w/o 91/215	AM	3836	B	0.49	3906	B	0.50
	PM	6059	C	0.77	6109	C	0.78
60 WB, w/o 91/215	AM	6301	D	0.80	6321	D	0.81
	PM	4077	B	0.52	4154	B	0.53
91 EB, w/o 215/60	AM	6344	**F0**	**1.08**	6424	**F0**	**1.09**
	PM	7118	**F0**	**1.21**	7176	**F0**	**1.22**
91 WB, w/o 215/60	AM	6886	**F0**	**1.17**	6908	**F0**	**1.18**
	PM	6113	**F0**	**1.04**	6200	**F0**	**1.06**

Table 5-11
2015 Freeway Segment LOS Summary With LRDP With Alternative 4-Lane Iowa Avenue Section

	Peak Hour	2015 Background			2015 W/ Project		
Freeway Segment		Volume	LOS	Delay	Volume	LOS	Delay
I-215 NB, s/o 60	AM	4721	**F0**	**1.22**	4892	**F1**	**1.27**
	PM	3372	D	0.87	3553	D	0.92
I-215 SB s/o 60	AM	2641	B	0.46	2731	B	0.47
	PM	3991	C	0.69	4242	C	0.73
I-215 NB, b/w 60 & Central	AM	10484	**F1**	**1.36**	10865	**F2**	**1.41**
	PM	7353	**E**	**0.95**	7756	**F**	**1.00**
I-215 SB, b/w 60 & Central	AM	6161	C	0.64	6360	C	0.66
	PM	9292	**E**	**0.96**	9850	**F0**	**1.02**
I-215 NB, b/w Central & MLK	AM	10148	**F1**	**1.31**	10488	**F2**	**1.36**
	PM	7117	D	0.92	7478	**E**	**0.97**
I-215 SB, b/w Central & MLK	AM	5963	B	0.62	6143	C	0.64
	PM	8995	**E**	**0.93**	9492	**E**	**0.98**
I-215 NB, b/w MLK & University	AM	9829	**F1**	**1.26**	10240	**F1**	**1.32**
	PM	6929	D	0.88	7306	**E**	**0.95**
I-215 SB, b/w MLK & University	AM	5725	B	0.59	5952	B	0.62
	PM	8812	D	0.89	9295	**E**	**0.96**
I-215 NB, b/w University & 3rd	AM	9721	**F2**	**1.45**	9858	**F3**	**1.48**
	PM	6846	D	0.87	6966	D	0.89
I-215 SB, b/w University & 3rd	AM	5686	D	0.85	5796	D	0.87
	PM	8669	**F0**	**1.10**	8808	**F0**	**1.12**
I-215 NB, b/w 3rd & Spruce	AM	9880	**F0**	**1.19**	9936	**F0**	**1.19**
	PM	6928	C	0.71	7147	C	0.73
I-215 SB, b/w 3rd & Spruce	AM	5804	D	0.87	6004	D	0.90
	PM	8757	**F0**	**1.12**	8901	**F0**	**1.14**
I-215 NB, b/w Spruce & 91/60	AM	9813	**F3**	**1.47**	9869	**F3**	**1.48**
	PM	6881	D	0.88	7100	D	0.91
I-215 SB, b/w Spruce & 91/60	AM	5765	D	0.86	5965	D	0.89
	PM	8697	**F0**	**1.11**	8841	**F0**	**1.13**
I-215 NB, n/o 91/60	AM	7610	**F1**	**1.30**	7624	**F1**	**1.30**
	PM	5977	**F0**	**1.02**	6032	**F0**	**1.03**
I-215 SB, n/o 91/60	AM	5621	**E**	**0.96**	5671	**E**	**0.97**
	PM	7253	**F0**	**1.24**	7289	**F0**	**1.24**
60 EB, e/o 215	AM	6237	**F3**	**1.60**	6346	**F3**	**1.63**
	PM	3443	D	0.89	3750	**E**	**0.96**
60 WB, e/o 215	AM	4327	**F0**	**1.11**	4537	**F0**	**1.17**
	PM	7120	**F3**	**1.83**	7342	**F3**	**1.89**
60 EB, w/o 91/215	AM	3836	B	0.49	3906	B	0.50
	PM	6059	C	0.77	6109	C	0.78
60 WB, w/o 91/215	AM	6301	D	0.80	6321	D	0.81
	PM	4077	B	0.52	4154	B	0.53
91 EB, w/o 215/60	AM	6344	**F0**	**1.08**	6424	**F0**	**1.09**
	PM	7118	**F0**	**1.21**	7176	**F0**	**1.22**
91 WB, w/o 215/60	AM	6886	**F0**	**1.17**	6908	**F0**	**1.18**
	PM	6113	**F0**	**1.04**	6200	**F0**	**1.06**

Assumes 4-lane section on Iowa Avenue, between Univeristy Avenue and Martin Luther King Blvd.

Section 6.0
MITIGATION MEASURES WITHOUT AND WITH LRDP PROJECT

This section presents the mitigation measures identified for the project study intersections found to be deficient in the analysis of Sections 4 and 5 (2015 Without and With LRDP Project). Based on the results of the analysis presented previously, the following mitigation measures are recommended to bring intersections forecast to operate at unacceptable service levels (i.e. LOS E and F) to acceptable levels (LOS D or better). Mitigation measures for the 2015 Without LRDP and 2015 With LRDP conditions are listed for both the current two-lane Iowa Avenue condition and the four-lane alternative Iowa Avenue configuration.

6.1 2015 BACKGROUND CONDITIONS (WITHOUT LRDP PROJECT)

Two-Lane Iowa Avenue, Between University Avenue and Martin Luther King Boulevard

Nine intersections would operate at unacceptable levels of service in the 2015 Background condition with Iowa Avenue remaining as a two-lane roadway between University Avenue and Martin Luther King Boulevard. The following mitigation measures would bring the intersections into acceptable operating conditions. These improvements are depicted in Figure 6-1.

- The intersection of Blaine Street/Iowa Avenue would require a separate through and a right-turn lane on the southbound approach to operate at LOS D or better. The approach currently consists of a left-turn lane, one through lane, and one shared through/right-turn lane. The mitigated approach would consist of a left-turn lane, two through lanes, and one right-turn lane.
- The intersection of University Avenue/Chicago Avenue would require an additional through lane on the southbound approach to operate at LOS D or better. The approach currently consists of two left-turn lanes, one through lane, and one shared through/right-turn lane. The mitigated approach would consist of two left-turn lanes, two through lanes, and one shared through/right-turn lane. In addition, the eastbound right-turn movement would require an overlap signal phase.
- The intersection of Martin Luther King Boulevard/Chicago Avenue would require an additional left-turn lane on the southbound approach, and an additional through lane on the eastbound approach to operate at LOS D or better.
- The intersection of Martin Luther King Boulevard/Canyon Crest Drive would require an additional right-turn lane on the eastbound approach to operate at LOS D or better.
- The intersection of Central Avenue/Canyon Crest Drive would require an additional left-turn lane on the southbound approach, and an additional through lane on the eastbound approach to operate at LOS D or better. The eastbound approach currently consists of one left-turn lane, two through lanes, and one right-turn lane. The mitigated eastbound approach would consist of one left-turn lane, two through lanes, and one shared through/right-turn lane.

- The intersection of Central Avenue/Box Springs Boulevard would require a separate through and a right-turn lane on the eastbound approach to operate at LOS D or better. The approach currently consists of one left-turn lane, one through lane, and one shared through/right-turn lane. The mitigated approach would consist of one left-turn lane, two through lanes, and one right-turn lane.
- The intersection of Big Springs Road/Watkins Drive would require signalization and would then operate at LOS B or better. In addition, the eastbound and westbound approaches should be restriped to provide an exclusive left-turn lane and a shared through/right-turn lane.
- The intersection of Le Conte Drive/Chicago Ave would require a separate left-turn and right-turn lane on the westbound approach for the approach to operate at LOS D or better.
- The intersection of Central Avenue/I-215 Northbound Ramp would require signalization and would then operate at LOS C or better.

Four-Lane Iowa Avenue Alternative, Between University Avenue and Martin Luther King Boulevard

Seven intersections would operate at unacceptable levels of service in the 2015 Background condition with Iowa Avenue as a four-lane roadway between University Avenue and Martin Luther King Boulevard. The following mitigation measures would bring the intersections into acceptable operating conditions. These improvements are depicted in Figure 6-2.

- The intersection of Blaine Street/Iowa Avenue would require a separate through and a right-turn lane on the southbound approach to operate at LOS D or better. The approach currently consists of a left-turn lane, one through lane, and one shared through/right-turn lane. The mitigated approach would consist of a left-turn lane, two through lanes, and one right-turn lane.
- The intersection of Martin Luther King Boulevard/Canyon Crest Drive would require an additional right-turn lane on the eastbound approach to operate at LOS D or better.
- The intersection of Central Avenue/Canyon Crest Drive would require an additional left-turn lane and an additional through lane on the southbound approach to operate at LOS D or better.
- The intersection of Central Avenue/Box Springs Boulevard would require a separate through and right-turn lane on the eastbound approach to operate at LOS D or better.
- The intersection of Big Springs Road/Watkins Drive would require signalization and would then operate at LOS B or better. In addition, the eastbound and westbound approaches should be restriped to provide an exclusive left-turn lane and a shared through/right-turn lane.
- The intersection of Le Conte Drive/Chicago Ave would require a separate left-turn and right-turn lane on the westbound approach for the approach to operate at LOS D or better.
- The intersection of Central Avenue/I-215 Northbound Ramp would require signalization and would then operate at LOS C or better.

6.2 2015 PROJECT CONDITIONS (WITH LRDP PROJECT)

Two-Lane Iowa Avenue, Between University Avenue and Martin Luther King Boulevard

Twelve intersections would operate at unacceptable levels of service in the 2015 LRDP Project condition with Iowa Avenue remaining as a two-lane roadway between University Avenue and Martin Luther King Boulevard. Of these, nine intersections would be impacted without LRDP traffic. The following mitigation measures would bring the intersections into acceptable operating conditions. These mitigation measures are depicted in Figure 6-1.

- The intersection of 3rd Street/Chicago Avenue would require an additional left-turn lane on the westbound approach to operate at LOS D or better.
- In addition to the mitigation measure identified for the 'Without Project' scenario, the intersection of Blaine Street/Iowa Avenue would require an additional left-turn lane on the eastbound approach, and a separate through and right-turn lane on the westbound approach to operate at LOS D or better.
- In addition to the mitigation measures identified for the 'Without Project' scenario, the intersection of University Avenue/Chicago Avenue would require a separate through and a right-turn lane on the southbound approach to operate at LOS D or better.
- The intersection of University Avenue/Iowa Avenue would require an additional left-turn lane on the eastbound approach to operate at LOS D or better. The approach currently consists of one left-turn lane, two through lanes, and one right-turn lane. The mitigated approach would consist of two left-turn lanes, one through lane, and one shared through/right-turn lane.
- In addition to the mitigation measures identified for the 'Without Project' scenario, the intersection of Martin Luther King Boulevard/Chicago Avenue would require an additional through lane on the westbound approach to operate at LOS D or better.
- In addition to the mitigation measures identified for the 'Without Project' scenario, the intersection of Martin Luther King Boulevard/Canyon Crest Drive would require an additional left-turn lane on the westbound approach to operate at LOS D or better
- The intersection of Central Avenue/Canyon Crest Drive would not require additional mitigation measures beyond those identified for the "Without Project" scenario to operate acceptably.
- The intersection of Central Avenue/Box Springs Boulevard would not require additional mitigation measures beyond those identified for the "Without Project" scenario to operate acceptably.
- The intersection of Big Springs Road/Watkins Drive would not require additional mitigation measures beyond those identified for the "Without Project" scenario to operate acceptably.
- The intersection of Linden Street/Aberdeen Drive would require a shared through/left-turn lane and a right-turn lane on the eastbound approach to operate at LOS D or better.
- The intersection of Le Conte Drive/Chicago Ave would not require additional mitigation measures beyond those identified for the "Without Project" scenario to operate acceptably.

- The intersection of Central Avenue/I-215 Northbound Ramp would not require additional mitigation measures beyond those identified for the "Without Project" scenario to operate acceptably.

Four-Lane Iowa Avenue Alternative, Between University Avenue and Martin Luther King Boulevard

Ten intersections would operate at unacceptable levels of service in the 2015 Project condition with Iowa Avenue as a four-lane roadway between University Avenue and Martin Luther King Boulevard. Of these, seven intersections would be impacted without LRDP traffic. The following mitigation measures would bring the intersections into acceptable operating conditions. These mitigation measures are depicted in Figure 6-2.

- In addition to the mitigation measure identified for the 'Without Project' scenario, the intersection of Blaine Street/Iowa Avenue would require an additional left-turn lane on the southbound approach, an additional left-turn lane on the eastbound approach, an additional left-turn lane on the westbound approach, and a separate through and right-turn lane on the westbound approach to operate at LOS D or better.
- The intersection of University Avenue/Iowa Avenue would require an additional left-turn lane on the eastbound approach, and a separate through and right lane on the southbound approach to operate at LOS D or better. The southbound approach currently consists of one left-turn lane, one through lane, and one shared through/right-turn lane. The mitigated southbound approach would consist of one left-turn lane, two through lanes, and one right-turn lane.
- The intersection of Martin Luther King Boulevard/Chicago Avenue would require an additional through and right-turn lane on the eastbound approach to operate at LOS D or better.
- In addition to the mitigation measures identified for the 'Without Project' scenario, the intersection of Martin Luther King Boulevard/Canyon Crest Drive would require an additional left-turn lane on the westbound approach to operate at LOS D or better.
- The intersection of Central Avenue/Canyon Crest Drive would not require additional mitigation measures beyond those identified for the "Without Project" scenario to operate acceptably.
- The intersection of Central Avenue/Box Springs Boulevard would not require additional mitigation measures beyond those identified for the "Without Project" scenario to operate acceptably.
- The intersection of Big Springs Road/Watkins Drive would not require additional mitigation measures beyond those identified for the "Without Project" scenario to operate acceptably.
- The intersection of Linden Street/Aberdeen Drive would require a shared through/left-turn lane and a right-turn lane on the eastbound approach to operate at LOS D or better.
- The intersection of Le Conte Drive/Chicago Ave would not require additional mitigation measures to operate acceptably.
- The intersection of Central Avenue/I-215 Northbound Ramp would not require additional mitigation measures beyond those identified for the "Without Project" scenario to operate acceptably.

As previously mentioned, the mitigation measures described above are illustrated in Figures 6-1 and 6-2 for the 2-lane and 4-lane Iowa conditions, respectively. Tables 6-1 and 6-2 present the resultant levels of service with the mitigation measures in place for the 2-lane and 4-lane Iowa conditions, respectively.

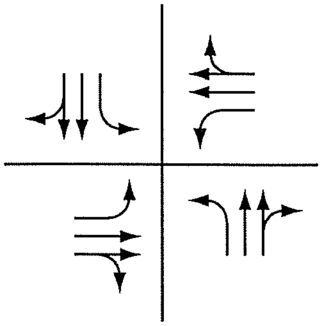
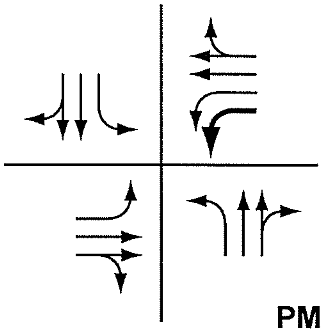
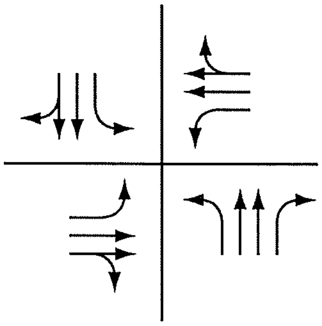
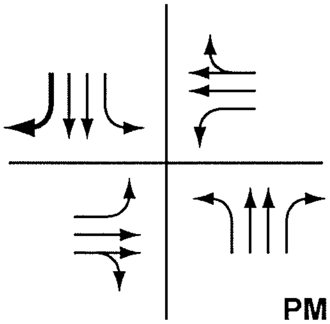
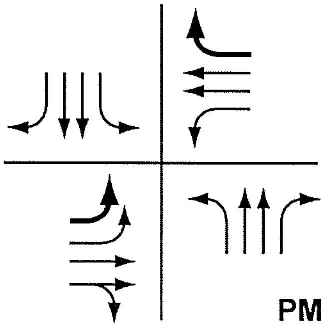
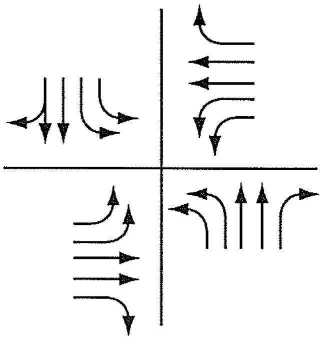
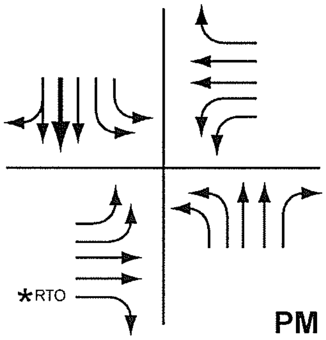
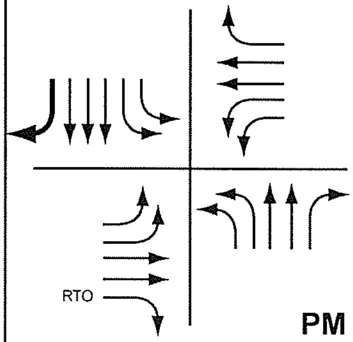
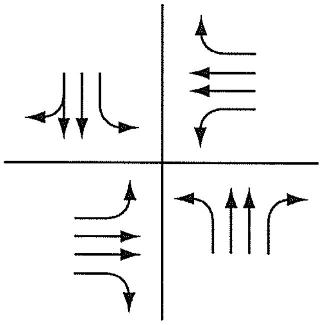
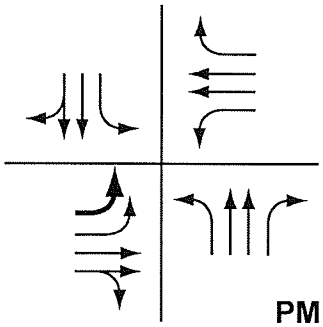
Table 6-1
2015 Mitigation Measures – Background and Project

