



UNIVERSITY OF CALIFORNIA BERKELEY

**LONG RANGE DEVELOPMENT PLAN
& CHANG-LIN TIEN CENTER FOR EAST ASIAN STUDIES**

2020
VOL I DRAFT ENVIRONMENTAL IMPACT REPORT



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I INTRODUCTION

This Draft Environmental Impact Report (EIR) provides a program-level assessment of the potential environmental consequences of adoption and implementation of the proposed 2020 Long Range Development Plan (2020 LRDP) for the University of California, Berkeley (UC Berkeley). This assessment is designed to inform UC Berkeley decision-makers, other responsible agencies, and the public-at-large of the nature of the 2020 LRDP and its effect on the environment. This Draft EIR has been prepared in accordance with and in fulfillment of California Environmental Quality Act (CEQA) requirements. The University of California is the Lead Agency for the project.

Environmental and planning documents that contributed to the development of the 2020 LRDP EIR include the following:

- UC Berkeley Northeast Quadrant Science and Safety Projects and 1990 Long Range Development Plan Amendment EIR (State Clearinghouse 2001022038).
- UC Berkeley 1990 Long Range Development Plan EIR (State Clearinghouse 8811208).
- City of Berkeley General Plan Draft EIR and Final EIR (State Clearinghouse 2000102107).

This Draft EIR also includes a project-specific environmental review of the proposed Chang-Lin Tien Center for East Asian Studies. The Tien Center is the first individual project planned under the policy framework of the 2020 LRDP. The evaluation of the Tien Center in this EIR is a model for future environmental review of any project proposed to implement the 2020 LRDP.

I.1 PROPOSED ACTION

2020 LRDP

The proposed 2020 LRDP will replace the 1990-2005 LRDP, which has been the principal policy document guiding land use and capital investment at UC Berkeley. The 2020 LRDP has a long-term (approximately 16-year) horizon, yet it provides comprehensive policy direction to inform decisions on projects implementing the 2020 LRDP, and to guide UC Berkeley staff in managing campus stewardship and development programs.

The 2020 LRDP provides a framework for land use and capital investment decisions by the university to meet its academic goals and objectives through the year 2020. It describes the magnitude and distribution of development anticipated within this period, in terms of campus headcount, program space, housing and parking, and identifies policies and guidelines to inform the location, scale and design of individual capital projects. The 2020 LRDP is presented in its entirety in Chapter 3.1.

TIEN CENTER

The Tien Center is a two-phase project proposed to be built at the base of Observatory Hill facing the Central Glades. The Tien Center will consolidate the various programs of the East Asian Library, the Institute of East Asian Studies and the Department of East Asian Studies. A full project description of the Tien Center appears in Chapter 3.2.

I.2 EIR SCOPE AND PURPOSE

This document includes a program-level EIR on adoption and implementation of the 2020 LRDP and a project-specific EIR for the Tien Center project.

This EIR supports the 2020 LRDP by assessing the potential environmental impacts of full implementation of the 2020 LRDP, as required by the California Environmental Quality Act (CEQA). The EIR has several purposes:

- To inform university decisionmakers, responsible and interested agencies, and the general public of the environmental implications of the 2020 LRDP program,
- To enable the Regents of the University of California to consider those environmental implications in their review and approval of the 2020 LRDP, and
- To serve as a reference document for subsequent review of individual projects undertaken to implement the 2020 LRDP.

The 2020 LRDP provides a policy framework to guide land use and capital investment decisions at UC Berkeley through the year 2020. It is not an implementation plan, and its adoption does not commit the university to any specific project, construction schedule, or funding priority. Rather, it describes a potential development program for the campus through the year 2020. Each individual project undertaken within the scope and timeframe of the 2020 LRDP must be approved individually by the university, and the approval process must include compliance with CEQA. Therefore, this 2020 LRDP EIR is a first tier EIR that evaluates the potential effects of the entire 2020 LRDP at a program level.

CEQA and the CEQA Guidelines state that subsequent projects should be examined in light of the program-level EIR to determine whether subsequent project-specific environmental documents must be prepared. If no new significant effects would occur, all significant effects have been adequately addressed, and no new mitigation measures would be required, subsequent projects within the scope of the 2020 LRDP could rely on the environmental analysis presented in the program-level EIR, and no subsequent environmental documents would be required; otherwise, project-specific environmental documents must be prepared.

These subsequent documents may rely on the program-level EIR for information on setting and regulatory framework, for analysis of general growth-related and cumulative impacts, and on alternatives to the 2020 LRDP. In general, the environmental analysis in these subsequent documents would focus on more specific project-level information not available for the 2020 LRDP EIR. Mitigation measures identified in the 2020 LRDP EIR that apply to significant impacts of the project would be implemented as part of the project, and would be identified in the project-specific review. Other project-specific mitigation measures for significant impacts not addressed in detail in the 2020 LRDP EIR may also be implemented as part of the project. Such measures would be identified in the project-specific review.

The scope of this Draft EIR was established by UC Berkeley through the Initial Study process. UC Berkeley published a Notice of Preparation and Initial Study for the project on August 29, 2003, and held a scoping session regarding this EIR on September 22, 2003. A total of 76 comment letters regarding the scope of the EIR were received during the 42-day scoping period, and 37 people spoke about the EIR scope at the scoping session.

Based on the Initial Study and on the scoping comments received, the following issues were identified to be addressed in this EIR:

1. Aesthetics
2. Air Quality
3. Biological Resources
4. Cultural Resources
5. Geology, Seismicity and Soils
6. Hazardous Materials
7. Hydrology and Water Quality
8. Land Use
9. Noise
10. Population and Housing
11. Public Services
12. Transportation and Traffic
13. Utilities and Service Systems

A summary of the scoping comments on each of these issues is included at the beginning of each of the topic-specific chapters within Chapter 4.

I.3 REPORT ORGANIZATION

This Draft EIR is organized into the following major chapters:

- **Chapter 1: Introduction** provides an introduction and overview describing both the intended use of the document and the review and certification process.
- **Chapter 2: Report Summary** summarizes environmental consequences that would result from the proposed 2020 LRDP, describes recommended mitigation measures, and indicates the level of significance of impacts before and after mitigation.
- **Chapter 3: Project Description** contains the 2020 LRDP itself as section 3.1, which serves as the Project Description for the 2020 LRDP component of this EIR. Section 3.2 of this chapter includes a description of the proposed Tien Center project.
- **Chapter 4: Environmental Evaluation** is divided into 13 topic-specific chapters. Each chapter provides an analysis of the potential environmental impacts of the proposed 2020 LRDP and the Tien Center project, outlines the continuing campus best practices that limit potential environmental impacts, and recommends mitigation measures, if required or feasible, to further reduce the significance of impacts in each environmental issue area.
- **Chapter 5: Alternatives** considers four alternatives to the proposed 2020 LRDP and three alternatives for the Tien Center, including the CEQA-required No Project Alternative for each of these two EIR components.

- **Chapter 6: CEQA-Required Assessment Conclusions** discusses growth inducement, cumulative impacts, unavoidable significant effects, and expected significant irreversible changes.
- **Chapter 7: Report Preparation** identifies the preparers of the Draft EIR and individuals who were contacted for information.
- **Chapter 8: Glossary** includes definitions of planning and technical terms used in this EIR, as well as a list of acronyms.

I.4 ENVIRONMENTAL REVIEW PROCESS

This Draft EIR will be available for review by the public and interested parties, agencies and organizations for a review period of 61 days; only a 45 day review period is required by law. Public hearings on the Draft EIR will be held during the review period on May 5 and May 11, 2004. The public is invited to attend a hearing to offer oral comments on this Draft EIR. The May 5 hearing will be at the North Berkeley Senior Center, 1901 Hearst Avenue, Berkeley from 7 to 9 pm; the May 11 hearing will be at the Clark Kerr Campus Krutch Theater, 2601 Warring Street, Berkeley, from 5:30 to 8:30 pm. Comments on the Draft EIR may also be submitted in writing to:

Ms. Jennifer Lawrence
Co-Director, 2020 LRDP EIR
Facilities Services
1936 University Ave #300
University of California
Berkeley CA 94720-1382
Email: 2020LRDP@cp.berkeley.edu

Comments must be received by 5:00 pm on June 14, 2004 to be considered in the Final Environmental Impact Report (FEIR). Following the close of the public comment period, an FEIR will be prepared to respond to all substantive environmental comments regarding this Draft EIR. Once the Regents certify the FEIR, the university will also consider adoption of the 2020 LRDP itself, which may be approved as proposed, modified, or rejected. The Regents will then also consider approval of the Tien Center project, which may also be approved as proposed, modified or rejected.

I.5 USES OF THE 2020 LRDP EIR

This document serves three purposes. The Regents will use this EIR to evaluate the environmental implications of adopting the 2020 LRDP, and approving the Tien Center project. If the 2020 LRDP is approved, this EIR will be used to focus environmental review of subsequent campus development projects. Lastly, this document may be used as a source of information by responsible agencies with permitting or approval authority over projects implementing the 2020 LRDP.

No other agency approval, over than by The Regents, is required for the 2020 LRDP. However, under limited circumstances as individual projects are proposed, other permits and approvals may be needed depending on the characteristics of the projects. A list of potential permits includes:

Section 404 Permit. Implementation of the 2020 LRDP could result in the filling of wetlands and other waters of the United States. The US Army Corps of Engineers (ACOE) regulates the nation’s waterways and wetlands, and is responsible for implementing and enforcing Section 404 of the federal Clean Water Act (CWA). ACOE regulations require that any activity that discharges fill material or requires excavation in “waters of the United States” (see below), including wetlands, must obtain a Section 404 permit.

Section 401 Water Quality Certification: The State Water Resources Control Board and the Regional Water Quality Control Boards (RWQCBs) promulgate and enforce narrative and numeric water quality standards in order to protect water quality and adopt and approve Water Quality Control Plans. The State Board and the RWQCBs also regulate discharges of harmful substances to surface waters, including wetlands, under the federal CWA and the California Porter-Cologne Water Quality Control Act (Porter-Cologne). If issuance of a Section 404 permit is required, it will be subject to water quality certification under CWA Section 401.

Section 7 Consultation: The Federal Endangered Species Act requires a federal agency (potentially the ACOE if issuance of a Section 404 permit is required) to seek formal consultation with the US Fish and Wildlife Service (USFWS) for species listed as threatened or endangered, or proposed for listing as threatened or endangered. Based on this consultation, the USFWS issues a biological opinion determining whether the project is likely to adversely affect or jeopardize the continued existence of a federally listed species, or result in the destruction or adverse modification of critical habitat proposed to be designated for such species.

Section 10 of the Endangered Species Act: Section 10 of the Federal Endangered Species Act provides a nonfederal applicant a mechanism to obtain incidental take authorization for federally listed threatened or endangered species.

Section 106 Compliance: For projects with federal funding, the National Historic Preservation Act of 1966 (NHPA), as amended by 16 United States Code (USC) section 470 et seq., Section 106, 36 Code of Federal Regulations (CFR) 800, includes provisions for protection of significant archaeological and historical resources. Procedures for dealing with previously unsuspected cultural resources discovered during construction are identified in 36 CFR 800 (for implementing Section 106 processes). The administering agency is the State Historic Preservation Officer (SHPO) and the federal lead agency.

Section 1601 Permit: The California Department of Fish and Game (CDFG) requires notification for any project or activity that will take place in, or in the vicinity of, a river, stream, lake, or its tributaries. Section 1601 (1603 for private entities) of the Fish and Game Code requires that state or local governmental agencies notify the CDFG before they begin any construction project that will: (1) divert, obstruct, or change the natural flow or the bed, channel, or bank of any river, stream, or lake; (2) use materials from a streambed; or (3) result in the disposal or disposition of debris, waste, or other material containing crumbled, flaked or ground pavement where it can pass into any river, stream or lake.

Section 2081 Compliance: Section 2081 of the California Endangered Species Act permits the “take” (hunt, pursue, catch, or kill) of endangered or threatened species, provided that the take is incidental to an otherwise lawful activity, the impacts of the authorized take are minimized and fully mitigated, the take permit is consistent with the CDFG recovery programs, the applicant ensures adequate funding to implement the mitigation and monitoring program, and the action will not jeopardize the continued existence of the species. Substantial information regarding state-listed species is presented in Chapter 4.3 of this EIR.

NPDES Permits: The Clean Water Act requires a National Pollution Discharge Elimination System (NPDES) permit for any discharge of pollutants from a point source to waters of the United States. This law and its regulations also apply to storm water in certain circumstances. In 1987, Congress amended the CWA to require implementation, in two phases, of a comprehensive national program for addressing storm water discharges. Phase 1 requires NPDES permits for stormwater discharge from a large number of priority sources, including medium and large municipal separate storm sewer systems, and several categories of industrial activity, including construction activity that disturbs five or more acres of land. Phase II of the storm water program requires permits for storm water discharges from certain small municipal separate storm sewer systems and construction activity generally disturbing between 1 and 5 acres. The campus is subject to Phase II regulations.

Other Permits and Approvals: A variety of other permits and approvals from federal, state and local agencies may be needed for future projects, or for implementation of project mitigation. These may include encroachment permits and approvals from infrastructure providers for service and extension of facilities to the campus.

2 REPORT SUMMARY

This summary presents an overview of the analysis contained in Chapter 4: Environmental Evaluation. CEQA requires that this chapter summarize the following: 1) areas of controversy; 2) significant impacts; 3) unavoidable significant impacts; and 4) implementation of mitigation measures. Alternatives to the project are analyzed in Chapter 5.

2.1 PROJECT UNDER REVIEW

This Draft Environmental Impact Report (EIR) provides an assessment of the potential environmental consequences of adoption of UC Berkeley's 2020 Long Range Development Plan (2020 LRDP). The 2020 LRDP is intended to serve as the principal policy document for guiding future development at UC Berkeley. The 2020 LRDP provides a framework for land use and capital investment to meet the academic goals and objectives of UC Berkeley through the year 2020. It describes both the scope and nature of development anticipated within this timeframe, as well as policies to guide the location, scale and design of individual capital projects. The 2020 LRDP is further detailed in Chapter 3.1 of this EIR.

2.2 AREAS OF CONTROVERSY

Over the years, UC Berkeley has worked with the City of Berkeley and campus neighbors on various issues of mutual interest. As the primary policy document guiding future land use and development at UC Berkeley, the 2020 LRDP is expected to be of great interest to the city and to campus neighbors, as well as to various regional public agencies.

In September 2003, a public scoping meeting was held at UC Berkeley for the 2020 LRDP and Tien Center EIR. A scoping period for the EIR extended from August 29, 2003 to October 10, 2003. During the scoping period interested parties were invited to submit their written comments, and to speak at the public scoping meeting. Commentors included the cities of Berkeley, Albany and Emeryville, several public agencies, community groups, neighborhood associations and individuals. Particular areas of concern identified during the scoping period included the following:

- **Aesthetics:** potential impacts to the aesthetic character of the canyons and view corridors; light and glare impacts from future use changes at Memorial Stadium; aesthetic impacts of the Tien Center project.
- **Air Quality:** potential air quality impacts resulting from construction and new traffic generated as a result of implementing the 2020 LRDP.
- **Hill Campus Habitat:** potential impacts on sensitive habitat and species, and on hydrology and water quality, in the Hill Campus.
- **Strawberry Creek:** potential impacts to riparian habitat, particularly the habitat along Strawberry Creek.
- **Cultural Resources:** impacts of future development on historic buildings and cultural resources; impacts to the historic setting of the Campus Park.
- **Seismic Hazards:** the proximity of the campus to the Hayward fault; development within the fault hazard zone, and seismic safety hazards.
- **Hazardous Materials:** hazardous materials use at the Lawrence Berkeley National Laboratory, which is outside the scope of the 2020 LRDP and is only addressed as a cumulative condition in this EIR.

- **Land Use:** compatibility of development under the 2020 LRDP with the City of Berkeley General Plan and the Southside Plan.
- **Noise:** potential noise impacts from construction.
- **Housing:** housing impacts associated with an increased campus population.
- **Fire and Emergency Response:** potential impacts on the ability of fire and emergency services to access the Hill Campus in the event of a disaster; potential impacts to fire services in general.
- **Schools:** impacts of potential increases in school-aged children on the school districts serving the 2020 LRDP area.
- **Traffic:** impacts of additional campus development on local and regional traffic conditions; impacts associated with providing additional campus parking.
- **Utilities and Service Systems:** potential impacts of additional campus development on the capacity of sewer, storm drainage and other service systems.

All of these issues were considered in the preparation of the 2020 LRDP. To the extent these issues have environmental impacts, they are also addressed in this EIR.