Intersection	Peak Hour	2015 Background					
		Base			Mitigated		
		Control	LOS	Delay	Control	LOS	Delay
Blaine St./Iowa Ave.	AM	Signal	-	-	Signal	-	-
	PM		E	60.1		D	44.4
University Ave./Chicago Ave.	AM	Signal	-	-	Signal	-	-
	PM		E	64.2		D	42.8
Martin Luther King Blvd./Chicago Ave.	AM	Signal	-	-	Signal	-	-
	PM		E	67.0		D	51.2
Martin Luther King Blvd./Canyon Crest Dr.	AM	Signal	-	-	Signal	-	-
	PM		F	91.8		D	48.8
Central Ave./Canyon Crest Dr.	AM	Signal	-	-	Signal	-	-
	PM		E	79.4		D	46.6
Central Ave./Box Springs Blvd.	AM	Signal	-	-	Signal	-	-
	PM		E	65.9		D	45.6
Big Springs Rd./Watkins Dr.	AM	AWS	E	35.2	Signal	A	6.5
	PM		F	129.6		B	15.9
Le Conte Dr./Chicago Ave.	AM	Minor	WB: F	70.6	Minor	WB: D	34.8
	PM		-	-		-	-
Central Ave./I-215 NBR	AM	Minor	NB: F	60.3	Signal	B	18.3
	PM		NB: F	320.0		C	22.1
Intersection	Peak Hour	2015 UCR LRDP					
		Base			Mitigated		
		Control	LOS	Delay	Control	LOS	Delay
3rd St./Chicago Ave.	AM	Signal	-	-	Signal	-	-
	PM		E	59.9		D	36.3
Blaine St./Iowa Ave.	AM	Signal	-	-	Signal	-	-
	PM		F	110.3		D	50.6
University Ave./Chicago Ave.	AM	Signal	-	-	Signal	-	-
	PM		F	87.3		D	52.6
University Ave./Iowa Ave.	AM	Signal	-	-	Signal	-	-
	PM		E	70.0		D	48.9
Martin Luther King Blvd./Chicago Ave.	AM	Signal	E	56.3	Signal	D	47.8
	PM		F	85.9		D	53.2
Martin Luther King Blvd./Canyon Crest Dr.	AM	Signal	-	-	Signal	-	-
	PM		F	110.7		D	42.1
Central Ave./Canyon Crest Dr.	AM	Signal	-	-	Signal	-	-
	PM		F	88.1		D	53.5
Central Ave./Box Springs Blvd.	AM	Signal	-	-	Signal	-	-
	PM		E	66.7		D	46.2
Big Springs Rd./Watkins Dr.	AM	AWS	E	47.8	Signal	A	7.6
	PM		F	208.3		B	15.1
Linden St./Aberdeen Dr.	AM	AWS	-	-	AWS	-	-
	PM		E	41.6		D	30.0
Le Conte Dr./Chicago Ave.	AM	Minor	WB: F	77.9	Minor	WB: E	36.5
	PM		WB: E	38.1		WB: D	29.9
Central Ave./I-215 NBR	AM	Minor	NB: F	81.3	Signal	B	19.4
	PM		NB: F	361.4		C	27.1

Table 6-2
2015 Mitigation Measures – Background and Project With Alternative 4-Lane Iowa Avenue Section

Intersection	Peak Hour	**2015 Background**					
		Base			Mitigated		
		Control	LOS	Delay	Control	LOS	Delay
Blaine St./Iowa Ave.	AM	Signal	-	-	Signal	-	-
	PM		E	56.8		D	45.3
Martin Luther King Blvd./Canyon Crest Dr.	AM	Signal	-	-	Signal	-	-
	PM		F	104.7		D	45.9
Central Ave./Canyon Crest Dr.	AM	Signal	-	-	Signal	-	-
	PM		E	79.4		D	47.0
Central Ave./Box Springs Blvd.	AM	Signal	-	-	Signal	-	-
	PM		E	65.9		D	45.6
Big Springs Rd./Watkins Dr.	AM	AWS	E	35.2	Signal	A	6.5
	PM		F	129.6		B	15.9
Le Conte Dr./Chicago Ave.	AM	Minor	WB: F	70.6	Minor	WB: D	34.8
	PM		-	-		-	-
Central Ave./I-215 NBR	AM	Minor	NB: F	60.3	Signal	B	18.3
	PM		NB: F	320.0		C	22.1

Intersection	Peak Hour	**2015 UCR LRDP**					
		Base			Mitigated		
		Control	LOS	Delay	Control	LOS	Delay
Blaine St./Iowa Ave.	AM	Signal	-	-	Signal	-	-
	PM		F	107.4		D	52.6
University Ave./Iowa Ave.	AM	Signal	-	-	Signal	-	-
	PM		F	82.7		D	48.7
Martin Luther King Blvd./Chicago Ave.	AM	Signal	-	-	Signal	-	-
	PM		E	64.5		D	52.1
Martin Luther King Blvd./Canyon Crest Dr.	AM	Signal	-	-	Signal	-	-
	PM		F	116.6		D	44.5
Central Ave./Canyon Crest Dr.	AM	Signal	-	-	Signal	-	-
	PM		F	88.1		D	52.2
Central Ave./Box Springs Blvd.	AM	Signal	-	-	Signal	-	-
	PM		E	66.7		D	46.2
Big Springs Rd./Watkins Dr.	AM	AWS	E	47.8	Signal	A	7.6
	PM		F	208.3		B	15.1
Linden St./Aberdeen Dr.	AM	AWS	-	-	AWS	-	-
	PM		E	41.6		D	30.0
Le Conte Dr./Chicago Ave.	AM	Minor	WB: F	77.9	Minor	WB: E	36.5
	PM		WB: E	38.1		WB: D	29.9
Central Ave./I-215 NBR	AM	Minor	NB: F	81.3	Signal	B	19.4
	PM		NB: F	361.4		C	27.1

INTERSECTION	EXISTING LANE CONFIGURATION	2015 IMPROVEMENT NEEDED WITHOUT UCR LRDP	ADDITIONAL IMPROVEMENT WITH UCR LRDP
3RD ST (E/W) @ CHICAGO AVE (N/S)		NONE	 **PM**
BLAINE ST (E/W) @ IOWA AVE (N/S)		 **PM**	 **PM**
UNIVERSITY AVE (E/W) @ CHICAGO AVE (N/S)		 **PM**	 **PM**
UNIVERSITY AVE (E/W) @ IOWA AVE (N/S)		NONE	 **PM**

Note: Improvement Shown in Bold Font

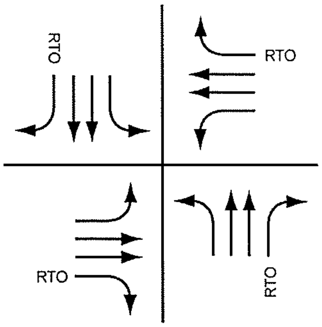
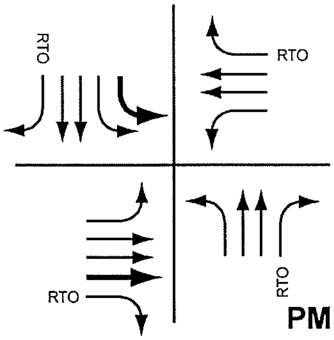
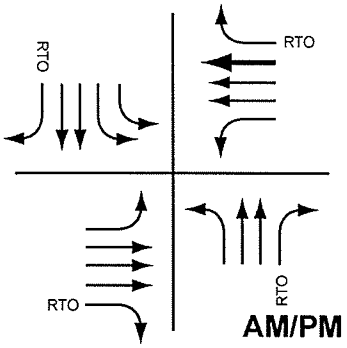
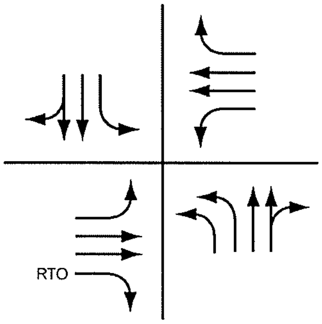
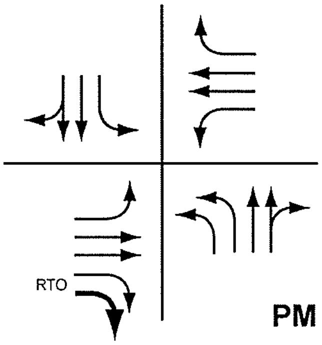
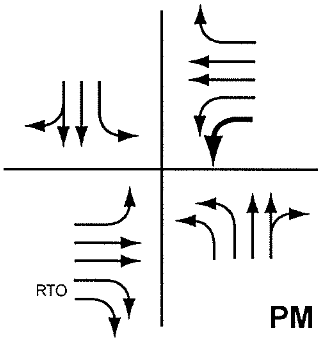
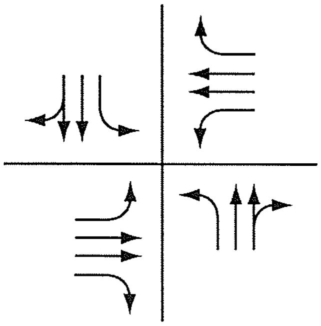
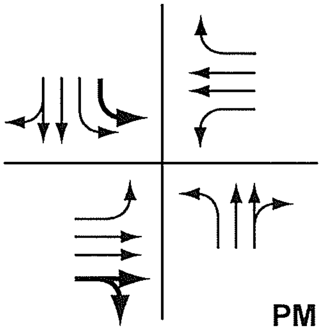
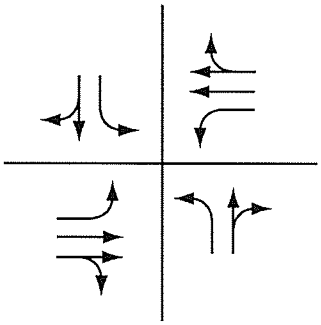
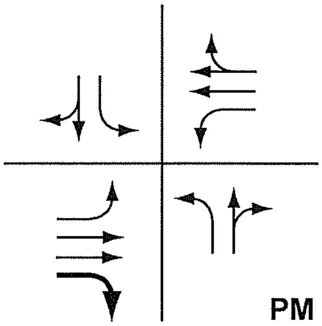
* Added Improvement

RTO Right Turn Overlap Signal Phase

▸ Stop Sign

SUMMARY OF NEEDED INTERSECTION IMPROVEMENTS
YEAR 2015 SCENARIO (2-Lane Iowa Avenue Condition)
UC Riverside Long Range Development Plan (UCR LRDP)

Figure 6-1A

INTERSECTION	EXISTING LANE CONFIGURATION	2015 IMPROVEMENT NEEDED WITHOUT UCR LRDP	ADDITIONAL IMPROVEMENT WITH UCR LRDP
MLK BLVD (E/W) @ CHICAGO AVE (N/S)		 PM	 AM/PM
MLK BLVD (E/W) @ CANYON CREST DR (N/S)		 PM	 PM
CENTRAL AVE (E/W) @ CANYON CREST DR (N/S)		 PM	NONE
CENTRAL AVE (E/W) @ BOX SPRINGS BLVD (N/S)		 PM	NONE

Note: Improvement Shown in Bold Font

* Added Improvement

RTO Right Turn Overlap Signal Phase

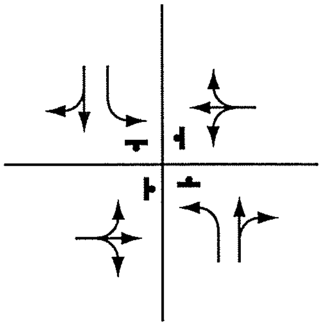
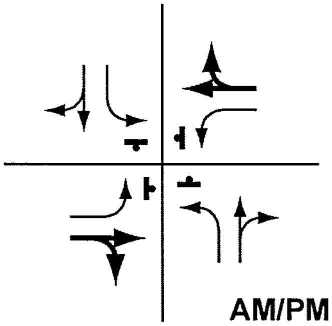
▸ Stop Sign

SUMMARY OF NEEDED INTERSECTION IMPROVEMENTS

YEAR 2015 SCENARIO (2-Lane Iowa Avenue Condition)

UC Riverside Long Range Development Plan (UCR LRDP)

Figure 6-1B

INTERSECTION	EXISTING LANE CONFIGURATION	2015 IMPROVEMENT NEEDED WITHOUT UCR LRDP	ADDITIONAL IMPROVEMENT WITH UCR LRDP
BIG SPRINGS RD (E/W) @ WATKINS DR (N/S)			NONE

Note: Improvement Shown in Bold Font

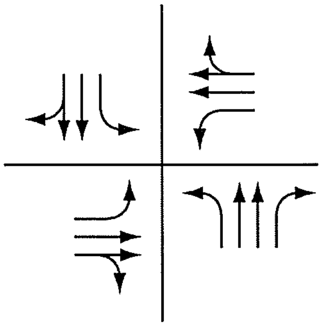
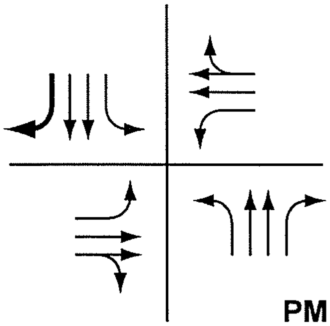
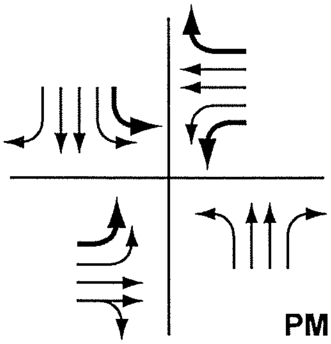
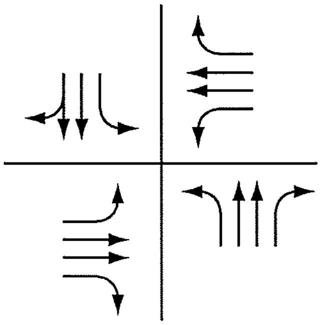
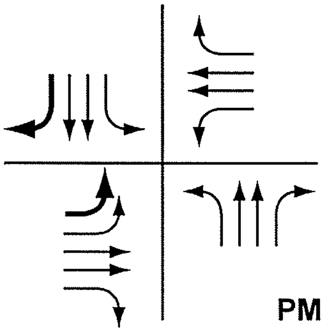
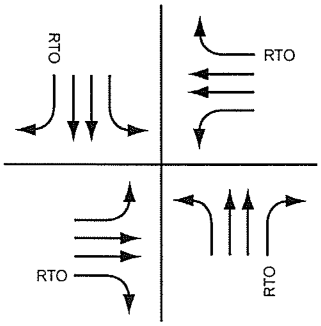
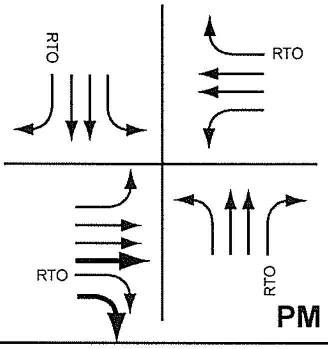
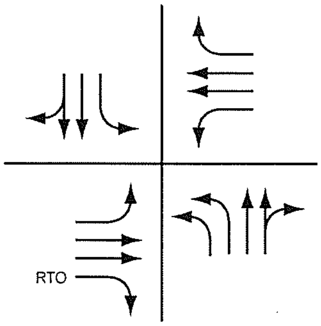
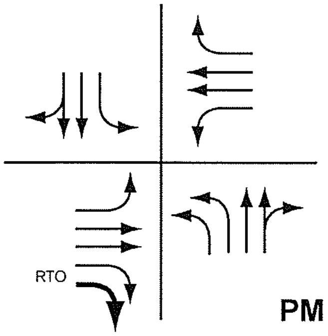
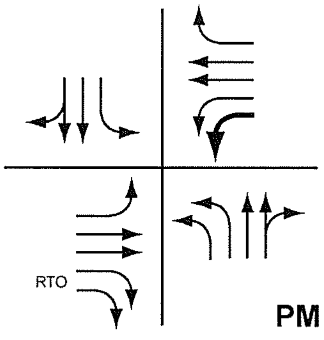
* Added Improvement

RTO Right Turn Overlap Signal Phase

┣ Stop Sign

SUMMARY OF NEEDED INTERSECTION IMPROVEMENTS
YEAR 2015 SCENARIO (2-Lane Iowa Avenue Condition)
UC Riverside Long Range Development Plan (UCR LRDP)

Figure 6-1C

INTERSECTION	EXISTING LANE CONFIGURATION	2015 IMPROVEMENT NEEDED WITHOUT UCR LRDP	ADDITIONAL IMPROVEMENT WITH UCR LRDP
BLAINE ST (E/W) @ IOWA AVE (N/S)			
UNIVERSITY AVE (E/W) @ IOWA AVE (N/S)		NONE	
MLK BLVD (E/W) @ CHICAGO AVE (N/S)		NONE	
MLK BLVD (E/W) @ CANYON CREST DR (N/S)			