2.3 SIGNIFICANT IMPACTS

Under CEQA, a significant impact on the environment is defined as a substantial, or potentially substantial, adverse change in any of the physical conditions within the area affected by the project, including land, air, water, minerals, flora, fauna, ambient noise, and objects of historic and aesthetic significance. Implementation of the 2020 LRDP has the potential to generate significant environmental impacts in a number of areas. This EIR identifies these potential impacts and presents mitigation measures. Potential impacts are summarized in Table 2-1 at the end of this chapter.

2.4 CONTINUING BEST PRACTICES AND MITIGATION MEASURES

This EIR details continuing best practices and mitigation measures that would reduce potential impacts to less than significant levels, except where impacts are significant and unavoidable. These measures are summarized in Table 2-1. They will be the subject of a Mitigation Monitoring Program.

2.5 UNAVOIDABLE ENVIRONMENTAL IMPACTS

This EIR identifies significant unavoidable impacts in the following topic areas: air quality, cultural resources, noise, traffic and transportation.

2.6 ALTERNATIVES TO THE PROJECT

This Draft EIR analyzes four alternatives to the proposed 2020 LRDP, as follows:

- L-1 Reduced enrollment and employment growth from 2020 LRDP levels
- L-2 No new parking and more transit incentives
- L-3 Diversion of some future growth to remote sites
- L-4 No project (as required by CEQA)

During the scoping process, other alternatives were considered, but were determined either to be infeasible or to offer no significant environmental benefits over the 2020 LRDP or the alternatives listed above. The Draft EIR includes brief, qualitative analyses of these alternatives, as follows:

- L-5 Less new university housing than proposed
- L-6 More new university housing than proposed
- L-7 More intensive development of the Hill Campus than proposed
- L-8 More intensive development of the Clark Kerr Campus than proposed

Based on the comparative alternatives analysis contained in this EIR, Alternative L-1 is the environmentally superior alternative. However, despite the potential environmental advantages of Alternative L-1, it does not fully meet the Objectives established for the 2020 LRDP. Details of this analysis are included in Chapter 5.1.

This Draft EIR also analyzes three alternatives to the proposed Tien Center project:

- T-1 No project (as required by CEQA)
- T-2 Alternate site
- T-3 Phase 1 only, no Phase 2

Either T-2 or T-3 would, on balance, be environmentally superior to the proposed project. However, despite the potential modest environmental advantages of Alternatives T-2 and T-3, they would not fully meet the Objectives established for the Tien Center. Details of this analysis are included in Chapter 5.2.

2.7 SUMMARY TABLE

Table 2-1 presents a summary of impacts and mitigation measures identified in this report. It is organized to correspond with environmental issues discussed in Chapter 4.

The table is arranged in four columns: 1) environmental impacts; 2) significance prior to mitigation; 3) mitigation measures; and 4) significance after mitigation. A series of mitigation measures is noted where more than one mitigation may be required to achieve a less than significant impact. For a complete description of potential impacts and suggested mitigation measures, as well as analysis of potential cumulative impacts, please refer to the topical chapters within Chapter 4.

TABLE 2-1 SUMMARY OF IMPACTS, MITIGATION MEASURES AND CONTINUING BEST PRACTICES

Impact	Significance Before Mitigation	Mitigation Measures and Continuing Best Practices	Significance With Mitigation
AESTHETICS			
<p>LRDP Impact AES-1: Projects under the 2020 LRDP would result in visual changes, through new construction on presently undeveloped sites, through replacement of existing structures with new structures, and through exterior renovations of existing structures. The design provisions of the 2020 LRDP would ensure those changes would not degrade the existing visual quality and character of their environs.</p>	LTS	<p>Continuing Best Practice AES-1-a: New projects in the Campus Park would as a general rule conform to the Campus Park Guidelines. While the Guidelines would not preclude alternate design concepts when such concepts present the best solution for a particular site, UC Berkeley would not depart from the Guidelines except for solutions of extraordinary quality.</p>	LTS
		<p>Continuing Best Practice AES-1-b: Major new campus projects would continue to be reviewed at each stage of design by the UC Berkeley Design Review Committee. The provisions of the 2020 LRDP, as well as project specific design guidelines prepared for each such project, would guide these reviews.</p>	
		<p>Continuing Best Practice AES-1-c: New Hill Campus projects would as a general rule conform to the design principles established in the Hill Campus Framework. While these principles would not preclude alternate design concepts when such concepts present the best solution for a particular site, the University would not depart from these principles except for solutions of extraordinary quality.</p>	
		<p>Continuing Best Practice AES-1-d: To the extent feasible, future fuel management practices would include the selective replacement of high-hazard introduced plant species with native species: for example, the restoration of native grassland and oak-bay woodland through the eradication of invasive exotics, and replacement of aged pines and second-growth eucalyptus. Such conversions would be planned with care, however, to avoid significant disruption of faunal habitats.</p>	

TABLE 2-1 SUMMARY OF IMPACTS, MITIGATION MEASURES AND CONTINUING BEST PRACTICES

Impact	Significance Before Mitigation	Mitigation Measures and Continuing Best Practices	Significance With Mitigation
AESTHETICS			
		<p>Continuing Best Practice AES-1-e: UC Berkeley would make informational presentations of all major projects in the City Environs in Berkeley to the Berkeley Planning Commission and, if relevant, the Berkeley Landmarks Commission for comment prior to schematic design review by the UC Berkeley Design Review Committee. Major projects in the City Environs in Oakland would similarly be presented to the Oakland Planning Commission and, if relevant, to the Oakland Landmarks Preservation Advisory Board.</p>	
		<p>Continuing Best Practice AES-1-f: Each individual project built in the City Environs under the 2020 LRDP would be assessed to determine whether it could pose potential significant aesthetic impacts not anticipated in the 2020 LRDP, and if so, the project would be subject to further evaluation under CEQA.</p>	
		<p>Continuing Best Practice AES-1-g: To the extent feasible, University housing projects in the 2020 LRDP Housing Zone would not have a greater number of stories nor have setback dimensions less than could be permitted for a project under the relevant city zoning ordinance as of July 2003.</p>	
		<p>Continuing Best Practice AES-1-h: Assuming no further substantive changes are made by the city prior to adoption, the University would as a general rule use the design guidelines and standards prescribed in the Southside Plan as its guide for the location and design of University projects implemented under the 2020 LRDP within the area of the Southside Plan.</p>	

TABLE 2-1 SUMMARY OF IMPACTS, MITIGATION MEASURES AND CONTINUING BEST PRACTICES

Impact	Significance Before Mitigation	Mitigation Measures and Continuing Best Practices	Significance With Mitigation
AESTHETICS			
LRDP Impact AES-2: The Campus Park and Hill Campus have a number of scenic vistas into, within, and from campus lands. While projects under the 2020 LRDP would result in visual changes, the design provisions of the 2020 LRDP would ensure those changes would not have adverse effects on those scenic vistas.	LTS	See CBPs under LRDP Impact AES-1	LTS
LRDP Impact AES-3: Projects under the 2020 LRDP have the potential to create new sources of substantial light or glare that could have adverse impacts on day- or night-time views, but the mitigation measures would reduce this impact to <i>less than significant</i> .	S	LRDP Mitigation Measure AES-3-a: Lighting for new development projects would be designed to include shields and cut-offs that minimize light spillage onto unintended surfaces and minimize atmospheric light pollution. The only exception to this principle would be in those areas where such features would be incompatible with the visual and/or historic character of the area. LRDP Mitigation Measure AES-3-b: As part of the design review procedures described in the above Continuing Best Practices, light and glare would be given specific consideration, and measures incorporated into the project design to minimize both. In general, exterior surfaces would not be reflective: architectural screens and shading devices are preferable to reflective glass.	LTS
Tien Center Impact AES-1: The Tien Center has the potential to degrade the visual quality and character of its environs, but the project design avoids such impacts by conforming to the Campus Park Guidelines in the 2020 LRDP.	LTS	See CBPs under LRDP Impact AES-1	LTS
Tien Center Impact AES-2: The Tien Center has the potential to cause adverse impacts on scenic vistas, but the project design avoids such impacts by conforming to the Campus Park Guidelines in the 2020 LRDP.	LTS	See CBPs under LRDP Impact AES-1	LTS

TABLE 2-1 SUMMARY OF IMPACTS, MITIGATION MEASURES AND CONTINUING BEST PRACTICES

Impact	Significance Before Mitigation	Mitigation Measures and Continuing Best Practices	Significance With Mitigation
AESTHETICS			
Tien Center Impact AES-3: As a project implementing the 2020 LRDP, the Tien Center would not create new sources of light or glare that could have adverse impacts on day or night-time views.	LTS	See mitigation measures under LRDP Impact AES-3	LTS
AIR QUALITY			
LRDP Impact AIR-1: Implementation of the 2020 LRDP would not violate the carbon monoxide standard or expose sensitive receptors to substantial CO concentrations.	LTS	Continuing Best Practice AIR-1: UC Berkeley shall continue to implement the same or equivalent alternative transit programs, striving to improve the campus mode split and reduce the use of single occupant vehicles among students, staff, faculty and visitors to campus.	LTS
LRDP Impact AIR-2: Implementation of the 2020 LRDP would not create objectionable odors affecting a substantial number of people.	LTS	None required.	LTS
LRDP Impact AIR-3: Implementation of the 2020 LRDP would not expose people to substantial levels of toxic air contaminants (TACs) from stationary and area sources.	LTS	None required.	LTS
LRDP Impact AIR-4: Emissions from construction activities associated with the 2020 LRDP would be controlled and would not lead to a violation of air quality standards.	LTS	Continuing Best Practice AIR-4-a: UC Berkeley shall continue to include in all construction contracts the measures specified below to reduce fugitive dust impacts: <ul style="list-style-type: none"> ▪ All disturbed areas, including quarry product piles, which are not being actively utilized for construction purposes, shall be effectively stabilized of dust emissions using tarps, water, (non-toxic) chemical stabilizer/suppressant, or vegetative ground cover. ▪ All on-site unpaved roads and off-site unpaved access roads shall be effectively stabilized of dust emissions using water or (non-toxic) chemical stabilizer/suppressant. ▪ When quarry product or trash materials are transported off-site, all material shall be covered, or at least two feet of freeboard space from the top of the container shall be maintained. 	LTS

TABLE 2-1 SUMMARY OF IMPACTS, MITIGATION MEASURES AND CONTINUING BEST PRACTICES

Impact	Significance Before Mitigation	Mitigation Measures and Continuing Best Practices	Significance With Mitigation
AIR QUALITY			
		<p>LRDP Mitigation Measure AIR-4-a: In addition, UC Berkeley shall include in all construction contracts the measures specified below to reduce fugitive dust impacts, including but not limited to the following:</p> <ul style="list-style-type: none"> ▪ All land clearing, grubbing, scraping, excavation, land leveling, grading, cut and fill, and demolition activities shall be effectively controlled of fugitive dust emissions utilizing application of water or by presoaking. ▪ When demolishing buildings, water shall be applied to all exterior surfaces of the building for dust suppression. ▪ All operations shall limit or expeditiously remove the accumulation of mud or dirt from paved areas of construction sites and from adjacent public streets as necessary. See also CBP HYD 1-b. ▪ Following the addition of materials to, or the removal of materials from, the surface of outdoor storage piles, said piles shall be effectively stabilized of fugitive dust emissions by utilizing sufficient water or by covering. ▪ Limit traffic speeds on unpaved roads to 15 mph. ▪ Water blasting shall be used in lieu of dry sand blasting wherever feasible. ▪ Install sandbags or other erosion control measures to prevent silt runoff to public roadways from sites with slopes over one percent. ▪ To the extent feasible, limit area subject to excavation, grading, and other construction activity at any one time. ▪ Replant vegetation in disturbed areas as quickly as possible. 	

TABLE 2-1 SUMMARY OF IMPACTS, MITIGATION MEASURES AND CONTINUING BEST PRACTICES

Impact	Significance Before Mitigation	Mitigation Measures and Continuing Best Practices	Significance With Mitigation
AIR QUALITY			
	S	<p>Continuing Best Practice AIR-4-b: UC Berkeley shall continue to implement the following control measure to reduce emissions of diesel particulate matter and ozone precursors from construction equipment exhaust:</p> <ul style="list-style-type: none"> ▪ Minimize idling time when construction equipment is not in use. 	
		<p>LRDP Mitigation Measure AIR-4-b: UC Berkeley shall implement the following control measures to reduce emissions of diesel particulate matter and ozone precursors from construction equipment exhaust:</p> <ul style="list-style-type: none"> ▪ To the extent that equipment is available and cost effective, UC Berkeley shall require contractors to use alternate fuels and retrofit existing engines in construction equipment. ▪ To the extent practicable, manage operation of heavy-duty equipment to reduce emissions, including the use of particulate traps. 	
<p>LRDP Impact AIR-5: Operational emissions from implementation of the 2020 LRDP may hinder the attainment of the Clean Air Plan. This would be a <i>significant and unavoidable</i> impact.</p>	S	<p>Continuing Best Practice AIR-5: UC Berkeley will continue to implement transportation control measures such as supporting voluntary trip-reduction programs, ridesharing, and implementing improvements to bicycle facilities.</p>	SU
		<p>LRDP Mitigation Measure AIR-5: UC Berkeley will work with the City of Berkeley, ABAG and BAAQMD to ensure that emissions directly and indirectly associated with the campus are adequately accounted for and mitigated in applicable air quality planning efforts.</p>	

TABLE 2-1 SUMMARY OF IMPACTS, MITIGATION MEASURES AND CONTINUING BEST PRACTICES

Impact	Significance Before Mitigation	Mitigation Measures and Continuing Best Practices	Significance With Mitigation
BIOLOGICAL RESOURCES			
<p>LRDP Impact BIO-1: New construction, land management and other 2020 LRDP activities would not have a substantial adverse effect on special-status species, or unique vegetation elements that contribute to the campus character.</p>	LTS	<p>LRDP Mitigation Measure BIO-1-a: UC Berkeley will, to the full feasible extent, avoid the disturbance or removal of nests of raptors and other special-status bird species when in active use. A pre-construction nesting survey for loggerhead shrike or raptors, covering a 100 yard perimeter of the project site, would be conducted during the months of March through July prior to commencement of any project that may impact suitable nesting habitat on the Campus Park and Hill Campus. The survey would be conducted by a qualified biologist no more than 30 days prior to initiation of disturbance to potential nesting habitat. In the Hill Campus, surveys would be conducted for new construction projects involving removal of trees and other natural vegetation. In the Campus Park, surveys would be conducted for construction projects involving removal of mature trees within 100 feet of a Natural Area, Strawberry Creek, and the Hill Campus. If any of these species are found within the survey area, grading and construction in the area would not commence, or would continue only after the nests are protected by an adequate setback approved by a qualified biologist. To the full feasible extent, the nest location would be preserved, and alteration would only be allowed if a qualified biologist verifies that birds have either not begun egg-laying and incubation, or that the juveniles from those nests are foraging independently and capable of survival. A pre-construction survey is not required if construction activities commence during the non-nesting season (August through February).</p>	LTS

TABLE 2-1 SUMMARY OF IMPACTS, MITIGATION MEASURES AND CONTINUING BEST PRACTICES

Impact	Significance Before Mitigation	Mitigation Measures and Continuing Best Practices	Significance With Mitigation
BIOLOGICAL RESOURCES			
		<p>LRDP Mitigation Measure BIO-1-b: UC Berkeley will, to the full feasible extent, avoid the remote potential for direct mortality of special-status bats and destruction of maternal roosts. A preconstruction roosting survey for special-status bat species, covering the project site and any affected buildings, would be conducted during the months of March through August prior to commencement of any project that may impact suitable maternal roosting habitat on the Campus Park and Hill Campus. The survey would be conducted by a qualified biologist no more than 30 days prior to initiation of disturbance to potential roosting habitat. In the Hill Campus, surveys would be conducted for new construction projects prior to grading, vegetation removal, and remodel or demolition of buildings with isolated attics and other suitable roosting habitat. In the Campus Park, surveys would be conducted for construction projects prior to remodel or demolition of buildings with isolated attics. If any maternal roosts are detected during the months of March through August, construction activities would not commence, or would continue only after the roost is protected by an adequate setback approved by a qualified biologist. To the full feasible extent, the maternal roost location would be preserved, and alteration would only be allowed if a qualified biologist verifies that bats have completed rearing young, that the juveniles are foraging independently and capable of survival, and bats have been subsequently passively excluded from the roost location. A pre-construction survey is not required if construction activities commence outside the maternal roosting season (September through February).</p>	