Note: Improvement Shown in Bold Font

* Added Improvement

RTO Right Turn Overlap Signal Phase

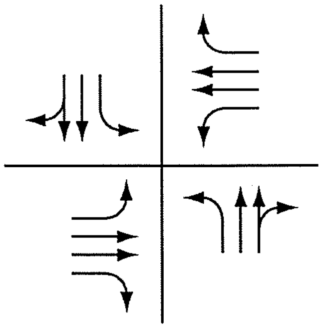
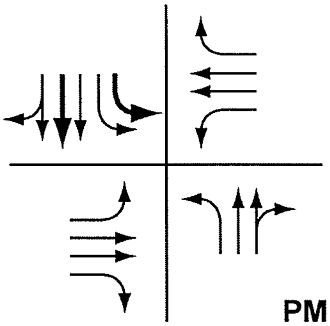
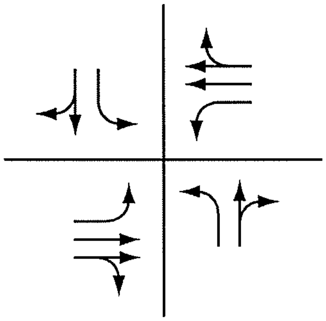
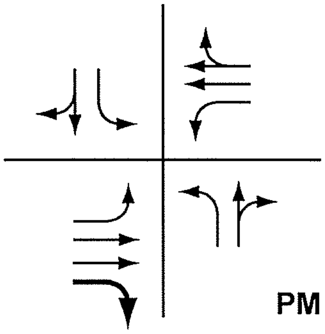
⊧ Stop Sign

SUMMARY OF NEEDED INTERSECTION IMPROVEMENTS

YEAR 2015 SCENARIO (4-Lane Iowa Avenue Condition)

UC Riverside Long Range Development Plan (UCR LRDP)

Figure 6-2A

INTERSECTION	EXISTING LANE CONFIGURATION	2015 IMPROVEMENT NEEDED WITHOUT UCR LRDP	ADDITIONAL IMPROVEMENT WITH UCR LRDP
CENTRAL AVE (E/W) @ CANYON CREST DR (N/S)		 **PM**	NONE
CENTRAL AVE (E/W) @ BOX SPRINGS RD (N/S)		 **PM**	NONE

Note: Improvement Shown in Bold Font

* Added Improvement

RTO Right Turn Overlap Signal Phase

▶ Stop Sign

SUMMARY OF NEEDED INTERSECTION IMPROVEMENTS

YEAR 2015 SCENARIO (4-Lane Iowa Avenue Condition)

UC Riverside Long Range Development Plan (UCR LRDP)

Figure 6-2B

Appendix I Water Supply Assessment

WATER DIVISION

RIVERSIDE
PUBLIC UTILITIES

3900 MAIN STREET | RIVERSIDE CA | 92522 | PHONE 909.826.5285 | FAX 909.826.2488 | WWW.RIVERSIDEPUBLICUTILITIES.COM

WORKING COPY

File: Water Supply Assessment CR

February 25, 2005

Megan K. Starr
Best Best & Krieger LLP
3750 University Avenue
Riverside, CA 92502-1028

Subject: UCR's Request for Confirmation or Update of Water Supply Assessment

Dear Ms. Starr,

This is in response to your request for assessment of the current validity of the City of Riverside's 2003 water supply assessment for the University of California, Riverside (UCR) Long Range Development Plan (LRDP). Your letter specifically requests the City state whether the projected water demand associated with the UCR LRDP was included as part of the City's most recently adopted Urban Water Management Plan.

The UCR LRDP water supply assessment, adopted on August 26, 2003, was based on the City's 2001 Urban Water Management Plan (UWMP). The projected water demand in the 2001 UWMP was not project specific, but represented the overall projected demand within the City's service area. The UCR LRDP demand was within the City's overall projected water demand.

Since the adoption of the UCR LRDP water supply assessment on August 26, 2003, the City has refined its projected water demand as well as water supplies. The projected water demand was refined based on the City's projected land use including UCR LRDP. The refined projected water demand is presented in the City's Water Master Plan (WMP), which is currently being finalized. The projected water demand in the Water Master Plan is within the range of that presented in the 2001 UMWP, confirming that water demand projected in the 2001 UWMP encompasses the UCR LRDP's increased demand.

The updated water supplies are presented in the City's Water Supply Plan (WSP), dated July 2004. The Water Supply Plan describes the sources of supplies to meet the City's future water demand, as well as water conservation to reduce the demand. The additional sources of supply considered in the 2004 Water Supply Plan include additional production from the Riverside Basin, additional water exchange with the Gage Canal Company, recycled water, water from Seven Oaks Dam, and imported water. To meet its future demand, particularly during dry years, the City intends to supplement its water supplies by purchasing additional imported treated water from WMWD.

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FEB 28 2005
BEST BEST & KRIEGER, LLP

The City's UWMP is currently being updated and will be adopted by December 2005. The water demand and supply analysis in the 2005 UWMP will be based on the City's updated Water Master Plan and Water Supply Plan. The WMP and WSP indicate that the available and planned additional water supplies should meet the City's projected water demand, which includes the UCR LRDP demand.

Sincerely,

Zahra Panahi, Ph.D., P.E.
Principal Water Engineer

cc: David H. Wright, Public Utilities Director
Eileen M. Teichert, Supervising Deputy City Attorney
Dieter P. Wirtzfeld, Assistant Director - Water

People Serving
People

CITY OF RIVERSIDE

CITY COUNCIL MEMORANDUM

Riverside
All-America City
1998

HONORABLE MAYOR AND CITY COUNCIL

DATE: August 26, 2003

ITEM NO: 64

SUBJECT: **WATER SUPPLY ASSESSMENT FOR THE UNIVERSITY OF CALIFORNIA, RIVERSIDE (UCR) PROPOSED 2003 LONG RANGE DEVELOPMENT PLAN (LRDP)**

BACKGROUND:

The State of California Senate Bill 610 (SB 610) took effect from January 1, 2002. SB 610 has been codified in the Water Code (Section 10910) and requires the preparation of a Water Supply Assessment (WSA) for projects that propose to construct more than 500 residential units, or that will use an amount of water equivalent to, or more than, what would be used by 500 residential units. The WSA is to determine whether the City of Riverside (City) has sufficient water supplies to serve the incremental demand from the proposed project.

The University of California, Riverside (UCR) has prepared a draft Environmental Impact Report (EIR) for its proposed 2003 Long Range Development Plan (LRDP) in compliance with the California Environmental Quality Act (CEQA). Staff has prepared a Water Supply Assessment for the proposed project. This WSA will be included as an Appendix to the draft EIR and its conclusions are to be considered in analyzing the potential impacts on water supply.

The 2003 LRDP proposes to accommodate a projected increase in student enrollment from 12,703 students during the 2000/2001 academic year to approximately 25,000 students by 2015/2016. Facilities required include 7.5 million gross square-feet of new on-campus structures, including 8,620 beds of on-campus student housing. During the 2001/2002 fiscal year, on-campus water demand was 4,036 acre-feet per year, which was met from available water supplies to the City.

City staff prepared an Urban Water Management Plan (UWMP), which was adopted by the City Council in March 2002. That Urban Water Management Plan includes the current and projected water supply and demand available during normal, single, dry, and multiple dry years over a 20-year period (2000 – 2020). The Urban Water Management Plan also included an assessment of the reliability of the water supply and its vulnerability to seasonal or climatic shortages and plans for dealing with such water shortage contingencies.

The UWMP projections include total growth within the City service area. The WSA determined that the proposed project would increase total on-campus net annual water demand by 1,880 acre-feet, which is within the projected water demand for the City.

The Water Supply Assessment was reviewed and approved by the Board of Public Utilities on August 1, 2003.

FISCAL IMPACT:

None.

ALTERNATIVES:

One alternative is not to adopt the WSA. This alternative is not recommended because the City is legally obligated to prepare a WSA in response to UCR's request.

RECOMMENDATIONS:

That the City Council:

1. Approve and adopt the attached Water Supply Assessment for the University of California, Riverside Proposed 2003 Long Range Development Plan.

Prepared by:

Thomas P. Evans
Public Utilities Director

Approved by:

George A. Caravalho
City Manager

Approved as to form:

for Gregory P. Priamos
City Attorney

Concurs with:

Paul C Sundeen

Paul C. Sundeen
Finance Director

DPW/ZP/Babs

Attachment: Water Supply Assessment for University of California, Riverside Proposed 2003 Long Range Development Plan – City of Riverside
Board of Public Utilities meeting minutes of August 1, 2003

Water Supply Assessment
for
University of California, Riverside Proposed 2003 Long Range Development Plan
City of Riverside

Section 1: Introduction:

On January 1, 2002, a new law, Senate Bill 610 (SB 610), took effect. SB 610, which has been codified in the Water Code beginning at Section 10910, requires the preparation of water supply assessments for projects that propose to construct more than 500 residential units, or that will use an amount of water equivalent to what would be used by 500 residential units.

The purpose of this WSA is to satisfy the requirements under SB 610. SB 610 stipulates that when an environmental review is required in connection with certain large development projects for approval by the lead agency, the water agency that is to serve the development must complete a water supply report to assess the adequacy of water supplies available to meet demands. The assessment must evaluate water supplies that are or will be available during normal, single-dry and multiple dry years during a 20-year projection to meet existing and planned future demands including the demand associated with the proposed development.

The assessment includes, among other information, an identification of existing water supply entitlements, water rights, or other water service contracts relevant to the identified water supply for the proposed project and water received in prior years pursuant to those entitlements, rights, and contracts and a description of the quantities of water received in prior years by the public water system.

The development project under consideration here is the University of California, Riverside's 2003 Long Range Development Plan. In compliance with the California Environmental Quality Act ("CEQA"), an environmental impact report ("EIR") has been prepared for the Project. This water supply assessment will be included as an appendix to the Draft EIR and the conclusions reached in this document will be considered in analyzing the Project's potential impacts on water supply.

Section 2: Project Description

The 2003 UC Riverside Long Range Development Plan ("LRDP") proposes to accommodate a projected increase in student enrollment from 12,703 (three-quarter average students for the 2000/2001 academic year) to approximately 25,000 students by the 2015/16 academic year. To provide the academic, administrative and support facilities necessary to support the proposed increase in enrollment, the 2003 UCR LRDP proposes to accommodate approximately 7.5 million gross square feet of new structures on-campus, including approximately 8,620 beds of on-campus student housing. The new on-campus student housing would consist of 714 units of family student housing, 4,920 beds in student apartments, and 2,986 beds in student residence halls.

Based on year 2000 census data, the 2001 Urban Water Management Plan (UWMP) identified that the City of Riverside, with approximately 58,000 service connections in 2001, provided water to a population within the service area of approximately 250,000 persons. The UWMP projects a population within the service area of 300,000 persons in 2015 or a 16% growth in population from 2000 to 2015. However, the UWMP's projections do not include growth in UCR's student population because the UWMP is based on census data.

While the campus grew very little during the 90s, UCR is projected to grow from 12,703 students in the year 2000 to 25,000 students in 2015. This is an increase of over 90% over a period of fifteen years.

The most recent data available detailing campus water demand relate to fiscal year 2001-02 and cover the period from June 6, 2001 through the June 6, 2002. During fiscal year 2001-02, the total campus water consumption was approximately 3.6 million gallons per day (MGD) or 4,036 acre-feet per year. Of this total, 2.3 MGD (2,576 acre-feet per year) is attributable to potable/domestic water demand, while the remainder (1,460 acre-feet per year) relates to irrigation needs for the approximately 480 acres of campus land used for agricultural research and production.

Approximately 40% of the total campus water consumption is attributed to indoor use, including air conditioning, cooling, and hygienic uses, with approximately 60% used for landscape irrigation. Of the 40%, primary water uses include residential, research and laboratory, steam boilers and cooling towers, chillers, food facilities, restrooms, custodial areas, showers, and drinking fountains.

Future water demands have been estimated for the 2003 LRDP's projected ultimate build-out population using recently developed sustainability factors that promote water conservation. Projected water demands for the 2003 LRDP are, therefore, less than previously projected for the University. Also, due to the improved fire rating of modern construction materials and the increased use of automatic sprinkler systems, newer buildings will have lower fire flow demands than the older, existing buildings on campus.

Projected demands for anticipated future construction will use sustainable water use factors for academic, residential and landscape use. For instance, for students living on-campus, the sustainability demand factor is 70 gallons per day and for students, faculty and staff not living on-campus, the sustainability demand is 20 gallons per day.

Based on these factors, the campus anticipates a potable/domestic water demand of approximately 3 MGD on the East Campus and 1.2 MGD on the West Campus by 2015; the total potable/domestic demand will be 4.2 MGD or 4,704 acre-feet per year. As compared to current demand, this represents a potable/domestic water demand increase of 1.9 MGD (4.2 MGD - 2.3 MGD) or 2,128 acre-feet per year.

As a result of the Project, about 80 acres (approximately 17%) of the campus' existing agricultural land would be converted to developed uses. Assuming that the campus' demand for agricultural irrigation water declines by about 17% as a result of the conversion of this acreage, the existing demand of 1,460 acre-feet per year will be reduced by about 248 acre-feet per year. Thus, after Project build-out, the campus' total future agricultural water demand will be 1,212 acre-feet per year.

The 2,128 acre-feet per year increase in the campus' potable/domestic water demand will be partially offset by the 248 acre-feet per year reduction in agricultural water demand. Overall, as a result of the Project, the campus' water demand will increase by 1,880 acre-feet per year to 5,916 acre-feet per year (4,036 acre-feet per year total 2003 demand + 1,880 net increase resulting from the Project). However, as noted above, the University's annual domestic/potable water demand will increase by a total of 2,128 acre-feet as a result of this project. In other words, once the University's project is fully built, the University's yearly need for domestic/potable water will increase by 2,128 acre-feet.

Section 3: Requirement to Prepare a Water Supply Assessment:

The City must determine whether the Project requires preparation of a water supply assessment. The City provides municipal water service to many of its residents and its service area includes the Project site. Because the City has over 5,000 water supply connections, SB 610 requires the City to prepare a water supply assessment when a project includes any of the following components: (1) more than 500 residential dwelling units, (2) a shopping center or business with more than 500,000 square feet of floor space or more than 1,000 employees, (3) a commercial office building with more than 250,000 square feet of floor space or more than 1,000 employees, (4) a hotel or motel with more than 500 rooms, or (5) an industrial, manufacturing or processing plant, or an industrial park, with more than 650,000 square feet of floor area, more than 1,000 employees, or that occupies more than 40 acres. Even if the project does not meet any of the above criteria, the City must also prepare a water supply assessment when the project will use as much water as a 500 dwelling unit project would use (i.e., 500 Equivalent Dwelling Units ["EDUs"]).

This Project does not meet any of the specific criteria set forth in Water Code section 10912(a)(1) - (6). Moreover, it is not clear whether Water Code section 10912 is intended to apply to projects such as this one, which represent long-range development plans rather than proposed site-specific development. Out of an abundance of caution, it is assumed that the meaning of "project" as used in Water Code section 10912 encompasses long-range planning projects such as this Project. Given this assumption, the Project appears to meet the triggering criterion of Water Code section 10912(a)(7). The Project contemplates a projected increase in student enrollment from 12,703 (three-quarter average students for the 2000/2001 academic year) to approximately 25,000 students by the 2015/16 academic year, which entails the construction of additional educational facilities and housing. It is anticipated that the build-out of the Project will generate additional demand for potable water of 2,128 acre-feet per year. Based on this amount of projected increase in water demand, it appears that this Project meets the triggering criterion set forth in Water Code section 10912(a)(7). Therefore, the City has prepared this water supply assessment for this Project.

Section 4: Inclusion in an Urban Water Management Plan:

In accordance with the California Urban Water Management Planning Act, the City of Riverside adopted an Urban Water Management Plan ("UWMP") in December of 2001. As required by law, the UWMP includes projected water supplies required to meet future demands through 2020. A copy of the City's 2001 UWMP is attached hereto as Exhibit A and incorporated by this reference.

The 2001 UWMP assesses demand and supply and concludes that the City has an adequate supply to meet municipal, commercial and industrial demands, throughout the City's service area, through 2020. The UWMP does not contemplate specific projects but rather is based on the overall anticipated growth rate within the City's water service area.

This water supply assessment will analyze whether the City's supplies are sufficient to serve the additional 2,128 acre-feet per year of domestic/potable water demand that the University anticipates the project will generate.

Section 5: City's Existing and Projected Water Supply:

5.1 Water Supply Entitlements, Rights or Contracts That May Be Used to Serve the Project

All water supply entitlements, water rights, and/or water service contracts that may be used to serve the Project are set forth in the UWMP. Pursuant to Water Code 10910(c)(2), the City incorporates the UWMP by reference.

Bunker Hill Adjudicated Groundwater Basin

Much of the City's water supply comes from the Bunker Hill Groundwater Basin in San Bernardino County. The Bunker Hill Basin is adjudicated. Under the Judgment entered for the Bunker Hill Basin, the City is entitled to take up to 49,542 acre-feet of water annually. Of the 49,542 acre-feet, the City's share is 22,299 acre-feet and the Gage Canal Company's share is 27,243 acre-feet. The City has the right to use a portion of the Gage shares, based partially upon its ownership of Gage stock and partially by an exchange agreement between Gage and the City. The water available for such exchange was 14,030 acre-feet in 2000. This number reflects the City's portion of the water rights in this basin (up to 22,299 acre-feet), plus: (1) the amount of water rights formerly exercised by the Gage Canal Company that the City acquired by virtue of its acquisition of the stock of this company (up to 13,213 acre-feet as of 2000) and (2) the amount of irrigation water that the City exchanges with Gage Canal Company for potable groundwater drawn from the basin (up to 14,030 acre-feet).