TABLE 2-1 SUMMARY OF IMPACTS, MITIGATION MEASURES AND CONTINUING BEST PRACTICES

Impact	Significance Before Mitigation	Mitigation Measures and Continuing Best Practices	Significance With Mitigation
BIOLOGICAL RESOURCES			
		<p>LRDP Mitigation Measure BIO-1-c: During planning and feasibility studies prior to development of specific projects or adoption of management plans in the Hill Campus, a habitat assessment would be conducted by a qualified biologist to assess any potential impacts on special-status species. Detailed surveys would be conducted during the appropriate season where necessary to confirm presence or absence of any special-status species. Where required to avoid a substantial adverse effect on such species, in consultation with the CDFG and the USFWS feasible changes to schedule, siting and design of projects or management plans would be developed and implemented.</p>	
		<p>Continuing Best Practice BIO-1-a: UC Berkeley will continue to implement the Campus Specimen Tree Program to reduce adverse effects to specimen trees and flora. Replacement landscaping will be provided where specimen resources are adversely affected, either through salvage and relocation of existing trees and shrubs or through new plantings of the same genetic strain, as directed by the Campus Landscape Architect.</p>	
		<p>Continuing Best Practice BIO-1-b: Implementation of the 2020 LRDP, particularly the Campus Park Guidelines, as well as the Landscape Master Plan and project-specific design guidelines, would provide for stewardship of existing landscaping, and use of replacement and expanded tree and shrub plantings to preserve and enhance the Campus Park landscape. Coast live oak and other native plantings would continue to be used in future landscaping, serving to partially replace any trees lost as a result of projects implemented under the 2020 LRDP.</p>	

TABLE 2-1 SUMMARY OF IMPACTS, MITIGATION MEASURES AND CONTINUING BEST PRACTICES

Impact	Significance Before Mitigation	Mitigation Measures and Continuing Best Practices	Significance With Mitigation
BIOLOGICAL RESOURCES			
LRDP Impact BIO-2: New construction, land management and other 2020 LRDP activities would be designed and implemented to avoid any substantial adverse effect on any riparian habitat or sensitive natural communities.	LTS	<p>Continuing Best Practice BIO-1-c: Because trees and other vegetation require routine maintenance, as trees age and become senescent, UC Berkeley would continue to undertake trimming, thinning, or removal, particularly if trees become a safety hazard. Vegetation in the Hill Campus requires continuing management for fire safety, habitat enhancement, and other objectives. This may include removal of mature trees such as native live oaks and non-native plantings of eucalyptus and pine.</p> <p>Continuing Best Practice BIO-2-a: Implementation of the 2020 LRDP, including provisions that ensure proposed projects on the Campus Park will be designed to avoid Natural Preserves and provide for protection and enhancement of riparian habitat along Strawberry Creek as prescribed in the Campus Park Design Guidelines, will avoid substantial adverse effect on riparian habitat or sensitive natural communities. The Natural Preserves are comprised of two subzones: the riparian areas along the streamcourse, and other rustic woodlands adjacent to these riparian areas. The riparian areas are dominated by native and naturalized plants forming dense woodlands along the streamcourse: their width may vary in response to local conditions, but in general should be at least 100', centered on the streamcourse. Management of the Natural Preserves will be based on ecological principles, including replacing invasive exotic plants with native plants suited to this biotic zone, replacing unhealthy plants and plants at the ends of their natural lives, and preserving and enhancing the habitat value of the zone, as prescribed in the 2020 LRDP.</p>	LTS

TABLE 2-1 SUMMARY OF IMPACTS, MITIGATION MEASURES AND CONTINUING BEST PRACTICES

Impact	Significance Before Mitigation	Mitigation Measures and Continuing Best Practices	Significance With Mitigation
BIOLOGICAL RESOURCES			
		<p>Continuing Best Practice BIO-2-b: The Strawberry Creek Management Plan will continue to be revised and implemented, in consultation with CDFG, to include recommendations for habitat restoration and enhancement along specific segments of the creek on both the Campus Park and Hill Campus. This will include minimum development setbacks, targets on invasive species controls, appropriate native plantings, and in-channel habitat improvements such as retention of large woody debris and creation of a refugio and deep plunge pools where feasible.</p>	
		<p>Continuing Best Practice BIO-2-c: During planning and feasibility studies prior to development of specific projects or implementation of management plans in the Hill Campus, a habitat assessment will be conducted by a qualified biologist to identify and minimize potential impacts on riparian habitat, freshwater seeps, and native grassland sensitive natural communities. Detailed surveys will be conducted at appropriate times where necessary to confirm and map the extent of any sensitive natural communities. Where required to avoid a substantial adverse effect on such communities, in consultation with the CDFG, feasible changes to schedule, siting and design of projects or management plans will be developed and implemented.</p>	

TABLE 2-1 SUMMARY OF IMPACTS, MITIGATION MEASURES AND CONTINUING BEST PRACTICES

Impact	Significance Before Mitigation	Mitigation Measures and Continuing Best Practices	Significance With Mitigation
BIOLOGICAL RESOURCES			
LRDP Impact BIO-3: Construction, land management practices, and other 2020 LRDP activities would be designed and implemented to avoid any substantial adverse effect on jurisdictional wetlands.	LTS	Continuing Best Practice BIO-3: Proposed projects on the Campus Park and Hill Campus will be designed to avoid designated jurisdictional wetlands and waters along the Strawberry Creek channel. As necessary, wetlands will be mapped and the extent of jurisdictional waters verified by the Corps during planning and feasibility studies prior to development of specific projects or implementation of management plans in the Hill Campus. When unavoidable, any modifications to Strawberry Creek and other jurisdictional waters will be coordinated with jurisdictional agencies, including the CDFG, Corps, and the RWQCB as necessary.	LTS
LRDP Impact BIO-4: Construction, land management practices, and other 2020 LRDP activities would be designed and implemented to avoid any substantial interference with the movement of any native resident or migratory fish or wildlife species, or with established wildlife corridors or native wildlife nursery sites.	LTS	Continuing Best Practice BIO-4-a: Proposed projects in the Hill Campus will be designed to avoid obstructing important established wildlife corridors to the full feasible extent. Before any new fencing is installed for security purposes, UC Berkeley will consider the effect of such fencing on opportunities for wildlife movement, and will avoid new or expanded fencing which would obstruct important established movement corridors. Continuing Best Practice BIO-4-b: During planning and feasibility studies prior to development of specific projects or implementation of management plans in the Hill Campus, a habitat assessment will be conducted by a qualified biologist to identify and minimize potential impacts on wildlife movement opportunities, including avoidance of new fencing across Strawberry Creek and tributary drainages.	LTS
LRDP Impact BIO-5: Construction, land management and other 2020 LRDP activities would not result in a significant environmental effect upon biological resources due to conflict with local ordinances.	LTS	None required.	

TABLE 2-1 SUMMARY OF IMPACTS, MITIGATION MEASURES AND CONTINUING BEST PRACTICES

Impact	Significance Before Mitigation	Mitigation Measures and Continuing Best Practices	Significance With Mitigation
BIOLOGICAL RESOURCES			
Tien Center Impact BIO-1: Development of the Tien Center would not substantially affect any sensitive natural community.	LTS	See CBPs under LRDP Impact BIO-2.	LTS
Tien Center Impact BIO-2: Development of the Tien Center would not substantially interfere with movement of native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, nor impede the use of native wildlife nursery sites.	LTS	See CBPs under LRDP Impact BIO-4.	LTS
Tien Center Impact BIO-3: The Tien Center project design would not create significant adverse impacts to special-status species, including raptors, or specimen trees or plants.	LTS	See CBPs and mitigation measures under LRDP Impact BIO-1.	LTS
CULTURAL RESOURCES			
LRDP Impact CUL-1: Construction activities under the 2020 LRDP could have the potential to destroy a unique paleontological resource, or site, or unique geologic feature, but campus best practices would ensure this impact is <i>less than significant</i> .	LTS	Continuing Best Practice CUL-1: In the event that paleontological resource evidence or a unique geological feature is identified during project planning or construction, the work would stop immediately and the find would be protected until its significance can be determined by a qualified paleontologist or geologist. If the resource is determined to be a “unique resource,” a mitigation plan would be formulated and implemented to appropriately protect the significance of the resource by preservation, documentation, and/or removal, prior to recommending activities.	LTS

TABLE 2-1 SUMMARY OF IMPACTS, MITIGATION MEASURES AND CONTINUING BEST PRACTICES

Impact	Significance Before Mitigation	Mitigation Measures and Continuing Best Practices	Significance With Mitigation
CULTURAL RESOURCES			
LRDP Impact CUL-2: Projects developed under the 2020 LRDP could cause adverse changes in the significance of historical resources. However, in general the provisions of the 2020 LRDP and the best practices would ensure this impact is <i>less than significant</i> . (See also LRDP Impact CUL-3.)	S	<p>Continuing Best Practice CUL-2-a: If a project could cause a substantial adverse change in features that convey the significance of a primary or secondary resource, an Historic Structures Assessment (HSA) would be prepared. Recommendations of the HSA made in accordance with the Secretary of the Interior’s Standards would be implemented, in consultation with the UC Berkeley Design Review Committee and the State Historic Preservation Office, such that the integrity of the significant resource is preserved and protected. Copies of all reports would be filed in the University Archives/Bancroft Library.</p> <p>Continuing Best Practice CUL-2-b: UC Berkeley would make informational presentations of all major projects in the City Environs in Berkeley to the Berkeley Planning Commission and, if relevant, the Berkeley Landmarks Commission for comment prior to schematic design review by the UC Berkeley Design Review Committee. Major projects in the City Environs in Oakland would similarly be presented to the Oakland Planning Commission and, if relevant, to the Oakland Landmarks Preservation Advisory Board.</p>	LTS
LRDP Impact CUL-3: Under certain circumstances warranted by public benefits in furtherance of the University’s educational mission, projects developed under the 2020 LRDP could cause substantial adverse changes in the significance of historical resources. Under these circumstances, the University would follow the mitigation measure described, but the impact would remain <i>significant and unavoidable</i> .	S	LRDP Mitigation Measure CUL-3: If, in furtherance of the educational mission of the University, a project would require the demolition of a primary or secondary resource, or the alteration of such a resource in a manner not in conformance with the Secretary of the Interior’s Standards, the resource would be recorded to archival standards prior to its demolition or alteration.	SU

TABLE 2-1 SUMMARY OF IMPACTS, MITIGATION MEASURES AND CONTINUING BEST PRACTICES

Impact	Significance Before Mitigation	Mitigation Measures and Continuing Best Practices	Significance With Mitigation
CULTURAL RESOURCES			
<p>LRDP Impact CUL-4: Projects developed under the 2020 LRDP could destroy significant prehistoric or historic archaeological resources. The mitigations would reduce this impact to <i>less than significant</i>. (See also LRDP Impact CUL-5.)</p>	S	<p>LRDP Mitigation Measure CUL-4-a: UC Berkeley will create an internal document: a UCB Campus Archaeological Resources Sensitivity Map. The map will identify only the general locations of known and potential archaeological resources within the 2020 LRDP planning area. For the Hill Campus, the map will indicate the areas along drainages as being areas of high potential for the presence of archaeological resources. If any project would affect a resource, then either the project will be sited to avoid the location or, in consultation with a qualified archaeologist, UC Berkeley will determine the level of archaeological investigation that is appropriate for the project site and activity, prior to any construction or demolition activities.</p>	LTS
<p>Continuing Best Practice CUL-4-a: In the event resources are determined to be present at a project site, the following actions would be implemented as appropriate to the resource and the proposed disturbance:</p>			
<p>UC Berkeley shall retain a qualified archaeologist to conduct a subsurface investigation of the project site, to ascertain the extent of the deposit of any buried archaeological materials relative to the project's area of potential effects. The archaeologist would prepare a site record and file it with the California Historical Resource Information System.</p>			
<p>If the resource extends into the project's area of potential effects, the resource would be evaluated by a qualified archaeologist. UC Berkeley as lead agency would consider this evaluation in determining whether the resource qualifies as a historical resource or a unique archaeological resource under the criteria of CEQA Guidelines section 15064.5. If the resource does not qualify, or if no resource is present within the project area of potential effects, this would be noted in the environmental document and no further mitigation is required unless there is a discovery during construction (see below).</p>			

TABLE 2-1 SUMMARY OF IMPACTS, MITIGATION MEASURES AND CONTINUING BEST PRACTICES

Impact	Significance Before Mitigation	Mitigation Measures and Continuing Best Practices	Significance With Mitigation
CULTURAL RESOURCES			
		<p>If a resource within the project area of potential effect is determined to qualify as an historical resource or a unique archaeological resource in accordance with CEQA, UC Berkeley shall consult with a qualified archaeologist to mitigate the effect through data recovery if appropriate to the resource, or to consider means of avoiding or reducing ground disturbance within the site boundaries, including minor modifications of building footprint, landscape modification, the placement of protective fill, the establishment of a preservation easement, or other means that would permit avoidance or substantial preservation in place of the resource. If further data recovery, avoidance or substantial preservation in place is not feasible, UC Berkeley shall implement LRDP Mitigation Measure CUL-5, outlined below.</p> <p>A written report of the results of investigations would be prepared by a qualified archaeologist and filed with the University Archives/ Bancroft Library and the Northwest Information Center.</p>	
		<p>LRDP Mitigation Measure CUL-4-b: If a resource is discovered during construction (whether or not an archaeologist is present), all soil disturbing work within 35 feet of the find shall cease. UC Berkeley shall contact a qualified archaeologist to provide and implement a plan for survey, subsurface investigation as needed to define the deposit, and assessment of the remainder of the site within the project area to determine whether the resource is significant and would be affected by the project, as outlined in Continuing Best Practice CUL-3-a. UC Berkeley would implement the recommendations of the archaeologist.</p>	

TABLE 2-1 SUMMARY OF IMPACTS, MITIGATION MEASURES AND CONTINUING BEST PRACTICES

Impact	Significance Before Mitigation	Mitigation Measures and Continuing Best Practices	Significance With Mitigation
CULTURAL RESOURCES			
		<p>Continuing Best Practice CUL-4-b: In the event human or suspected human remains are discovered, UC Berkeley would notify the County Coroner who would determine whether the remains are subject to his or her authority. The Coroner would notify the Native American Heritage Commission if the remains are Native American. UC Berkeley would comply with the provisions of Public Resources Code Section 5097.98 and CEQA Guidelines Section 15064.5(d) regarding identification and involvement of the Native American Most Likely Descendant and with the provisions of the California Native American Graves Protection and Repatriation Act to ensure that the remains and any associated artifacts recovered are repatriated to the appropriate group, if requested.</p>	
		<p>Continuing Best Practice CUL-4-c: Prior to disturbing the soil, contractors shall be notified that they are required to watch for potential archaeological sites and artifacts and to notify UC Berkeley if any are found. In the event of a find, UC Berkeley shall implement LRDP Mitigation Measure CUL-4-b.</p>	

TABLE 2-1 SUMMARY OF IMPACTS, MITIGATION MEASURES AND CONTINUING BEST PRACTICES

Impact	Significance Before Mitigation	Mitigation Measures and Continuing Best Practices	Significance With Mitigation
CULTURAL RESOURCES			
<p>LRDP Impact CUL-5: Under certain circumstances warranted by public benefits in furtherance of the University’s educational mission, projects developed under the 2020 LRDP could cause substantial adverse changes in the significance of archaeological resources. Under these circumstances, the University would follow the mitigation measure, but the impact would remain <i>significant and unavoidable</i>.</p>	S	<p>LRDP Mitigation Measure CUL-5: If, in furtherance of the educational mission of the University, a project would require damage to or demolition of a significant archaeological resource, a qualified archaeologist shall, in consultation with UC Berkeley:</p> <p>Prepare a research design and archaeological data recovery plan that would attempt to capture those categories of data for which the site is significant, and implement the data recovery plan prior to or during development of the site.</p> <p>Perform appropriate technical analyses, prepare a full written report and file it with the appropriate information center and provide for the permanent curation of recovered materials.</p>	SU
<p>Tien Center Impact CUL-1: The proposed Phase 1 and Phase 2 buildings have the potential to cause adverse changes in the significance of historical resources, but no such changes are anticipated.</p>	LTS	See CBPs under LRDP Impact CUL-2, above.	LTS
<p>Tien Center Impact CUL-2: Excavation and site development for the Phase I building would result in the loss of historic archaeological resources, but the best practices would reduce this impact to <i>less than significant</i>.</p>	LTS	See CPB CUL-4-a, above.	LTS