The City acquired additional rights to withdraw water from the Bunker Hill Basin when it acquired shares of stock in the Meeks & Daley and Riverside Highland water companies. Under the Judgment, Agua Mansa Water Company and Meeks & Daley Water Company are collectively entitled to withdraw up to 7,515 acre-feet of water from the basin per year. The Judgment also allows Riverside Highland Water Company to withdraw up to 1,845 acre-feet of water per year. The City's shares of stock in Meeks & Daley and Riverside Highland water companies entitle the City to withdraw up to 3,816 acre-feet of water from the basin each year.

The City has an additional right to Bunker Hill basin withdrawals as the successor-in-interest to the University's share of the extractions. The Bunker Hill Judgment allowed the Regents of the University of California to withdraw up to 536 acre-feet per year of water from the basin. The Regents subsequently assigned this right to the City in exchange for the City's agreement to provide water service to the campus.

Riverside Groundwater Basin

The City also has a right to withdraw water from the Riverside groundwater basin. The Riverside groundwater basin is denominated Riverside North and Riverside South, but the basin is one hydrological unit and this division merely reflects political geography. The Riverside/San Bernardino County line is the dividing line between the Riverside North and Riverside South sub-basins.

From Riverside North, the City's average domestic water supply is estimated at 8,000 acre-feet per year. This estimate is based on the production records from the Van Buren wells and the City's share of production from the DeBerry well. From 1989 through 2001, the City's production from the Riverside North basin exceeded 8,000 acre-feet in four of the 12 years.

Recently, the City has been producing about 12,000 acre-feet per year of potable water from its domestic wells and about 7,000 acre-feet of irrigation supply from its other wells in the Riverside South basin. The City can increase its domestic capacity to 16,000 acre-feet per year by using the full capacity of its existing domestic wells. In the past, production from the City's Electric Street, Garner B and Russell C wells was limited, and production from the Palmyrita 2, Twin Spring, and Moor-Griffith wells was precluded, due to high localized concentrations of dibromochloropropane (DBCP).

The City has constructed two treatment plants to eliminate this water quality constraint to exercising its rights to withdraw water from the Riverside basin. Another such plant is under construction and is expected to be fully operational during 2003. Once the treatment plant is operational, the City will be able to resume full production from the Electric Street, Palmyrita 2, Twin Spring, and Moor-Griffith wells, assuming it obtains the necessary regulatory approval from the State Department of Health Services (DHS) for operation of domestic wells. The return to service of the Palmyrita 2, Twin Spring, and Moor-Griffith wells will increase the City's average annual domestic production by about 11,500 acre-feet per year.

To further increase its production from the Riverside basin, the City is also planning to drill additional wells and build new treatment facilities in the downtown area. The City anticipates that these sources will be available by 2010 and will contribute 10,000 acre-feet of domestic water per year. This project will also be subject to regulatory approvals from DHS.

Imported Water

The City has a contract to obtain State Water Project water from the Western Municipal Water District of Riverside County ("Western"). In recent years, the City has been taking 400 acre-feet of water under this contract. A copy of the City's contract with Western to obtain this water is attached hereto as Exhibit B and incorporated herein by reference

Recycled Water

The City also has a wastewater treatment plant that provides the capability of generating recycled water for non-potable uses. The City anticipates that, by 2005, it will be able to transfer about 2,000 acre-feet per year of irrigation uses to this non-potable water supply. By 2015, the City anticipates that about 10,000 acre-feet of irrigation uses can be supplied with this reclaimed water.

Anticipated New Supplies

Through Western, the City has also applied for appropriation permits to divert and store water at the newly constructed Seven Oaks Dam on the Santa Ana River near Mentone. The two applications filed jointly by Western and the San Bernardino Municipal Water District seek a total appropriation of 200,000 acre-feet of water per year. Western's share of any appropriative water rights that may be granted pursuant to the applications will be 27.95%; the City will obtain a pro rata amount of Western's share in accordance with the City's rights under the Bunker Hill Judgment.

5.2 Amount of Water Historically Received

The amount of water the City has historically received under each of the water rights described in Section 5.1 is set forth in the UWMP. Pursuant to Water Code 10910(c)(2), the City incorporates by reference in this WSA the information set forth in the UWMP.

Bunker Hill Basin

The City's annual domestic groundwater production is also set forth in the attached spread sheet. Of the total amounts indicated on the spread sheet, the City's withdrawals from the Bunker Hill basin have been 61,358 acre-feet.[1]

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[1] For at least the last 5 years, the Watermaster established pursuant to the Bunker Hill basin adjudication has made a finding that there is surplus water available in the basin, and the City has been able to withdraw 8,000 acre-feet in addition to its entitlements. However, this surplus water may not be available in all years. Therefore, the surplus Bunker Hill basin water has not been counted as a source of supply in this WSA.

Riverside Basin

For at least the past five years, the City has been pumping nearly 6,000 acre-feet from the Riverside North basin and about 12,000 acre-feet of potable water and 7,000 acre-feet of non-potable water from the Riverside South basin. As indicated above, the City's pumping of groundwater from this basin has been limited by water quality rather than water quantity issues.

Imported Water

The City has been receiving 400 acre-feet of imported State Water Project water per year pursuant to a contract with Western Municipal Water District.

Recycled Water

The City has the capacity to provide recycled water for non-potable uses, but, to date, there has been little demand for this water because non-potable groundwater has been available for irrigation use. As of 2001, the City was providing only a small amount of recycled water, which was used to irrigate one golf course.

Newly Developed Supplies

The Seven Oaks Dam is a newly developed potential source of supply. The dam did not become operational until 2000, and the City has not previously received any water from this source. If the dam is operated for water conservation as well as flood control purposes, its conservation pool will conserve the upstream floodwaters of the Santa Ana River. Pursuant to the judgment in the Bunker Hill adjudication, the upstream parties to the judgment, including the City, will share in any water conserved at the dam according to their pro-rata share of the safe yield of the Bunker Hill basin. The other parties that have a right to receive water from the Conservation Pool are the parties to the judgment, which is attached to this WSA as Exhibit C and incorporated herein by reference.

Section 6: Description of Groundwater Basins and Analysis of Groundwater Supply:

As indicated above, one of the City's sources of supply is groundwater, and the UWMP contains the following information, which the City incorporates into this WSA by reference, pursuant to Water Code 10910(c)(2):

a. Descriptions of groundwater basin(s) that will be used to serve the Project - Please see UWMP and Section 5.1, above, for descriptions of the two groundwater basins that may be used to serve the Project.

b. Legal status of the groundwater basin(s) that will be used to serve the Project

   (1) Bunker Hill - As indicated in the UWMP and above in Section 5.1, the Bunker Hill Basin is adjudicated. The judgment of adjudication determined the safe yield of the basin and the amount of water to

which the City is entitled; a copy of the judgment is attached to this WSA as Exhibit C and incorporated herein by reference.

(2) Riverside - As indicated in the UWMP and above in Section 5.1, the Riverside basin is not adjudicated.

c. Description of unadjudicated basins

(1) The Riverside basin has not been characterized in any DWR bulletin as being in a threatened or actual overdraft under current management practices. Rather, as indicated above, production of domestic water from this basin has been limited by water quality issues.

(2) The amount and location of groundwater pumped from the Riverside basin by the City for the past five years is set forth in the UWMP and in Section 5.2, above.

(3) Projected pumping needed to supply Project - As indicated in the UWMP, about 98% of the water demand within the City's service area is served by local groundwater supplies. Thus, the Project's needs will also likely be served by the City's local groundwater supplies. At full build-out in 2015, the Project will generate a domestic/potable water demand of about 2,128 acre-feet per year . The UWMP anticipates that the annual water demand within the City's service jurisdiction will increase by 10,018 acre-feet by 2015; the UWMP also demonstrates how the City will meet this increased demand from its existing supplies. Thus, the City's Bunker Hill and/or Riverside groundwater supplies are more than adequate to serve the Project with an additional 2,128 acre-feet of potable water per year. For additional information, please see Section 8, below.

Section 7: Existing and Forecasted Water Demands

The UWMP contains the past, current and forecasted water use with the City's service area, and, pursuant to Water Code 10910(c)(2), the City incorporates by reference the information in this WSA, with the disclaimer noted in Section 5(c)(3), above.

Section 8: Adequacy of Water Supply:

The City's total projected water supplies (including groundwater) available during normal, single dry, and multiple dry years over a 20-year period are adequate to meet the projected water demand associated with the proposed Project in addition to existing and planned future uses. As indicated in Table 5-2 of the City's Urban Water Management Plan, by 2005, the City's projected water demand will be about 92,300 acre-feet per year, while the projected supply is 108,600 acre-feet per year. By 2010, the City's available water surplus will increase to 27,300 acre-feet per year, and by 2015 (at full Project build-out), the City's anticipated surplus is 28,100 acre-feet per year. By 2020, the City's available water surplus will drop to about 23,600 acre-feet per year, based on projected growth within the City's service area. However, the City's projected surplus is still comfortably large enough to accommodate the Project.

Because about 98% of the City's water supplies come from groundwater, the City is generally not subject to shortfalls in times drought, so single dry or multiple dry years do not create supply problems. (For more information on the reliability of the City's groundwater supplies during drought periods, please see the UWMP.)

Therefore, the City's total projected water supplies (including groundwater) during the next 20 years are sufficient to meet the additional 2,128 acre-feet per year of domestic/potable water demand resulting from this Project, in addition to existing and planned future uses.

However, this finding of adequacy is solely for UCR's 2003 LRDP. Should UCR seek to actually construct the projects set forth in the 2003 LRDP, additional water supply assessments may be needed, pursuant to Water Code section 10910(h), which provides that additional water supply assessments shall be required for subsequent projects that were part of a larger project for which a water supply assessment was completed and one or more of the following changes occurs: "(1) Changes in the project that result in a substantial increase in water demand for the project, (2) Changes in the circumstances or conditions substantially affecting the ability of the public water system, or the city or county if either is required to comply with this part pursuant to subdivision (b), to provide a sufficient supply of water for the project, or (3) Significant new information becomes available which was not known and could not have been known at the time when the assessment was prepared."

EXHIBIT 'A'

PLEASE SEE SEPARATE ATTACHMENT

EXHIBIT "B"

AGREEMENT FOR SERVICE RIGHT IN THE WESTERN MUNICIPAL WATER DISTRICT STATE PROJECT WATER PIPELINE

AGREEMENT FOR SERVICE RIGHT IN THE WESTERN MUNICIPAL WATER DISTRICT STATE PROJECT WATER PIPELINE

THIS AGREEMENT made this 23rd day of September, 1986, is entered into by and between the WESTERN MUNICIPAL WATER DISTRICT OF RIVERSIDE COUNTY ("WMWD"), a municipal water district organized under the laws of the State of California and a member agency of the Metropolitan Water District of Southern California ("MWD") and of the Santa Ana Watershed Project Authority ("SAWPA"), and the CITY OF RIVERSIDE, a charter city ("CITY").

RECITALS

1. The Santa Ana Watershed Project Authority, a joint powers agency organized and existing pursuant to the laws of California and to a certain Joint Powers Agreement of January, 1975, exercising the powers common to its member agencies ("SAWPA"), has agreed to engineer, design, and construct an imported water conveyance system within the service area of WMWD, consisting of a gravity pipeline, a pressure pipeline, a reservoir and a pumping station ("PROJECT"), for the purpose of supplying treated water to WMWD's service area for irrigation, domestic and industrial uses. PROJECT Construction is presently estimated to be complete by 1990.

SAWPA has entered into a contract with the United States pursuant to the Small Reclamation Projects Act for a loan to construct the PROJECT entitled Contract Between the U.S. and Santa Ana Watershed Project Authority, dated February 11, 1985 and on file with SAWPA which is incorporated herein by reference. SAWPA has estimated the total project cost to be $23,316,500. The loan, in an amount not to exceed $14,917,000, has been approved and authorized for funding. The loan contract required the execution of a Lease-Purchase agreement between SAWPA and WMWD, which was executed on January 2, 1985 and is on file with the WMWD at its offices, which Agreement is incorporated herein by reference.

2. By the terms of the Lease-Purchase Agreement, WMWD will lease and operate the PROJECT from SAWPA during the period of time SAWPA is obligated under the loan contract with the United States, and will be solely responsible for all the financial obligations, costs and expenses of the PROJECT and the loan contract. At the time the loan obligation is repaid, SAWPA will convey its ownership interest in the PROJECT to WMWD.

3. WMWD, in turn, will make service rights in the PROJECT available to applicants within its service area, subject to certain payment requirements and terms and conditions.

4. CITY has applied for a service right of 30 cubic feet per second ("cfs"), and has agreed to pay the cost and to comply with the terms and conditions.

5. It is the purpose of this Agreement to provide the terms, conditions and payment schedule under which CITY will acquire a 30 cfs service right in the PROJECT.

COVENANTS

Based upon the foregoing facts, and in consideration of the mutual covenants of the parties, it is hereby agreed as follows:

6. Definitions. As used in this Agreement, these terms shall have the following meaning:

A. Service Right. A right to receive treated State Water Project water service at a specific maximum rate of flow of water at specific connections, to the extent water is available to WMWD from the Metropolitan Water District of Southern California ("MWD"), and to the extent the PROJECT facilities are capable of delivering design capacity flows. The amount of the service right shall be expressed in cubic feet per second as constant flow during a 24-hour period, and shall be equal to the maximum flow which may be required by CITY as measured at its connections on Reach A. Use of the pipeline by any project participant or participants shall not diminish CITY's service right.

B. PROJECT. The PROJECT is an imported water conveyance system intended to carry treated State Water Project water from the Henry J. Mills Filtration Plant ("Mills") on Alessandro Boulevard in western Riverside County to certain locations within the service area of WMWD. The conveyance system consists of two separate pipelines.

The first is a gravity pipeline, which begins at the Mills Filtration Plant and runs westerly approximately 65,000 feet, generally following the alignment of the Box Springs and Upper Feeder right of way belonging to MWD, to a final turnout at Eagle Valley. It includes a 10 million gallon storage facility located near the westerly end of the pipeline.

The second is a pressure pipeline, which will begin at the Mills Filtration Plant and run southerly approximately 18,300 feet, and includes a pumping station located near the Mills Filtration Plant.

C. PROJECT Participants. PROJECT Participants shall be those entities which obtain a service right in the PROJECT from WMWD and agree to abide by the terms and conditions set by WMWD for acquisition and utilization of such right.

D. Gravity Pipeline Reaches. The gravity pipeline shall consist of five reaches and a reservoir which are further defined as follows:

(1) Reach A. Reach A shall be the first reach of the gravity pipeline from the Mills Filtration Plant, running westerly approximately 31,200 feet, and consisting of a 60-inch pipeline.

(2) Reach B. Reach B shall be the second reach of the gravity pipeline from the Mills Plant, commencing at the westerly end of Reach A, running westerly approximately 14,600 feet, and consisting of a 54-inch pipeline.

(3) Reach C. Reach C shall be the third reach of the gravity pipeline, commencing at the westerly end of Reach B, running westerly approximately 3,200 feet, and consisting of a 48-inch pipeline.

(4) Reach D. Reach D shall be the fourth reach of the gravity pipeline, commencing at the end of Reach C, running westerly approximately 12,300 feet, consisting of a 48-inch pipeline.

(5) Reach E. Reach E shall be the fifth reach of the gravity pipeline, commencing at the western end of Reach D, running westerly 3,700 feet, consisting of a 36-inch pipeline, and terminating in Eagle Valley.

(6) Reservoir. Reservoir shall mean a 10 million gallon storage facility located along the gravity pipeline toward the westerly end. CITY shall have no storage rights in this facility.

A map generally showing the location and terminus of each Reach and the Reservoir of the PROJECT is attached hereto as Exhibit "A."

E. <u>PROJECT Costs</u>. PROJECT Costs are defined as all ordinary and usual costs relevant to creating the PROJECT for its stated purposes, including construction costs of the gravity pipeline, reservoir, pressure pipeline, pump station, design, engineering, legal and administrative costs, rights of way, Bureau of Reclamation participation, loan application reports, CEQA-EIR costs, field inspection, interest costs, escalation factors and contingencies.

7. <u>CITY Service Right</u>. CITY shall have the right to require and WMWD shall have the obligation to deliver at connections to be determined along or at the end of Reach A, 30 cfs of treated State Water Project water, dependent upon full payment of the purchase price therefor by CITY, and compliance with the terms and conditions set forth herein, and further dependent upon the availability of MWD water to WMWD, and the capability of the PROJECT to deliver water at its design capacity.

8. <u>Price of Service Right</u>. The total price of the 30 cfs service right is fixed at $2,400,000 and is not subject to changed project requirements, cost overruns, or other increases or decreases in actual costs.

9. <u>Payment Terms</u>. CITY shall pay WMWD the total price of $2,400,000 in one payment submitted no later than September 26, 1986.

10. Reach A Estimated Completion Date. SAWPA estimates completion of construction of Reach A by February 1, 1988, provided Bureau of Reclamation loan funds continue to be made available as presently expected and authorized. WMWD agrees to exercise its best efforts to cause SAWPA to use due diligence in completing construction of Reach A by February 1, 1988.

WMWD also agrees to use its best efforts to provide water service to CITY immediately after acceptance of Reach A, regardless of completion of subsequent reaches of the gravity pipeline.

11. Operation, Maintenance, Repair and Replacement Costs (Gravity Pipeline). Operation and maintenance costs which shall be those associated with the gravity section of the PROJECT shall be divided between fixed and variable costs.