TABLE 2-1 SUMMARY OF IMPACTS, MITIGATION MEASURES AND CONTINUING BEST PRACTICES

Impact	Significance Before Mitigation	Mitigation Measures and Continuing Best Practices	Significance With Mitigation
GEOLOGY, SEISMICITY AND SOILS			
<p>LRDP Impact GEO-1: Implementation of the 2020 LRDP could expose people and/or structures to potential substantial adverse effects resulting from rupture of a known earthquake fault, strong seismic groundshaking, seismic-related ground failure and landsliding. Given continuing campus best practices, however, a significant increase in risk to people or the environment is not anticipated.</p>	LTS	<p>Continuing Best Practice GEO-1-a: UC Berkeley will continue to comply with the CBC and the <i>University Policy on Seismic Safety</i>.</p>	LTS
		<p>Continuing Best Practice GEO-1-b: Site-specific geotechnical studies will be conducted under the supervision of a California Registered Engineering Geologist or licensed geotechnical engineer and UC Berkeley will incorporate recommendations for geotechnical hazard prevention and abatement into project design.</p>	
		<p>Continuing Best Practice GEO-1-c: The Seismic Review Committee (SRC) shall continue to review all seismic and structural engineering design for new and renovated existing buildings on campus and ensure that it conforms to the California Building Code and the <i>University Policy on Seismic Safety</i>.</p>	
		<p>Continuing Best Practice GEO-1-d: UC Berkeley shall continue to use site-specific seismic ground motion specifications developed for analysis and design of campus projects. The information provides much greater detail than conventional codes and is used for performance-based analyses.</p>	
		<p>Continuing Best Practice GEO-1-e: UC Berkeley will continue to implement the SAFER Program. Through this program, UC Berkeley has already identified all existing buildings in need of upgrades and is currently performing seismic upgrades on several of these buildings.</p>	

TABLE 2-1 SUMMARY OF IMPACTS, MITIGATION MEASURES AND CONTINUING BEST PRACTICES

Impact	Significance Before Mitigation	Mitigation Measures and Continuing Best Practices	Significance With Mitigation
GEOLOGY, SEISMICITY AND SOILS			
		<p>Continuing Best Practice GEO-1-f: Through the Office of Emergency Preparedness, UC Berkeley will continue to implement programs and projects in emergency planning, training, response, and recovery. Each campus building housing Berkeley students, faculty and staff has a Building Coordinator who prepares building response plans and coordinates education and planning for all building occupants.</p>	
		<p>Continuing Best Practice GEO-1-g: As stipulated in the <i>University Policy on Seismic Safety</i>, the design parameters for specific site peak acceleration and structural reinforcement will be determined by the geotechnical and structural engineer for each new or rehabilitation project proposed under the 2020 LRDP. The acceptable level of actual damage that could be sustained by specific structures would be calculated based on geotechnical information obtained at the specific building site.</p>	
		<p>Continuing Best Practice GEO-1-h: Hill Campus dewatering would be carried out as needed and would be monitored and maintained by qualified engineers.</p>	
<p>LRDP Impact GEO-2: Implementation of the 2020 LRDP, particularly in steep areas, could result in soil erosion. Given continuing campus best practices, however, a significant increase in erosion is not anticipated.</p>	LTS	<p>Continuing Best Practice GEO-2: Campus construction projects with potential to cause erosion or sediment loss, or discharge of other pollutants, would include the campus Stormwater Pollution Prevention Specification. This specification includes by reference the “Manual of Standards for Erosion and Sediment Control” of the Association of Bay Area Governments and requires that each large and exterior project develop an Erosion Control Plan.</p>	LTS
<p>LRDP Impact GEO-3: Implementation of the 2020 LRDP would not result in a substantial loss of topsoil.</p>	LTS	<p>See CBPs and mitigation measures under LRDP Impacts GEO-1 and GEO-2 above.</p>	LTS

TABLE 2-1 SUMMARY OF IMPACTS, MITIGATION MEASURES AND CONTINUING BEST PRACTICES

Impact	Significance Before Mitigation	Mitigation Measures and Continuing Best Practices	Significance With Mitigation
GEOLOGY, SEISMICITY AND SOILS			
LRDP Impact GEO-4: Implementation of the 2020 LRDP could result in development located on a geologic unit or soil that is unstable and could potentially be subject to landslides, lateral spreading, subsidence, liquefaction or collapse. Given continuing campus best practices, however, a significant increase in risk to people or the environment is not anticipated.	LTS	See CBPs under LRDP Impacts GEO-1 and GEO-2 above.	LTS
LRDP Impact GEO-5: Implementation of the 2020 LRDP could result in development located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code, creating substantial risks to life or property. Given continuing campus best practices, however, a significant increase in risk to people or the environment is not anticipated.	LTS	See CBPs under LRDP Impacts GEO-1 and GEO-2 above.	LTS
Tien Center Impact GEO-1: The Tien Center project would not expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving strong seismic ground shaking or seismic related ground failure, including liquefaction.	LTS	See CBPs under LRDP Impacts GEO-1 and GEO-2 above.	LTS
Tien Center Impact GEO-2: The Tien Center project would not result in substantial soil erosion or the loss of topsoil.	LTS	See CBPs under LRDP Impacts GEO-1 and GEO-2 above.	LTS
Tien Center Impact GEO-3: The Tien Center project would not be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project.	LTS	See CBPs under LRDP Impacts GEO-1 and GEO-2 above.	LTS
Tien Center Impact GEO-4: The Tien Center project would not be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code.	LTS	See CBPs under LRDP Impacts GEO-1 and GEO-2 above.	LTS

TABLE 2-1 SUMMARY OF IMPACTS, MITIGATION MEASURES AND CONTINUING BEST PRACTICES

Impact	Significance Before Mitigation	Mitigation Measures and Continuing Best Practices	Significance With Mitigation
HAZARDOUS MATERIALS			
<p>LRDP Impact HAZ-1: Implementation of the 2020 LRDP would increase the routine transport, use, disposal and storage of hazardous materials and waste (including chemical, radioactive, and biohazardous materials and waste), but given continuing campus best practices, this would not increase hazards to the public or the environment.</p>	LTS	<p>Continuing Best Practice HAZ-1: UC Berkeley shall continue to implement the same (or equivalent) health and safety plans, programs, practices and procedures related to the use, storage, disposal, or transportation of hazardous materials and wastes (including chemical, radioactive, and biohazardous materials and waste) during the 2020 LRDP planning horizon. These include, but are not necessarily limited to, requirements for safe transportation of hazardous materials, EH&S training programs, the Hazard Communication Program, publication and promulgation of drain disposal guidelines, the requirement that laboratories have Chemical Hygiene Plans, the Chemical Inventory Database, the Toxic Use Reduction Program, the Aboveground Storage Tank Spill Prevention Control and Countermeasure Plan, monitoring of underground storage tanks, hazardous waste disposal policies, the Chemical Exchange Program, the Hazardous Waste Minimization Program, the Biosafety Program, the Medical Waste Management Program, and the Radiation Safety Program. These programs may be subject to modification as more stringent standards are developed or if the programs become obsolete through replacement by other programs that incorporate similar health and safety protection measures.</p>	LTS

TABLE 2-1 SUMMARY OF IMPACTS, MITIGATION MEASURES AND CONTINUING BEST PRACTICES

Impact	Significance Before Mitigation	Mitigation Measures and Continuing Best Practices	Significance With Mitigation
HAZARDOUS MATERIALS			
LRDP Impact HAZ-2: Implementation of the 2020 LRDP would increase the routine use of laboratory animals on campus by UC Berkeley laboratories, but given continuing campus best practices, this would not increase hazards to the public or the environment.	LTS	Continuing Best Practice HAZ-2: UC Berkeley shall continue to implement the same (or equivalent) programs related to laboratory animal use during the 2020 LRDP planning horizon, including, but not necessarily limited to, compliance with U.S. Public Health Service Regulations, the National Research Council Guide for the Care and Use of Laboratory Animals, and Animal Welfare Act regulations. These programs may be subject to modification as more stringent standards are developed or if the programs become obsolete through replacement by other programs that incorporate similar health and safety protection measures.	LTS
LRDP Impact HAZ-3: Implementation of the 2020 LRDP would increase the use of transgenic organisms on campus by UC Berkeley laboratories, but given continuing campus best practices, this would not increase hazards to the public or the environment.	LTS	Continuing Best Practice HAZ-3: UC Berkeley shall continue to implement the same (or equivalent) programs related to transgenic materials use during the 2020 LRDP planning horizon, including, but not necessarily limited to, compliance with the NIH Guidelines for Research Involving Recombinant DNA Molecules, USDA requirements for open field-based research involving transgenic plants, and requiring registration with EH&S for all research involving transgenic plants. These programs may be subject to modification as more stringent standards are developed or if the programs become obsolete through replacement by other programs that incorporate similar health and safety protection measures.	LTS