A. Fixed Costs, which shall include an amount for replacement, shall be charged to PROJECT participants as an annual charge on a fiscal year basis, and divided among participants based on each participant's percent of allocated service rights, whether or not the participants take delivery of the flow. The fixed costs may also be divided among participants on a reach by reach basis.

Replacement shall mean replacement after destruction by acts of God, malicious mischief, vandalism, extraordinary major maintenance costs or similar events. If such replacement becomes necessary when there are insufficient funds to cover the costs, WMWD shall meet with the PROJECT participants to determine how such costs shall be met.

B. Variable Costs shall be included in the rate for water, which shall be paid on a monthly basis. The water rate shall be the sum of the MWD rate for treated water, WMWD'S administrative charge, and variable costs of operation and maintenance of the gravity pipeline portion of the PROJECT. Payments shall be based on the net amount of water delivered to CITY's connections on Reach A. The water rate shall apply to the quantity of water delivered at each connection and shall be billed monthly.

WMWD shall establish an independent cost center and an annual budget for the operation and maintenance of the gravity pipeline portion of the Project. CITY shall be provided the opportunity to review and comment upon the proposed budget prior to its adoption by WMWD's board. Operation and maintenance cost amounts for this portion of the Project shall be based on the annual budget.

12. Point of Delivery. CITY shall be entitled to take delivery of its 30 cfs of water at a connection or connections, not to exceed 3, at such location or locations on Reach A as shall be determined by the parties. The primary water source shall be California State Water Project water, treated and delivered to WMWD at the Mills Plant. CITY shall be responsible for the costs of whatever additional

facilities required to make a connection to the PROJECT, including a structure, valves, meter, and telemetry, although the actual design and construction of such connection facility shall be completed by WMWD. Such costs shall be paid to WMWD in advance of letting any contract for the work or the purchase of any necessary equipment or facilities. Once a connection has been made, the connection facilities and meter shall belong to WMWD, and WMWD shall be responsible for their operation, maintenance, repair and replacement.

The CITY will have the right to install, maintain and inspect its own telemetry equipment and connections within the metering facilities. WMWD shall provide electrical contacts and meter characteristics as approved by the CITY for CITY's telemetry equipment and a flanged connection for the CITY's pipeline. All CITY's telemetry equipment shall belong to the CITY and CITY shall be responsible for its operation, maintenance, repair and replacement. The CITY will demonstrate the capability of flow control for its service connections.

13. Operation and Administration.

A. Scheduled outages - WMWD will provide advance notice of any scheduled pipeline outage.

B. Connection Right of Way - WMWD will assist CITY in obtaining permanent and temporary construction easements from MWD for right of way needed to connect to the metering facilities.

C. <u>Corrosion control</u> - The pipeline will be bonded and test leads will be brought to the surface and WMWD will monitor potential for corrosion and provide corrosion control if necessary as part of the operation and maintenance.

D. <u>Changes in flow</u> - WMWD will permit instantaneous changes in flow at the CITY's connection provided WMWD is permitted by MWD to make instantaneous changes in flow from the Mills treated water reservoir.

14. <u>Title to PROJECT</u>. After all payments on the loan obligations are made, SAWPA will convey title of the PROJECT to WMWD which shall thenceforth be the sole owner and operator of the PROJECT and of capacity in the PROJECT. Notwithstanding any provisions of this Agreement, PROJECT participants shall have no ownership rights to PROJECT facilities or capacity. Further, no right created by this Agreement may be assigned, sold, leased, or transferred.

15. <u>Reversion of Service Right</u>. If CITY should determine it does not need its full 30 cfs service right, it may notify WMWD and request a reversion of the surplus to WMWD. If WMWD thereafter sells that right to another participant or new party, it shall reimburse CITY the amount of CITY'S purchase price for that portion, plus 8.64% interest annually from date of purchase. WMWD, however, is under no obligation to offer such reverted rights to a purchaser in advance of offering any other then-existing capacity.

16. <u>Agreement Subject To Terms Of Prior Agreements</u>. This Agreement is subject to all the terms and conditions of the Lease Payment Agreement between SAWPA and WMWD dated January 2, 1985 and between SAWPA and the United States through the Loan Contract.

17. <u>Default</u>. Should CITY fail to perform its obligations under this Agreement with respect to payment for the service right, or with respect to the fixed and variable costs of operation, maintenance, repair or replacement, the following shall apply:

A. <u>Default on Service Right</u>. If CITY shall fail to make any payment due herein of the service right within ten (10) days from the date such payment is due, or if CITY shall fail to keep any of the terms and conditions of this Agreement concerning payment for the service right, then CITY shall be deemed to be in default hereunder. If CITY should, after notice, fail to remedy any such default with all reasonable dispatch, not to exceed thirty (30) days, then WMWD shall have the right, at its option, without any further demand or notice, to terminate this Agreement and to take possession of CITY's service right in the PROJECT and to declare CITY's right forfeited, and to thereafter hold or resell such right to other applicants without reimbursement to CITY.

With respect to the payment for the service right, this shall be the exclusive and only remedy for CITY's default should WMWD elect to pursue a remedy.

B. Default on Operation, Maintenance, Repair or Replacement Costs. If CITY shall fail to make any payment due herein within thirty (30) days from the invoice date, or if CITY shall fail to keep any of the terms and conditions of this contract concerning payment of operation, maintenance, repair or replacement costs, then CITY shall be deemed to be in default hereunder and WMWD shall have the right, at its option, without any further demand or notice, to terminate water service.

These rights are not intended to constitute WMWD's exclusive remedies, and they shall be in addition to any other right or remedy that WMWD may have for damages, termination of the Agreement, injunction, or other relief allowed by law.

18. Notices. Any notices or filings required to be given or made under this Agreement shall be served or made in the following manner:

A. Upon WMWD, by serving the Secretary or General Manager of WMWD personally or by registered mail addressed to the General Manager, Western Municipal Water District, 450 Alessandro Boulevard, Riverside, California 92508, P. O. Box 5286, Riverside, California 92517-5286.

B. Upon CITY, by serving the Public Utilities Director personally or by registered mail, Public Utilities Department, 3900 Main Street, Riverside, California 92522.

19. Severability. If any section or portion of this Agreement or the application thereof to any party is for any reason held invalid, it shall be deemed severable, and the validity of the remainder of the Agreement shall not be affected thereby.

20. Attorneys' Fees. Should either party hereto commence an action to enforce the provisions of this Agreement, then such party that prevails in that action shall be entitled to reasonable attorneys' fees, costs, expert witness fees, consulting fees and testing fees.

21. Amendments. This Agreement may be amended with the mutual consent of the parties, provided that such amendment shall be in writing, signed and dated by both parties hereto.

22. Hold Harmless. WMWD agrees to hold CITY harmless from any liability for damages or claims for personal injury and property damage which do not result from the negligent acts of CITY, its officials, officers, agents or employees, and CITY agrees to hold WMWD harmless from any liability for damages or claims for personal injury or property damage resulting from the negligence of CITY.

IN WITNESS WHEREOF, WMWD has caused this Agreement to be executed by the President of its Board of Directors and attested by the Secretary thereof, and CITY has executed this by its Mayor and attested by its CITY Clerk.

APPROVED AS TO FORM:

Anne T. Thomas
Attorney for Western
Municipal Water District
for Riverside County

WESTERN MUNICIPAL WATER
FOR RIVERSIDE COUNTY

By: Dick Hendrickson

ATTESTED BY:

CITY OF RIVERSIDE
a municipal corporation

By: Ron Loveridge
Mayor Pro Tempore

APPROVED AS TO FORM:

Woodruff
City Attorney
City of Riverside

ATTESTED BY:

Alice A. Hare
City Clerk

EXHIBIT "A"

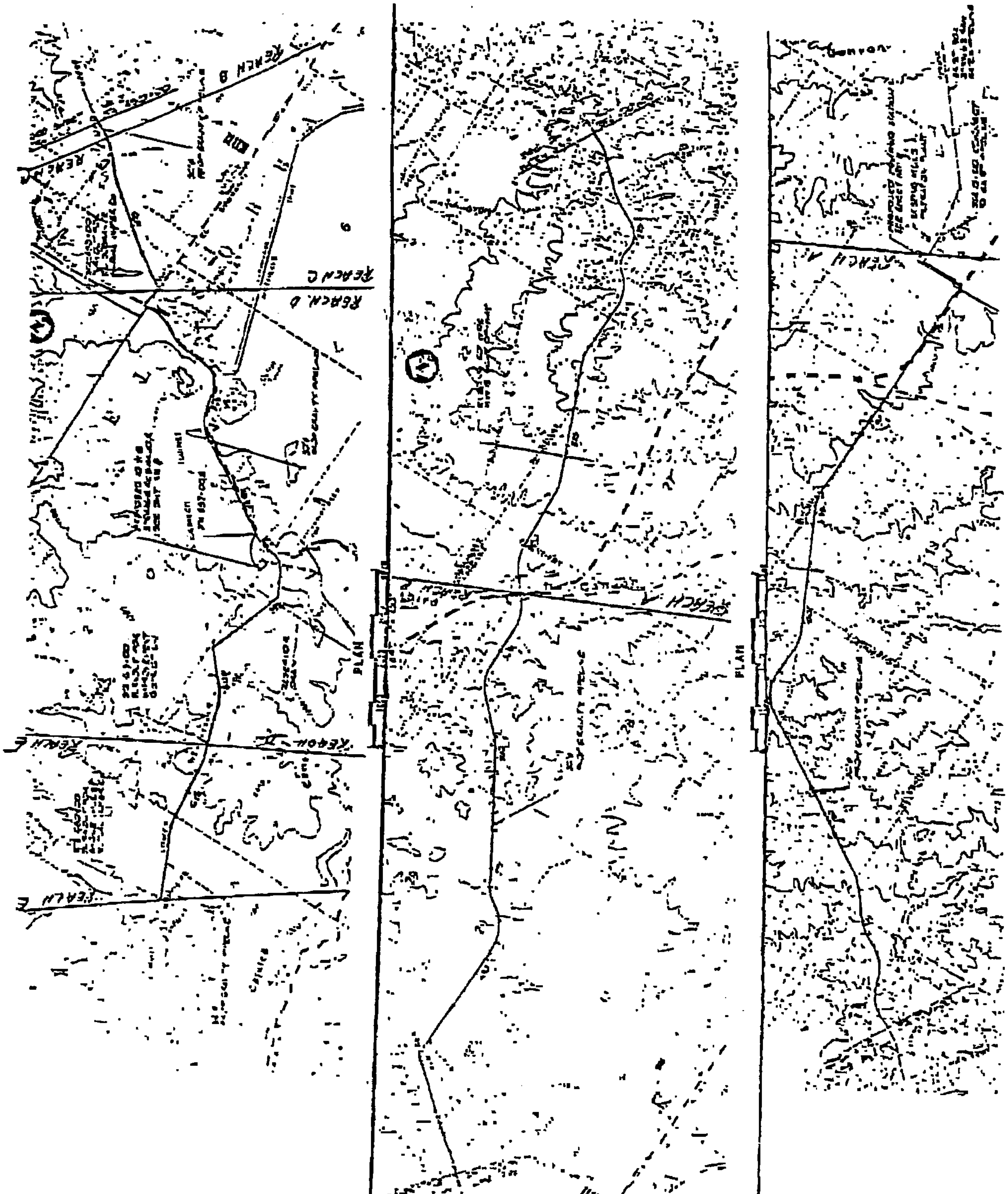

EXHIBIT C

STIPULATION FOR JUDGMENT

CLAYSON, STARK, ROTHROCK & MANN
ATTORNEYS AT LAW
LAW BUILDING
601 SOUTH MAIN STREET
P. O. BOX 670
CORONA, CALIFORNIA 91720
737-1910
689-7241

FILED
RIVERSIDE COUNTY
APR 17 1969
DONALD D. SULLIVAN, Clerk
By [illegible] Deputy

SUPERIOR COURT OF THE STATE OF CALIFORNIA
FOR THE COUNTY OF RIVERSIDE

WESTERN MUNICIPAL WATER DISTRICT OF RIVERSIDE COUNTY, et al.,

Plaintiff,

v.

EAST SAN BERNARDINO COUNTY WATER DISTRICT, et al.,

Defendants.

78426

No. 784726

4/17/69

STIPULATION FOR JUDGMENT

APR-21-69 10 [illegible] 150

The undersigned, as counsel for the indicated parties in the above-entitled action, hereby stipulate and agree as follows:

(1) That judgment, substantially in the form attached hereto as Exhibit "A", may be entered by the Court herein.

(2) That the limitation periods specified in Sections 581 and 583 of the Code of Civil Procedure are by this stipulation extended to and including the date hereof.

(3) Each party to this stipulation expressly

waives findings of fact and conclusions of law in support of the Judgment, and specifically waives any right to appeal therefrom; provided that nothing herein contained shall be deemed to restrict or impair the rights of any parties in relation to any proceeding which may hereafter be undertaken in connection with the exercise of the Court's reserved jurisdiction or determinations of the Watermaster.

Dated: April 17, 1969.

SAN BERNARDINO VALLEY
MUNICIPAL WATER DISTRICT

By Joseph E.
President

and
Secretary

Approved Martin McDonough
Attorney

BEST, BEST & KRIEGER

By Arthur L. Littleworth
for Western Municipal Water
District of Riverside County

JOHN WOODHEAD, City Attorney
LELAND J. THOMPSON, JR.

By
for City of Riverside,
for itself and as successor
in interest to Gage Canal
Company

CLAYSON, STARK, ROTHROCK & MANN

By Donald D. Stark
for Agua Mansa Water Company
and Meeks & Daley Water
Company

REDWINE & SHERRILL

By Sherrill
for Riverside Highland Water
Company

THOMAS J. CUNNINGHAM
JOHN P. SPARROW
ROBERT C. FIELD

By John P. Sparrow
for The Regents of the University
of California

JUDGMENT

FILED
RIV. RSIDE COUNTY
APR 17 1969
DONALD D. SULLIVAN, Clerk
By ________ Deputy

IN THE SUPERIOR COURT OF THE STATE OF CALIFORNIA
IN AND FOR THE COUNTY OF RIVERSIDE

WESTERN MUNICIPAL WATER DISTRICT OF RIVERSIDE COUNTY, a municipal water district; CITY OF RIVERSIDE, a municipal corporation; THE GAGE CANAL COMPANY, a corporation; AGUA MANSA WATER COMPANY, a corporation, MEEKS & DALEY WATER COMPANY, a corporation; RIVERSIDE HIGHLAND WATER COMPANY, a corporation, and THE REGENTS OF THE UNIVERSITY OF CALIFORNIA,

Plaintiffs,

-vs-

(A). EAST SAN BERNARDINO COUNTY WATER DISTRICT, et al.,

Defendants

784726
No. 784726
JBm
4/17/69

JUDGMENT

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RECITALS

(a) Complaint. The complaint in this action was filed by certain parties exporting water from the area defined herein as the San Bernardino Basin Area for use within Western, and sought a general adjudication of water rights.

(b) Orange County Water District Action. Subsequently the Orange County Water District filed an action for the adjudication of the water rights of substantially all water users in the area tributary to Prado Dam in the Santa Ana River Watershed. A decree of physical solution has been entered in such action whereby individual water users were dismissed, and San Bernardino Valley and Western assumed responsibility for the deliveries of certain flows at Riverside Narrows and Prado respectively.

(c) Physical Solution. The Judgment herein will further implement the physical solution in the Orange County Water District action, as well as determine the rights of the hereinafter named Plaintiffs to extract water from the San Bernardino Basin Area, and provide for replenishment of the area above Riverside Narrows. Such Judgment is fair and equitable, in the best interests of the parties, and in furtherance of the water policy of the State. San Bernardino Valley has the statutory power and resources to effectuate this Judgment and accordingly the other defendants may be dismissed.

(d) Stipulation. The parties named herein through their respective counsel have proposed and filed a written stipulation agreeing to the making and entry of this Judgment. By reason of such stipulation, and good cause appearing therefor,

IT IS HEREBY ORDERED, ADJUDGED AND DECREED as follows:

I

ACTIVE PARTIES

(a) The parties to this Judgment are as follows:

(1) Plaintiff Western Municipal Water District of Riverside County, a California municipal water district, herein often called "Western", appearing and acting pursuant to Section 71751 of the Water Code;

(2) Plaintiff City of Riverside, a municipal corporation;

(3) Plaintiffs Riverside Highland Water Company, Agua Mansa Water Company and Meeks & Daley Water Company, each of which is a mutual water company and a California corporation;

(4) Plaintiff The Regents of the University of California, a California public corporation;

(5) Defendant San Bernardino Valley Municipal Water District, a California municipal water district, herein often called "San Bernardino Valley", appearing and acting pursuant to Section 71751 of the Water Code;

(b) This Judgment shall inure to the benefit of, and be binding upon, the successors and assigns of the parties.

II

DISMISSED PARTIES

All parties other than those named in the preceding Paragraph I are dismissed without prejudice.

III

PRIOR JUDGMENTS

(a) The Judgment dated and entered on May 13, 1959, in that certain action filed in the Superior Court of the State of California in and for the County of San Bernardino, entitled and numbered "San Bernardino Valley Water Conservation District, a State Agency, Plaintiff v. Riverside Water Company, a corporation, et al., Defendants", No. 97031, is superseded effective January 1, 1971, and for so long as this Judgment remains in effect as to any party hereto that was a party to that action, and as to any party hereto that is a successor in interest to the rights determined in that action.

(b) The Judgment dated June 23, 1965, and entered on April 21, 1966, in that certain action filed in the Superior Court of the State of California in and for the County of San Bernardino entitled and numbered "San Bernardino Valley Water Conservation District, a State Agency, Plaintiff, v. Riverside Water Company, a corporation, et al., Defendants," No. 111614, is superseded effective January 1, 1971, and for so long as this Judgment remains in effect as to any party hereto that was a party to that action, and as to any party hereto that is a successor in interest to any rights determined in that action.

(c) As used in this Paragraph III only, "party" includes any person or entity which stipulates with the parties hereto to accept this Judgment.

IV

DEFINITIONS

The following ground water basins and tributary areas are situated within the Santa Ana River watershed upstream from Riverside Narrows and are tributary thereto, and their approximate locations and boundaries for purposes of this Judgment are shown upon the map attached hereto as Appendix "A"; San Bernardino Basin Area (the area above Bunker Hill Dike, but excluding certain mountainous regions and the Yucaipa, San Timoteo, Oak Glen and Beaumont Basins); Colton Basin Area, Riverside Basin Area within San Bernardino County, and Riverside Basin Area within Riverside County.

As used herein the following terms shall have the meanings herein set forth:

(a) Bunker Hill Dike - The San Jacinto Fault, located approximately as shown on Appendix "A", and forming the principal downstream boundary of the San Bernardino Basin Area.

(b) Riverside Narrows - That bedrock narrows in the Santa Ana River indicated on Appendix "A".

(c) Extractions - Any form of the verb or noun shall include pumping, diverting, taking or withdrawing water, either surface or subsurface, by any means whatsoever, except extractions for hydroelectric generation to the extent that such flows are returned to the stream, and except for diversions for replenishment.

(d) Natural Precipitation - Precipitation which falls naturally in the Santa Ana River watershed.

(e) Imported Water - Water brought into the Santa Ana River watershed from sources of origin outside such watershed.

(f) Replenishment - Artificial recharge of the ground water body achieved through the spreading or retention of water for the purpose of causing it to percolate and join the underlying ground water body, or injection of water into the ground water resources by means of wells; provided that as used with reference to any obligation of Western to replenish the Riverside Basin Area in Riverside County, the term replenishment shall include any water caused to be delivered by Western for which credit is received by San Bernardino Valley against its obligation under the Orange County Judgment to provide base flow at Riverside Narrows.

(g) Safe Yield - Safe yield is that maximum average annual amount of water that could be extracted from the surface and subsurface water resources of an area over a period of time sufficiently long to represent or approximate long-time mean climatological conditions, with a given areal pattern of extractions, under a particular set of physical conditions or structures as such affect the net recharge to the ground water body, and with a given amount of usable underground storage capacity, without resulting in long-term, progressive lowering of ground water levels or other undesirable result. In determining the operational criteria to avoid such adverse results, consideration shall be given to maintenance of adequate ground water quality, subsurface outflow, costs of pumping, and other relevant factors.

The amount of safe yield is dependent in part upon the amount of water which can be stored in and used from the ground water reservoir over a period of normal water supply under a given set of conditions. Safe yield is thus related to factors which influence or control ground water recharge, and to the amount of storage space available to carry over recharge occurring in years of above average supply to years of deficient supply. Recharge, in turn, depends on the available surface water supply and the factors influencing the percolation of that supply to the water table.

Safe yield shall be determined in part through the evaluation of the average net groundwater recharge which would occur if the culture of the safe yield year had existed over a period of normal native supply.

(h) Natural Safe Yield - That portion of the safe yield of the San Bernardino Basin Area which could be derived solely from natural precipitation in the absence of imported water and the return flows therefrom, and without contributions from new conservation. If in the future any natural runoff tributary to the San Bernardino Basin Area is diverted away from that Basin Area so that it is not included in the calculation of natural safe yield, any replacement made thereof by San Bernardino Valley or entities within it from imported water shall be included in such calculation.

(i) New Conservation - Any increase in replenishment from natural precipitation which results from operation of works and facilities not now in existence, other than those works installed and operations which may be initiated to offset losses caused by increased flood control channelization.

(j) Year - A calendar year from January 1 through December 31. The term "annual" shall refer to the same period of time.

(k) Orange County Judgment - The final judgment in Orange County Water District v. City of Chino, et al., Orange County Superior Court No. 117628, as it may from time to time be modified.

(l) Return Flow - That portion of the water applied for use in any particular ground water basin which subsequently reaches the ground water body in that basin.

(m) Five Year Period - a period of five consecutive years.

V

EXTRACTIONS FROM THE SAN BERNARDINO BASIN AREA

(a) For Use by Plaintiffs. The average annual extractions from the San Bernardino Basin Area delivered for use in each service area by each Plaintiff for the five year period ending with 1963 are hereby determined to be as set forth in Table B-1 of Appendix "B". The amount for each such Plaintiff delivered for use in each service area as set forth in Table B-1 shall be designated, for purposes of this Judgment, as its "base right" for such service area.

(b) For Use by Others. The total actual average annual extractions from the San Bernardino Basin Area by entities other than Plaintiffs for use within San Bernardino County for the five year period ending with 1963 are assumed to be 165,407 acre feet; the correct figure shall be determined by the Watermaster as herein provided.

VI

SAN BERNARDINO BASIN AREA RIGHTS AND REPLENISHMENT

(a) Determination of Natural Safe Yield. The natural safe yield of the San Bernardino Basin Area shall be computed by the Watermaster, reported to and determined initially by supplemental order of this Court, and thereafter shall be subject to the continuing jurisdiction thereof.

(b) Annual Adjusted Rights of Plaintiffs.

1. The annual "adjusted right" of each Plaintiff to extract water from the San Bernardino Basin Area for use in each service area designated in Table B-1 shall be equal to the sum of the following:

(a) its base right for such service area, until the natural safe yield of the San Bernardino Basin Area is determined, and thereafter its percentage of such natural safe yield determined by the methods used in Table B-2; and (b) an equal percentage for each service area of any new conservation, provided the conditions of the subparagraph 2 below have been met.

2. In order that the annual adjusted right of each such Plaintiff shall include its same respective percentage of any new conservation, such Plaintiff shall pay its proportionate share of the costs thereof. Each Plaintiff shall have the right to participate in new conservation projects, under procedures to be determined by the Watermaster for notice to Plaintiffs of the planned construction of such projects. With respect to any new conservation brought about by Federal installations, the term "costs" as used herein shall refer to any local share required to be paid in connection with such project. Each Plaintiff shall make its payment at times satisfactory to the constructing agency, and new conservation shall be credited to any participating Plaintiff as such conservation is effected.

3. In any five year period, each Plaintiff shall have the right to extract from the San Bernardino Basin Area for use in each service area designated in Table B-1 an amount of water equal to five times its adjusted right for such service area; provided, however, that extractions by each Plaintiff in any year in any service area shall not exceed such Plaintiff's adjusted right for that service area by more than 30 percent.

4. If the natural safe yield of the San Bernardino Basin Area has not been determined by January 1, 1972, the initial determination thereof shall be retroactive to that date and the rights of the Plaintiffs, and the replenishment obligation of San Bernardino Valley as hereinafter set forth, shall be adjusted as of such date. Any excess extractions by Plaintiffs shall be charged against their respective adjusted rights over the next five year period, or in the alternative, Plaintiffs may pay to San Bernardino Valley the full cost of any replenishment which it has provided as replenishment for such excess extractions. Any obligation upon San Bernardino Valley to provide additional replenishment, by virtue of such retroactive determination of natural safe yield, may also be discharged over such next five year period.

5. Plaintiffs and each of them and their agents and assigns are enjoined from extracting any more water from the San Bernardino Basin Area than is permitted under this Judgment. Changes in place

of use of any such water from one service area to another shall not be made without the prior approval of Court upon a finding of compliance with Paragraph XV(b) of this Judgment. So long as San Bernardino Valley is in compliance with all its obligations hereunder, and Plaintiffs are allowed to extract the water provided for in this Judgment, Plaintiffs are further enjoined from bringing any action to limit the water extracted from the San Bernardino Basin Area for use within San Bernardino Valley.

6. Nothing in this Judgment shall prevent future agreements between San Bernardino Valley and Western under which additional extractions may be made from the San Bernardino Basin Area, subject to the availability of imported water not required by San Bernardino Valley, and subject to payment satisfactory to San Bernardino Valley for replenishment required to compensate for such additional extractions.

(c) San Bernardino Valley Replenishment. San Bernardino Valley shall provide imported water for replenishment of the San Bernardino Basin Area at least equal to the amount by which extractions therefrom for use within San Bernardino County exceed during any five year period the sum of: (a) five times the total average annual extractions determined under Paragraph V(b) hereof, adjusted as may be required by the natural safe yield of the San Bernardino Basin Area; and (b) any new conservation to which users within San Bernardino Valley are entitled. Such replenishment shall be supplied in the year following any five year period; provided that during the first five year period, San Bernardino Valley shall supply annual amounts on account of its obligations hereunder, and such amounts shall be not less than fifty percent of the gross amount of excess extractions in the previous year.

1. Against its replenishment obligation over any five year period San Bernardino Valley shall receive credit for that portion of such excess extractions that returns to the ground water of the San Bernardino Basin Area.

2. San Bernardino Valley shall also receive credit against any future replenishment obligations for all replenishment which it provides in excess of that required herein, and for any amounts which may be extracted without replenishment obligation, which in fact are not extracted.

(d) In this subparagraph (d), "person" and "entity" mean only those persons and entities, and their successors in interest, which have stipulated with the parties to this Judgment within six months after its entry to accept this Judgment.

San Bernardino Valley agrees that the base rights of persons or entities other than Plaintiffs to extract water from the San Bernardino Basin Area for use within San Bernardino Valley will be determined by the average annual quantity extracted by such person or entity during the five year period ending with 1963. After the natural safe yield of the San Bernardino Basin Area is determined hereunder, such base rights will be adjusted to such natural safe yield; the adjusted right of each such person or entity shall be that percentage of natural safe yield as determined hereunder from time to time which the unadjusted right of such person or entity is of the amount determined under Paragraph V(b).

San Bernardino Valley further agrees that in the event the right to extract water of any of such persons or entities in the San Bernardino Basin Area is adjudicated and legal restrictions placed on such extractions which prevent extracting of water by said persons or entities in an amount equal to their base rights, or after natural safe yield is determined, their adjusted rights, San Bernardino Valley will furnish to such persons or entities or recharge the ground water resources in the area of extraction for their benefit with imported water, without direct charge to such persons or entities therefor, so that the base rights, or adjusted rights, as the case may be, may be taken by the person or entity.

Under the provisions hereof relating to furnishing of such water by San Bernardino Valley, such persons or entities shall be entitled to extract in addition to their base rights or adjusted rights any quantities of water spread for repumping in their area of extractions, which has been delivered to them by a mutual water company under base rights or adjusted base rights included by the Watermaster under the provisions of Paragraph V (b) hereof. Extractions must be made within three years of spreading to so qualify.

VII

WATER DISCHARGED ACROSS THE BUNKER HILL DIKE

San Bernardino Valley shall keep in force an agreement with the City of San Bernardino that the present annual quantity of municipal sewage effluent discharged across Bunker Hill Dike, assumed for all purposes herein to be 16,000 acre feet annually, shall be committed to the discharge of the downstream obligations imposed on San Bernardino Valley under this Judgment or under the Orange County Judgment, and that such effluent shall comply with the requirements of the Santa Ana River Basin Regional Water Quality Control Board in effect December 31, 1968.

VIII

EXTRACTIONS FROM COLTON BASIN AREA AND RIVERSIDE BASIN AREA IN SAN BERNARDINO COUNTY.

(a) The average annual extractions from the Colton Basin Area and that portion of the Riverside Basin Area within San Bernardino County, for use outside San Bernardino Valley, for the five year period ending with 1963 are assumed to be 3,349 acre feet and 20,191 acre feet, respectively; the correct figures shall be determined by the Watermaster as herein provided.

(b) Over any five year period, there may be extracted from each such Basin Area for use outside San Bernardino Valley, without replenishment obligation, an amount equal to five times such annual average for the Basin Area; provided, however, that if extractions in any year exceed such average by more than 20 percent, Western shall provide replenishment in the following year equal to the excess extractions over such 20 percent peaking allowance.

(c). To the extent that extractions from each such Basin Area for use outside San Bernardino Valley exceed the amounts specified in the next preceding Paragraph (b), Western shall provide replenishment. Except for any extractions in excess of the 20 percent peaking allowance, such replenishment shall be supplied in the year following any five year period, and shall not be from reclaimed water produced within San Bernardino Valley. Such replenishment shall also be of a quality at least equal to the water extracted from the Basin Area being recharged; provided, that water from the State Water Project shall be deemed to be of acceptable quality. Replenishment shall be supplied to the Basin Area from which any excess extractions have occurred and in the vicinity of the place of the excess extractions to the extent required to preclude influence on the water level in the three wells below designated; provided that discharge of imported water into the Santa Ana River or Warm Creek from a connection on the State Aqueduct near the confluence thereof, if released in accordance with a schedule approved by the Watermaster to achieve compliance with the objectives of this Judgment, shall satisfy any obligation of Western to provide replenishment in the Colton Basin Area, or that portion of the Riverside Basin Area in San Bernardino County, or the Riverside Basin Area in Riverside County.

(d) Extractions from the Colton Basin Area and that portion of the Riverside Basin Area within San Bernardino County, for use within San Bernardino Valley, shall not be limited. However, except for any required replenishment by Western, San Bernardino Valley shall provide the water to maintain the static water levels in the area, as determined by wells numbered

1S 4W 21 Q3, 1S 4W 29 H1, and 1S 4W 29 Q1 at an average level no lower than that which existed in the Fall season of 1963. Such 1963 average water level is hereby determined to be 822.04 feet above sea level. In future years, the level shall be computed by averaging the lowest static water levels in each of the three wells occurring at or about the same time of the year, provided that no measurements will be used which reflect the undue influence of pumping in nearby wells, or in the three wells, or pumping from the Riverside Basin in Riverside County in excess of that determined pursuant to Paragraph IX(a) hereof.

(e) Extractions by Plaintiffs from the Colton Basin Area and the portion of the Riverside Basin Area in San Bernardino County may be transferred to the San Bernardino Basin Area if the level specified in Paragraph (d) above is not maintained, but only to the extent necessary to restore such 1963 average water level, provided that Western is not in default in any of its replenishment obligations. San Bernardino Valley shall be required to replenish the San Bernardino Basin Area in an amount equal to any extractions so transferred. San Bernardino Valley shall be relieved of responsibility toward the maintenance of such 1963 average water level to the extent that Plaintiffs have physical facilities available to accommodate such transfers of extractions, and insofar as such transfers can be legally accomplished.

(f) The Colton Basin Area and the portion of the Riverside Basin Area in San Bernardino County constitute a major source of water supply for lands and inhabitants in both San Bernardino Valley and Western, and the parties hereto have a mutual interest in the maintenance of water quality in these Basin Areas and in the preservation of such supply. If the water quality in such Areas, as monitored by the City of Riverside wells along the river, falls below the Objectives set therefor by the Santa Ana River Basin Regional Water Quality Control Board, the Court shall have jurisdiction to modify the obligations of San Bernardino Valley to include, in addition to its obligation to maintain the average 1963 water level, reasonable provisions for the maintenance of such water quality.

(g) The primary objectives of Paragraph VIII and related provisions are to allow maximum flexibility to San Bernardino Valley in the operation of a coordinated replenishment and management program, both above and below Bunker Hill Dike; to protect San Bernardino Valley against increased extractions in the area between Bunker Hill Dike and Riverside Narrows, which without adequate provision for replenishment might adversely affect base flow at Riverside Narrows, for which it is responsible under the Orange County Judgment; and to protect the area as a major source of ground water supply available to satisfy the historic extractions therefrom for use within Western, without regard to the method of operation which may be adopted by San Bernardino Valley for the San Bernardino Basin Area, and without regard to the effect of such operation upon the historic supply to the area below Bunker Hill Dike.

If these provisions should prove either inequitable or unworkable, the Court upon the application of any party hereto shall retain jurisdiction to modify this Judgment so as to regulate the area between Bunker Hill Dike and Riverside Narrows on a safe yield basis; provided that under such method of operation, (1) base rights shall be determined on the basis of total average annual extractions for use within San Bernardino Valley and Western, respectively, for the five year period ending with 1963; (2) such base rights for use in both Districts shall be subject to whatever adjustment may be required by the safe yield of the area, and in the aggregate shall not be exceeded unless replenishment therefor is provided; (3) in calculating safe yield, the outflow from the area at Riverside Narrows shall be determined insofar as practical by the base flow obligations imposed on San Bernardino Valley under the Orange County Judgment; and (4) San Bernardino Valley shall be required to provide replenishment for any deficiency between the actual outflow and the outflow obligation across Bunker Hill Dike as established by safe yield analysis using the base period of 1934 through 1960.

IX

EXTRACTIONS FROM THE PORTION OF RIVERSIDE BASIN AREA IN RIVERSIDE COUNTY WHICH IS TRIBUTARY TO RIVERSIDE NARROWS.

(a) The average annual extractions from the portion of the Riverside Basin Area in Riverside County which is tributary to Riverside Narrows, for use in Riverside County, for the five year period ending with 1963 are assumed to be 30,044 acre feet; the correct figures shall be determined by the Watermaster as herein provided.

(b) Over any five year period, there may be extracted from such Basin Area, without replenishment obligation, an amount equal to five times such annual average for the Basin Area; provided, however, that if extractions in any year exceed such average by more than 20 percent, Western shall provide replenishment in the following year equal to the excess extractions over such 20 percent peaking allowance.

(c) To the extent that extractions from such Basin Area exceed the amounts specified in the next preceding

Paragraph (b), Western shall provide replenishment. Except for any extractions in excess of the 20 percent peaking allowance, such replenishment shall be supplied in the year following any five year period, and shall be provided at or above Riverside Narrows.

(d) Western shall also provide such replenishment to offset any reduction in return flow now contributing to the base flow at Riverside Narrows, which reduction in return flow results from the conversion of agricultural uses of water within Western to domestic or other uses connected to sewage or waste disposal systems, the effluent from which is not tributary to the rising water at Riverside Narrows.

X

REPLENISHMENT TO OFFSET NEW EXPORTS OF WATER TO AREAS NOT TRIBUTARY TO RIVERSIDE NARROWS.

Certain average annual amounts of water extracted from the San Bernardino Basin Area and the area downstream therefrom to Riverside Narrows during the five year period ending in 1963 have been exported for use outside of the area tributary to Riverside Narrows and are assumed to be 50,667 acre feet annually as set forth in Table C-1 of Appendix "C"; the correct amount shall be determined by the Watermaster as herein provided. Western shall be obligated to provide replenishment at or above Riverside Narrows for any increase over such exports by Western or entities within it from such areas for use within areas not tributary to Riverside Narrows. San Bernardino Valley shall be obligated to provide replenishment for any increase over the exports from San Bernardino Valley for use in any area not within Western nor tributary to Riverside Narrows as set forth in Table C-2 of

Appendix "C", such amounts being subject to correction by the Watermaster, or for any exports from the San Bernardino Basin Area for use in the Yucaipa, San Timoteo, Oak Glen and Beaumont Basins.

XI

REPLENISHMENT CREDITS AND ADJUSTMENT FOR QUALITY

(a) All replenishment provided by Western under Paragraph IX and all credits received against such replenishment obligation shall be subject to the same adjustments for water quality applicable to base flow at Riverside Narrows, as set forth in the Orange County Judgment.

(b) Western shall receive credit against its replenishment obligations incurred under this Judgment for the following:

1. As against its replenishment obligation under Paragraph VIII, any return flow to the Colton Basin Area or the portion of the Riverside Basin Area within San Bernardino County, respectively, resulting from any excess extractions therefrom; and as against its replenishment obligation under Paragraph IX, any return flow to the portion of the Riverside Basin Area in Riverside County, which contributes to the base flow at Riverside Narrows, resulting from any excess extractions therefrom, or from the Riverside Basin Area in San Bernardino County, or from the Colton Basin Area.

2. Subject to adjustment under Paragraph (a) hereof, any increase over the present amounts of sewage effluent discharged from

treatment plants within Riverside County which are tributary to Riverside Narrows, and which results from the use of imported water.

3. Any replenishment which may be provided in excess of that required; any amounts which hereunder are allowed to be extracted from the Colton and Riverside Basin Areas without replenishment obligation by Western, and which in fact are not extracted; any storm flows conserved between Bunker Hill Dike and Riverside Narrows by works financed solely by Western, or entities within it, which would not otherwise contribute to base flow at Riverside Narrows; and any return flow from imported water used in Riverside County which contributes to base flow at Riverside Narrows; provided, however, that such use of the underground storage capacity in each of the above situations does not adversely affect San Bernardino Valley in the discharge of its obligations at Riverside Narrows under the Orange County Judgment, nor interfere with the accomplishment by San Bernardino Valley of the primary objectives of Paragraph VIII, as stated in Subdivision (g).

(c) The replenishment obligations of Western under this Judgment shall not apply during such times as amounts of base flow at Riverside Narrows and the amounts of water stored in the ground water resources below Bunker Hill Dike and tributary to the maintenance of such flow are found by Order of the Court to be sufficient to satisfy any obligation which San Bernardino Valley may have under this Judgment, or under the

Orange County Judgment, and if the Court further finds by Order that during such times any such increase in pumping, changes in use or exports would not adversely affect San Bernardino Valley in the future.

(d) The replenishment obligations of San Bernardino Valley under Paragraph X of this Judgment for increase in exports from the Colton and Riverside Basin Areas within San Bernardino Valley below the Bunker Hill Dike shall not apply during such times as the amounts of water in the ground water resources of such area are found by Order of the Court to be sufficient to satisfy the obligations which San Bernardino Valley may have to Plaintiffs under this Judgment, and if the Court further finds by Order that during such times any such increases in exports would not adversely affect Plaintiffs in the future.

XII

CONVEYANCE OF WATER BY SAN BERNARDINO VALLEY TO RIVERSIDE NARROWS.

If San Bernardino Valley determines that it will convey reclaimed sewage effluent, or other water, to or near Riverside Narrows, to meet its obligations under this or the Orange County Judgment, the City of Riverside shall make available to San Bernardino Valley for that purpose any unused capacity in the former Riverside Water Company canal, and the Washington and Monroe Street storm drains, without cost except for any alterations or capital improvements which may be required, or any additional maintenance and operation costs which may result. The use of those facilities shall be subject to the requirements of the Santa Ana River Basin Regional Water Quality Control Board and of the State Health Department, and compliance therewith shall be San Bernardino Valley's responsibility.

XIII

WATERMASTER

(a) This Judgment and the instructions and subsequent orders of this Court shall be administered and enforced by a Watermaster. The parties hereto shall make such measurements and furnish such information as the Watermaster may reasonably require, and the Watermaster may verify such measurements and information and obtain additional measurements and information as the Watermaster may deem appropriate.

(b) The Watermaster shall consist of a committee of two persons. San Bernardino Valley and Western shall each have the right to nominate one of such persons. Each such nomination shall be made in writing, served upon the other parties to this Judgment, and filed in Court. Such person shall be appointed by and serve at the pleasure of and until further order of this Court. If either Western or San Bernardino Valley shall at any time nominate a substitute appointee in place of the last appointee to represent it, such appointee shall be appointed by the Court in place of such last appointee.

(c) Appendix "D" to this Judgment contains some of the data which have been used in preparation of this Judgment, and shall be utilized by the Watermaster in connection with any questions of interpretation.

(d) Each and every finding and determination of the Watermaster shall be made in writing certified to be by unanimous action of both members of the Watermaster committee. In the event of failure or inability of such Watermaster Committee to reach agreement, the Watermaster committee may determine to submit the dispute to a third person to be selected by them, or if they are unable to agree on a selection, to be selected by the Court, in which case the decision of the third person shall be binding on the parties; otherwise the fact, issue, or determination in question shall forthwith be certified to this Court by the Watermaster, and after due notice to the parties and opportunity for hearing, said matter shall be determined by order of this Court, which may refer the matter for prior recommendation to the State Water Resources Control Board. Such order of the Court shall be a determination by the Watermaster within the meaning of this Judgment.

(e) The Watermaster shall report to the Court and to each party hereto in writing not more than seven (7) months after the end of each year, or within such other time as the Court may fix, on each determination made by it pursuant to this Judgment, and such other items as the parties may mutually request or the Watermaster may deem to be appropriate. All of the books and records of the Watermaster which are used in the preparation of, or are relevant to, such reported data, determinations and reports shall be open to inspection by the parties hereto. At the request of any party this Court will establish a procedure for the filing and hearing of objections to the Watermaster's report.

(f) The fees, compensation and expenses of each person on the Watermaster shall be borne by the District which nominated such person. All other Watermaster service costs and expenses shall be borne by San Bernardino Valley and Western equally.

(g) The Watermaster shall initially compute and report to the Court the natural safe yield of the San Bernardino Basin Area, said computation to be based upon the cultural conditions equivalent to those existing during the five calendar year period ending with 1963.

(h) The Watermaster shall as soon as practical determine the correct figures for Paragraphs V(b), VI(b)1, VIII(a), IX(a) and X, as the basis for an appropriate supplemental order of this Court.

XIV

CONTINUING JURISDICTION OF THE COURT

(a) The Court hereby reserves continuing jurisdiction of the subject matter and parties to this Judgment, and upon application of any party, or upon its own motion, may review and redetermine, among other things, the following matters and any matters incident thereto:

1. The hydrologic condition of any one or all of the separate basins described in this Judgment in order to determine from time to time the safe yield of the San Bernardino Basin Area.

2. The desirability of appointing a different Watermaster or a permanent neutral member of the Watermaster, or of changing or more clearly defining the duties of the Watermaster.

3. The desirability of providing for increases or decreases in the extraction of any particular party because of emergency requirements or in order that such party may secure its proportionate share of its rights as determined herein.

4. The adjusted rights of the Plaintiffs as required to comply with the provisions hereof with respect to changes in the natural safe yield of the San Bernardino Basin

Area. If such changes occur, the Court shall adjudge that the adjusted rights and replenishment obligations of each party shall be changed proportionately to the respective base rights.

5. Conforming the obligations of San Bernardino Valley under this Judgment to the terms of any new judgment hereafter entered adjudicating the water rights within San Bernardino Valley, if inconsistencies of the two judgments impose hardship on San Bernardino Valley.

6. Adjusting the figures in Paragraphs V(b), VI(b) 1, VIII(a) IX(a), and X, to conform to determination by the Watermaster.

7. Credit allowed for return flow in the San Bernardino Basin Area if water levels therein drop to the point of causing undue hardship upon any party.

8. Other matters not herein specifically set forth which might occur in the future and which would be of benefit to the parties in the utilization of the surface and ground water supply described in this Judgment, and not inconsistent with the respective rights of the parties as herein established and determined.

(b) Any party may apply to the Court under its continuing jurisdiction for any appropriate modification of this Judgment if its presently available sources of imported water are exhausted and it is unable to obtain additional supplies of imported water at a reasonable cost, or if there is any substantial delay in the delivery of imported water through the State Water Project.

XV

SAVING CLAUSES

(a) Nothing in this Judgment precludes San Bernardino Valley, Western, or any other party from exercising such rights as it may have or obtain under law to spread, store underground and recapture imported water, provided that any such use of the underground storage capacity of the San Bernardino Basin Area by Western or any entity within it shall not interfere with any replenishment program of the Basin Area.

(b) Changes in the place and kind of water use, and in the transfer of rights to the use of water, may be made in the absence of injury to others or prejudice to the obligations of either San Bernardino Valley or Western under Judgment or the Orange County Judgment.

(c) If any Plaintiff shall desire to transfer all or any of its water rights to extract water within San Bernardino Valley to a person, firm, or corporation, public or private, who or which is not then bound by this Judgment, such Plaintiff shall as a condition to being discharged as hereinafter provided cause such transferee to appear in this action and file a valid and effective express assumption of the obligations imposed upon such Plaintiff under this Judgment as to such transferred water rights. Such appearance and assumption of obligation shall include the filing of a designation of the address to which shall be mailed all notices, requests, objections, reports and other papers permitted or required by the terms of this Judgment.

If any Plaintiff shall have transferred all of its said water rights and each transferee not theretofore bound by this Judgment as a Plaintiff shall have appeared in this action and filed a valid and effective express assumption of the obligations imposed upon such Plaintiff under this Judgment as to such transferred water rights, such transferring Plaintiff shall thereupon be discharged from all obligations hereunder. If any Plaintiff shall cease to own any rights in and to the wate supply declared herein and shall have caused the appearance and assumption provided for in the third preceding sentence with respect to each voluntary transfer, then upon application to this Court and after notice and hearing such Plaintiff shall thereupon be relieved and discharged from all further obligations hereunder. Any such discharge of any Plaintiff hereunder shall not impair the aggregate rights of defendant San Bernardino Valley or the responsibility hereunder of the remaining Plaintiffs or any of the successors.

(d) Non-use of any right to take water as provided herein shall not result in any loss of the right. San Bernardino Valley does not guarantee any of the rights set out herein for Western and the other Plaintiffs as against the claims of third parties not bound hereby. If Western or the other Plaintiffs herein should be prevented by acts of third parties within San Bernardino County from extracting the amounts of water allowed them by this Judgment, they shall have the right to apply to this Court for any appropriate relief, including vacation of this Judgment, in which latter case all parties shall be restored to their status prior to this Judgment insofar as possible.

(e) Any replenishment obligation imposed hereunder on San Bernardino Valley may be deferred until imported water first is available to San Bernardino Valley under its contract with the California Department of Water Resources and the obligation so accumulated may be discharged in five approximately equal annual installments thereafter.

(F) No agreement has been reached concerning the method by which the cost of providing replenishment will be financed, and no provision of this Judgment, nor its failure to contain any provision, shall be construed to reflect any agreement relating to the taxation or assessment of extractions.

XVI
EFFECTIVE DATE

The provisions of Paragraphs III and V to XII of this Judgment shall be in effect from and after January 1, 1971; the remaining provisions are in effect immediately.

XVII
COSTS

No party shall recover its costs herein as against any other party.

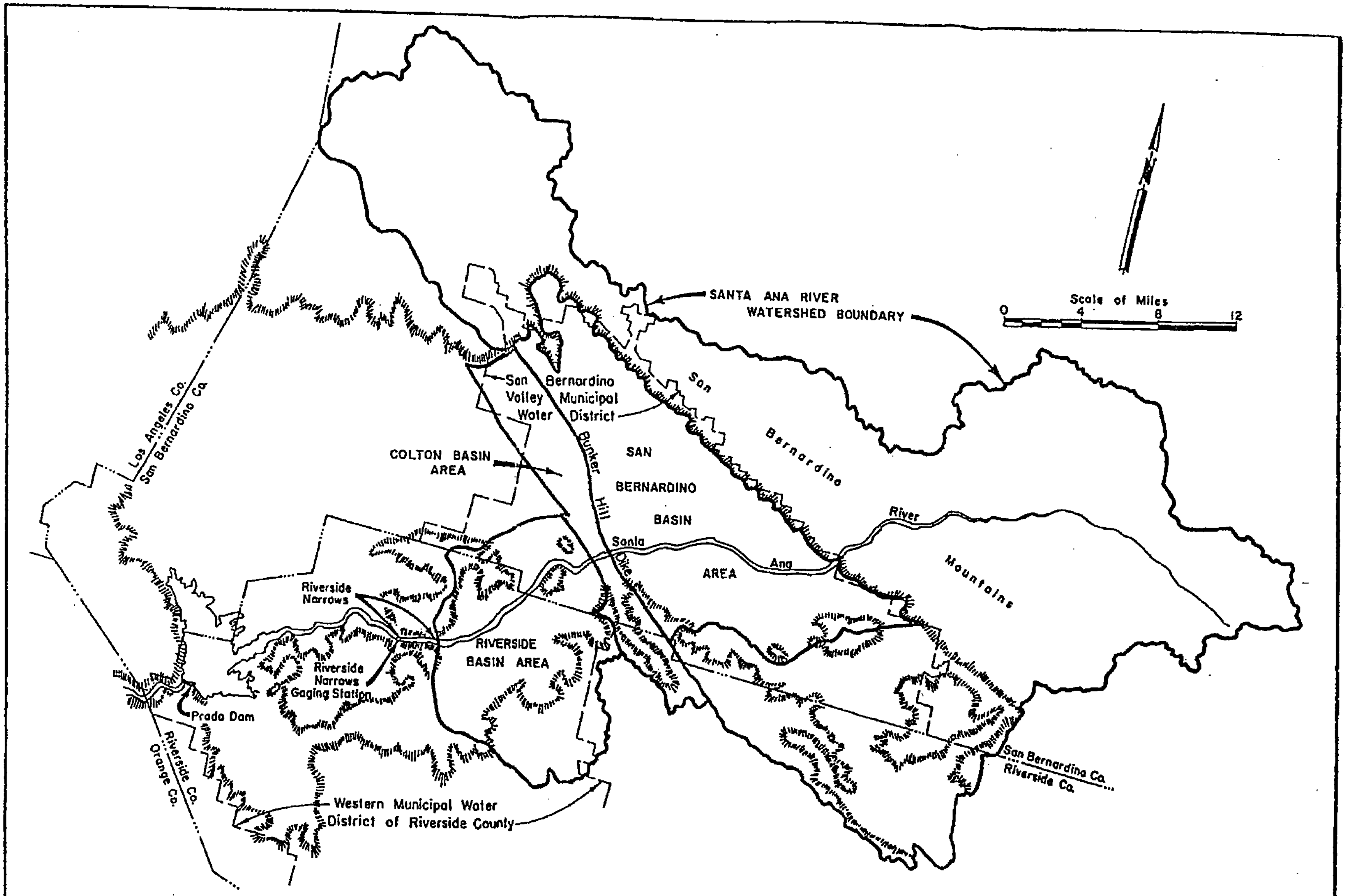
THE CLERK WILL ENTER THIS JUDGMENT FORTHWITH.

DATED: April 17, 1969

ENTERED
APR 17 1969

JUDGE OF THE SUPERIOR COURT

JUDGMENT BOOK 124 PG 42



MAP SHOWING

SAN BERNARDINO BASIN AREA, COLTON BASIN AREA, AND RIVERSIDE BASIN AREA SITUATED WITHIN SAN BERNARDINO COUNTY; RIVERSIDE BASIN AREA WITHIN RIVERSIDE COUNTY; BUNKER HILL DIKE; RIVERSIDE NARROWS; AND BOUNDARIES OF SAN BERNARDINO VALLEY MUNICIPAL WATER DISTRICT & WESTERN MUNICIPAL WATER DISTRICT OF RIVERSIDE COUNTY.

APPENDIX A

APPENDIX B
TABLE B-1

EXTRACTIONS BY PLAINTIFFS FROM THE SAN BERNARDINO BASIN AREA FOR AVERAGE OF 5-YEAR PERIOD ENDING WITH 1963

(All Values in Acre Feet)
Classified According to Service Area

Plaintiff	Total Extractions in San Bernardino Basin Area	Delivery to San Bernardino Basin Area	Delivery to Colton Basin Area & Riverside Basin Area in San Bernardino County	Delivery to Areas Outside San Bernardino Valley
City of Riverside (including those rights acquired as successor to the Riverside Water Company and The Gage Canal Company)	53,448	1462	1260	50,726
Riverside High-Land Water Company	4,399	0	2509	1,890
Agua Mansa Water Company, and Meeks & Daley Water Company	8,026	0	326	7,700
The Regents of the University of California	581	0	0	581
Total	66,454	1,462	4,095	60,897

APPENDIX B
TABLE B-2

PLAINTIFFS' PERCENTAGES OF BASE RIGHT TO TOTAL PRODUCTION FROM SAN BERNARDINO VALLEY BASIN AREA,

231,861 Acre Feet Annually,
For 5-Year Average Ending With 1963
Classified According to Service Area

Plaintiff	Delivery to San Bernardino Basin Area	Delivery to Colton Basin Area & Riverside Basin Area in San Bernardino County	Delivery to Areas Outside San Bernardino Valley
City of Riverside (including those rights acquired as successor to the Riverside Water Company and The Gage Canal Company)	.630	.543	21.878
Riverside Highland Water Company		1.082	0.815
Aqua Mansa Water Company, and Meeks & Daley Water Company		.141	3.321
The Regents of the University of California			0.250
Total	.630	1.766	26.264

APPENDIX C
TABLE C-1

EXTRACTIONS FOR USE WITHIN WESTERN FROM THE SAN BERNARDINO BASIN AREA, COLTON BASIN AREA, AND THE RIVERSIDE BASIN AREA FOR USE ON LANDS THAT ARE NOT TRIBUTARY TO THE RIVERSIDE NARROWS FOR AVERAGE OF FIVE-YEAR PERIOD ENDING IN 1963

Extractor	Five-Year Average Ac. Ft.
City of Riverside, including Irrigation Division water extracted by Gage Canal Co. and former Riverside Water Co.	30,657
Meeks & Daley Water Co., Agua Mansa Water Co., and Temescal Water Co., including water received from City of Riverside	13,731
Extractions delivered by West Riverside Canal received from Twin Buttes Water Co., La Sierra Water Co., Agua Mansa Water Co., Salazar Water Co., West Riverside 350" Water Co., and Jurupa Water Co.	5,712
Rubidoux Community Services District	531
Jurupa Hills Water Co.	36
TOTAL	50,667

APPENDIX C
TABLE C-2

EXTRACTIONS FOR USE WITHIN SAN BERNARDINO COUNTY FROM SAN BERNARDINO BASIN AREA AND COLTON BASIN AREA FOR USE ON LANDS NOT TRIBUTARY TO RIVERSIDE NARROWS FOR AVERAGE OF FIVE-YEAR PERIOD ENDING WITH 1963

(ALL VALUES IN ACRE FEET)

Entity	San Bernardino Basin Area	Colton Basin Area	Total
Fontana Union Water Co.	14,272	365	14,637
West San Bernardino County Water District	2,961	947	3,908
City of Rialto			700
TOTAL			19,245

APPENDIX D
TABLE D-1

EXTRACTIONS FROM SAN BERNARDINO BASIN AREA FOR THE AVERAGE OF FIVE-YEAR PERIOD ENDING WITH 1963 FOR USE WITHIN SAN BERNARDINO COUNTY

(ALL VALUES IN ACRE FEET)

Basin	Five Year Avg. 1959-63
Beaumont	10,064
Big Bear	1,171
Borea Canyon	91
Bunker Hill	181,600
City Creek	337
Cook Canyon	197
Devil Canyon	3,326
Devil Creek	42
Lower Cajon	2,090
Little San Creek	15
Lytle	29,364
Mill Creek	11,084
Oak Glen	935
Plunge Creek	1,265
Santa Ana	1,790
Strawberry Creek	291
San Timoteo	2,272
Waterman Canyon	367
Yucaipa	13,837
Upper Basin Total	260,139
Less: Beaumont	
Oak Glen	
San Timoteo	27,107
Yucaipa	
Subtotal	233,032
Less Big Bear	1,171
Subtotal	231,861
Less extractions for use outside San Bernardino County	60,897
Extractions from San Bernardino for use in San Bernardino County	170,964

APPENDIX D
TABLE D-2

EXTRACTIONS FROM COLTON BASIN AREA FOR AVERAGE OF FIVE-YEAR PERIOD ENDING WITH 1963 BY SAN BERNARDINO AND RIVERSIDE COUNTY ENTITIES FOR USE WITHIN EACH COUNTY

(VALUES IN ACRE FEET)

Extractor	Place of Use San Bernardino Co.	Riverside Co.	Total
San Bernardino County Entities	8,480	0	8,480
Riverside County Entities	147	3,349	3,496
TOTAL EXTRACTIONS	8,627	3,349	11,976

APPENDIX D
TABLE D-3

EXTRACTIONS FROM RIVERSIDE BASIN AREA IN SAN BERNARDINO COUNTY FOR AVERAGE FIVE-YEAR PERIOD ENDING WITH 1963 BY SAN BERNARDINO AND RIVERSIDE COUNTY ENTITIES FOR USE WITHIN EACH COUNTY

(VALUES IN ACRE FEET)

Extractor	Place of Use		
	San Bernardino Co.	Riverside Co.	Total
San Bernardino County Entities	9,582	0	9,582
Riverside County Entities	3,929	20,191	24,120
TOTAL EXTRACTIONS	13,511	20,191	33,702

APPENDIX D
TABLE D-4

EXTRACTIONS FROM SAN BERNARDINO BASIN AREA, COLTON BASIN AREA AND RIVERSIDE BASIN AREA USED WITHIN RIVERSIDE COUNTY FOR THE AVERAGE FIVE-YEAR PERIOD ENDING WITH 1963

(ALL VALUES IN ACRE FEET)

Basin	Five-Year Average
San Bernardino Basin Area	60,897
Colton Basin Area	3,349
Riverside Basin Area in San Bernardino County	20,191
Riverside Basin Area in Riverside County	30,044
TOTAL	114,481

APPENDIX D
TABLE D-5

IRRIGATED ACREAGE IN RIVERSIDE BASIN AREA IN RIVERSIDE COUNTY PRESENTLY TRIBUTARY TO RIVERSIDE NARROWS WHICH UPON CONVERSION TO URBAN USES REQUIRING SEWAGE DISPOSAL THROUGH THE RIVERSIDE TREATMENT PLANT WILL BE DISCHARGED TO THE RIVER BELOW RIVERSIDE NARROWS

Entity Serving Acreage	Acres
Gage Canal	1,752
Alta Mosa Water Co.	65
East Riverside Water Co.	926
Riverside Highland Water Company	1,173
TOTAL	3,916

CONSENT CALENDAR

A motion was made to approve the following items on the Consent Calendar.

Motion – Newberry, Jr., P.E. Second – Gipson.
Ayes: Acharya, Newberry, Jr., P.E., Tavaglione, Gage, and Gipson
Noes: None
Abstain: None
Absent: Peter Hubbard
Jim Anderson

The Board of Public Utilities:

WATER ITEMS

INCREASE OF CONSTRUCTION COST OF PALMYRITA WATER TREATMENT FACILITY

(1) Approved the increase of additional construction cost of Palmyrita Water Treatment Facility by $115,127.25; and

(2) Awarded the site improvement expenditures of $155,460.49 to Pacific Hydrotech Corporation.

➡ WATER SUPPLY ASSESSMENT FOR THE UNIVERSITY OF CALIFORNIA, RIVERSIDE (UCR) PROPOSED 2003 LONG RANGE DEVELOPMENT PLAN (LRDP)

Approved and recommended that the City Council approve and adopt the attached Water Supply Assessment for the University of California, Riverside Proposed 2003 Long Range Development Plan.

OTHER ITEMS

DISCUSSION CALENDAR

TRANSFER FUNDS FROM ELECTRIC FUND'S COMPETITIVE TRANSITION ACCOUNT ("CTA") TO OPERATING, ENERGY RISK MANAGEMENT, AND REGULATORY RESERVE ACCOUNTS AND DISSOLVE THE CTA

The Board of Public Utilities approved and recommended that the City Council approve:

(1) Establishing cash reserve accounts for Regulatory Risk, Energy Risk Management, and Operating;

(2) Transferring $4,000,000 into the Regulatory Risk Reserve Account from the Competitive Transition Account;

Appendix J Noise Data

ON-SITE TRAFFIC NOISE LEVELS AND NOISE CONTOURS

Project Number: 10537-00
Project Name: UC Riverside LRDP Update

Background Information

Model Description: FHWA Highway Noise Prediction Model (FHWA-RD-77-108) with California Vehicle Noise (CALVENO) Emission Levels.
Source of Traffic Volumes: Wilbur Smith Associates
Community Noise Descriptor: L_{dn}: ________ CNEL: X

Assumed 24-Hour Traffic Distribution:	Day	Evening	Night
Total ADT Volumes	77.70%	12.70%	9.60%
Medium-Duty Trucks	87.43%	5.05%	7.52%
Heavy-Duty Trucks	89.10%	2.84%	8.06%

Analysis Condition				Design		Vehicle Mix		Distance from Centerline of Roadway			
Roadway Name		Median	ADT	Speed	Alpha	Medium	Heavy	CNEL at	Distance to Contour		
Roadway Segment	Lanes	Width	Volume	(mph)	Factor	Trucks	Trucks	75 Feet	70 CNEL	65 CNEL	60 CNEL
Existing Traffic Volumes											
I-215/SR-60											
s/o University Ave.	8	25	151,000	65	0.5	3.3%	1.4%	82.2	491	1,058	2,280
Watkins Drive											
s/o Blaine St.	2	12	9,710	35	0.5	3.3%	1.4%	61.9	22	47	101
n/o Gernert Rd.	2	12	11,029	35	0.5	3.3%	1.4%	62.5	24	51	110
Canyon Crest Drive											
s/o Blaine St	2	0	9,808	45	0.5	3.3%	1.4%	64.2	31	67	143
s/o Pearblossom	4	0	19,200	45	0.5	3.3%	1.4%	67.3	50	107	231
Iowa Avenue											
s/o Linden St.	4	0	25,915	45	0.5	3.3%	1.4%	68.6	61	131	282
Blaine Street											
e/o Iowa Ave	4	12	15,134	40	0.5	3.3%	1.4%	65.3	37	79	170
Martin Luther King Blvd											
e/o Chicago Avenue	4	0	21,928	45	0.5	3.3%	1.4%	67.9	54	117	252
Futre Plus Project Traffic Volumes											
I-215/SR-60											
s/o University Ave.	8	25	157,410	65	0.5	3.3%	1.4%	82.4	505	1,088	2,344
Watkins Drive											
s/o Blaine St.	2	12	23,138	35	0.5	3.3%	1.4%	65.7	39	84	180
n/o Gernert Rd.	2	12	21,000	35	0.5	3.3%	1.4%	65.3	36	78	169
Canyon Crest Drive											
s/o Blaine St	2	0	13,238	45	0.5	3.3%	1.4%	65.5	38	81	175
s/o Pearblossom	4	0	43,250	45	0.5	3.3%	1.4%	70.8	85	184	396
Iowa Avenue											
s/o Linden St.	4	0	19,438	45	0.5	3.3%	1.4%	67.4	50	108	232
Blaine Street											
e/o Iowa Ave	4	12	35,213	40	0.5	3.3%	1.4%	69.0	64	139	299
Martin Luther King Blvd											
e/o Chicago Avenue	4	0	44,825	45	0.5	3.3%	1.4%	71.0	87	188	406

[1] Distance is from the centerline of the roadway segment to the receptor location.
"-" = contour is located within the roadway lanes.

OFF-SITE TRAFFIC NOISE LEVELS

Project Number: 10537-00
Project Name: UC Riverside LRDP update

Background Information

Model Description:	FHWA Highway Noise Prediction Model (FHWA-RD-77-108) with California Vehicle Noise (CALVENO) Emission Levels.
Analysis Scenario(s):	Existing and Future Traffic Volumes
Source of Traffic Volumes:	Wilbur Smith Associates
Community Noise Descriptor:	L_{dn}: ______ CNEL: X

Assumed 24-Hour Traffic Distribution:	Day	Evening	Night
Total ADT Volumes	77.70%	12.70%	9.60%
Medium-Duty Trucks	87.43%	5.05%	7.52%
Heavy-Duty Trucks	89.10%	2.84%	8.06%

Traffic Noise Levels

Analysis Condition Roadway Name Roadway Segment	Land Use	Lanes	Median Width	Peak Hour Volume	ADT Volume	Design Speed (mph)	Dist. from Center to Receptor[1]	Alpha Factor	Barrier Attn. dB(A)	Vehicle Mix Medium Trucks	Vehicle Mix Heavy Trucks	Peak Hou dB(A) L_{eq}	24-Hour dB(A) CNEL
Existing Traffic Volumes													
Chicago Avenue													
s/o Pennsylvania Ave.	Single Family Residential	4	12	0	16,724	40	60	0	0	3.3%	1.4%	0.0	67.7
s/o Linden St.	Multi-Family Residential	4	0	0	18,190	40	60	0	0	3.3%	1.4%	0.0	67.9
s/o Blaine St.	School	4	12	0	18,190	40	60	0	0	3.3%	1.4%	0.0	68.0
Blaine Street													
e/o Iowa Ave.	Multi-Family Residential	4	12	0	25,915	45	75	0	0	3.3%	1.4%	0.0	69.6
e/o Canyon Crest	Church	4	12	0	25,915	45	75	0	0	3.3%	1.4%	0.0	69.6
e/o Canyon Crest	Single Family Residential	4	12	0	25,915	45	75	0	0	3.3%	1.4%	0.0	69.6
Watkins Drive													
s/o Blaine St.	University	2	12	0	9,710	45	40	0	0	3.3%	1.4%	0.0	68.0
s/o Blaine St.	Single Family Residential	2	12	0	9,710	45	100	0	0	3.3%	1.4%	0.0	63.9
Iowa Avenue													
s/o Linden St.	Multi-Family Residential	2	12	0	25,915	40	50	0	0	3.3%	1.4%	0.0	70.1
s/o University Ave.	Multi-Family Residential	2	0	0	25,915	45	50	0	0	3.3%	1.4%	0.0	71.1
Canyon Crest Drive													
s/o Blaine St.	Multi-Family Residential	4	0	0	9,808	40	60	0	0	3.3%	1.4%	0.0	65.2
Future Without Project													
Chicago Avenue													
s/o Pennsylvania Ave.	Single Family Residential	4	12	3,616	45,200	40	60	0	0	3.3%	1.4%	72.9	72.0
s/o Linden St.	Multi-Family Residential	4	0	2,644	33,050	40	60	0	0	3.3%	1.4%	71.3	70.5
s/o Blaine St.	School	4	12	2,196	27,450	40	60	0	0	3.3%	1.4%	70.7	69.8
Blaine Street													
e/o Iowa Ave.	Multi-Family Residential	4	12	1,593	19,913	45	75	0	0	3.3%	1.4%	69.4	68.4
e/o Canyon Crest	Church	4	12	1,610	20,125	45	75	0	0	3.3%	1.4%	69.4	68.5
e/o Canyon Crest	Single Family Residential	4	12	1,610	20,125	45	75	0	0	3.3%	1.4%	69.4	68.5
Watkins Drive													
s/o Blaine St.	University	2	12	1,609	20,113	45	40	0	0	3.3%	1.4%	72.1	71.2
s/o Blaine St.	Single Family Residential	2	12	1,609	20,113	45	100	0	0	3.3%	1.4%	68.0	67.0
Iowa Avenue													
s/o Linden St.	Multi-Family Residential	2	12	2,370	29,625	40	50	0	0	3.3%	1.4%	71.6	70.7
s/o University Ave.	Multi-Family Residential	2	0	1,358	16,975	45	50	0	0	3.3%	1.4%	70.3	69.3
Canyon Crest Drive													
s/o Blaine St.	Multi-Family Residential	4	0	477	5,963	40	60	0	0	3.3%	1.4%	63.9	63.0
Future Plus Project													
Chicago Avenue													
s/o Pennsylvania Ave.	Single Family Residential	4	12	3,981	49,763	40	60	0	0	3.3%	1.4%	73.3	72.4
s/o Linden St.	Multi-Family Residential	4	0	2,834	35,425	40	60	0	0	3.3%	1.4%	71.6	70.8
s/o Blaine St.	School	4	12	2,420	30,250	40	60	0	0	3.3%	1.4%	71.1	70.3
Blaine Street													
e/o Iowa Ave.	Multi-Family Residential	4	12	2,817	35,213	45	75	0	0	3.3%	1.4%	71.9	70.9
e/o Canyon Crest	Church	4	12	2,773	34,663	45	75	0	0	3.3%	1.4%	71.8	70.8
e/o Canyon Crest	Single Family Residential	4	12	2,773	34,663	45	75	0	0	3.3%	1.4%	71.8	70.8
Watkins Drive													
s/o Blaine St.	University	2	12	1,851	23,138	45	40	0	0	3.3%	1.4%	72.7	71.8

s/o Blaine St.	Single Family Residential	2	12	1,851	23,138	45	100	0	0	3.3%	1.4%	68.6	67.6
Iowa Avenue													
s/o Linden St.	Multi-Family Residential	2	12	1,555	19,438	40	50	0	0	3.3%	1.4%	69.8	68.9
s/o University Ave.	Multi-Family Residential	2	0	1,558	19,475	45	50	0	0	3.3%	1.4%	70.9	69.9
Canyon Crest Drive													
s/o Blaine St.	Multi-Family Residential	4	0	1,059	13,238	40	60	0	0	3.3%	1.4%	67.4	66.5

[1]. Distance is from the centerline of the roadway segment to the receptor location.