TABLE 2-1 SUMMARY OF IMPACTS, MITIGATION MEASURES AND CONTINUING BEST PRACTICES

Impact	Significance Before Mitigation	Mitigation Measures and Continuing Best Practices	Significance With Mitigation
HAZARDOUS MATERIALS			
LRDP Impact HAZ-4: Implementation of the 2020 LRDP could locate development on a hazardous materials site, exposing construction workers and campus occupants or the general public to contaminated soil or groundwater. Given campus continuing best practices, however, this would not increase the risks to workers, campus occupants or the general public.	LTS	Continuing Best Practice HAZ-4: UC Berkeley shall continue to perform site histories and due diligence assessments of all sites where ground-disturbing construction is proposed, to assess the potential for soil and groundwater contamination resulting from past or current site land uses at the site or in the vicinity. The investigation will include review of regulatory records, historical maps and other historical documents, and inspection of current site conditions. UC Berkeley would act to protect the health and safety of workers or others potentially exposed should hazardous site conditions be found.	LTS
LRDP Impact HAZ-5: Implementation of the 2020 LRDP could result in exposure to hazardous emissions or handling of contaminated building materials. This is a <i>less than significant</i> impact.	LTS	Continuing Best Practice HAZ-5: UC Berkeley shall continue to perform hazardous materials surveys prior to capital projects in existing campus buildings. The campus shall continue to comply with federal, state, and local regulations governing the abatement and handling of hazardous building materials and each project shall address this requirement in all construction.	LTS
LRDP Impact HAZ-6: Implementation of the 2020 LRDP would increase the handling and transportation of hazardous materials. Given continuing campus best practices, this would not increase the risk of hazardous materials release into the environment through upset and accident conditions.	LTS	See CBPs for LRDP Impacts HAZ-1 through HAZ-3, above.	LTS
LRDP Impact HAZ-7: Implementation of the 2020 LRDP could result in hazardous emissions and the handling of hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school. Given continuing campus best practices, however, such emissions or handling practices would not pose a health or safety hazard to students or employees at such schools.	LTS	See CBPs for LRDP Impact HAZ-1, above.	LTS

TABLE 2-1 SUMMARY OF IMPACTS, MITIGATION MEASURES AND CONTINUING BEST PRACTICES

Impact	Significance Before Mitigation	Mitigation Measures and Continuing Best Practices	Significance With Mitigation
HAZARDOUS MATERIALS			
LRDP Impact HAZ-8: Implementation of the 2020 LRDP could expand research uses of non-ionizing radiation sources. This is a <i>less than significant</i> impact.	LTS	None required.	LTS
HYDROLOGY AND WATER QUALITY			
LRDP Impact HYD-1: Implementation of the 2020 LRDP would not violate existing water quality standards or wastewater discharge requirements, given the provisions of the 2020 LRDP and campus best practices.	LTS	Continuing Best Practices HYD-1-a: During the plan check review process and construction phase monitoring, UC Berkeley (EH&S) will verify that the proposed project complies with all applicable requirements and BMPs. Continuing Best Practice HYD-1-b: UC Berkeley shall continue implementing an urban runoff management program containing BMPs as published in the Strawberry Creek Management Plan, and as developed through the campus municipal Stormwater Management Plan completed for its pending Phase II MS4 NPDES permit. UC Berkeley will continue to comply with the NPDES stormwater permitting requirements by implementing construction and post construction control measures and BMPs required by project-specific SWPPPs and, upon its approval, by the Phase II SWMP to control pollution. Stormwater Pollution Prevention Plans would be prepared as required by the appropriate regulatory agencies including the Regional Water Quality Control Board and where applicable, according to the UC Berkeley Stormwater Pollution Prevention Specification to prevent discharge of pollutants and to minimize sedimentation resulting from construction and the transport of soils by construction vehicles.	LTS

TABLE 2-1 SUMMARY OF IMPACTS, MITIGATION MEASURES AND CONTINUING BEST PRACTICES

Impact	Significance Before Mitigation	Mitigation Measures and Continuing Best Practices	Significance With Mitigation
HYDROLOGY AND WATER QUALITY			
		<p>Continuing Best Practice HYD-1-c: UC Berkeley shall maintain a campus-wide educational program regarding safe use and disposal of facilities maintenance chemicals and laboratory chemicals, to prevent discharge of these pollutants to Strawberry Creek and the campus storm drains.</p>	
		<p>Continuing Best Practices HYD-1-d: UC Berkeley shall continue to implement the campus Drain Disposal Policy and Drain Disposal Guidelines which provides inspection, training, and oversight on use of the drains for chemical disposal for academic and research laboratories as well as shops and physical plant operations, to prevent harm to the sanitary sewer system.</p>	
<p>LRDP Impact HYD-2: Implementation of the 2020 LRDP, including associated construction activities, would not contribute substantial sedimentation or other pollutants in stormwater runoff that could cause sedimentation in local storm drains, and degrade the quality of receiving waters, given continuing campus best practices.</p>	LTS	<p>Continuing Best Practice HYD-2-a: In addition to Hydrology Continuing Best Practices 1-a and 1-b above, UC Berkeley will continue to review each development project, to determine whether project runoff would increase pollutant loading. If it is determined that pollutant loading could lead to a violation of the Basin Plan, UC Berkeley would design and implement the necessary improvements to treat stormwater. Such improvements could include grassy swales, detention ponds, continuous centrifugal system units, catch basin oil filters, disconnected downspouts and stormwater planter boxes.</p>	LTS
		<p>Continuing Best Practice HYD-2-b: Where feasible, parking would be built in covered parking structures and not exposed to rain to address potential stormwater runoff pollutant loads. See also HYD-2-a.</p>	

TABLE 2-1 SUMMARY OF IMPACTS, MITIGATION MEASURES AND CONTINUING BEST PRACTICES

Impact	Significance Before Mitigation	Mitigation Measures and Continuing Best Practices	Significance With Mitigation
HYDROLOGY AND WATER QUALITY			
		<p>Continuing Best Practice HYD-2-c: Landscaped areas of development sites shall be designed to absorb runoff from rooftops and walkways. The Campus Landscape Architect shall ensure that open or porous paving systems be included in project designs wherever feasible, to minimize impervious surfaces and absorb runoff.</p>	
		<p>Continuing Best Practice HYD-2-d: UC Berkeley shall continue to develop and implement the recommendations of the Strawberry Creek Management Plan and its updates, and construct improvements as appropriate. These recommendations include, but shall not be limited to, minimization of the amount of land exposed at any one time during construction as feasible; use of temporary vegetation or mulch to stabilize critical areas where construction staging activities must be carried out prior to permanent cover of exposed lands; installation of permanent vegetation and erosion control structures as soon as practical; protection and retention of natural vegetation; and implementation of post-construction structural and non-structural water quality control techniques.</p>	

TABLE 2-1 SUMMARY OF IMPACTS, MITIGATION MEASURES AND CONTINUING BEST PRACTICES

Impact	Significance Before Mitigation	Mitigation Measures and Continuing Best Practices	Significance With Mitigation
HYDROLOGY AND WATER QUALITY			
LRDP Impact HYD-3: Implementation of the 2020 LRDP would not interfere with groundwater recharge or contribute to lowering of the local groundwater table, given the provisions of the 2020 LRDP and campus best practices.	LTS	Continuing Best Practice HYD-3: In addition to Hydrology Continuing Best Practices 1-a, 1-b and 2-a and 2-c above, UC Berkeley will continue to review each development project, to determine whether rainwater infiltration to groundwater is affected. If it is determined that existing infiltration rates would be adversely affected, UC Berkeley would design and implement the necessary improvements to retain and infiltrate stormwater. Such improvements could include retention basins to collect and retain runoff, grassy swales, infiltration galleries, planter boxes, permeable pavement, or other retention methods. The goal of the improvement should be to ensure that there is no net decrease in the amount of water recharged to groundwater that serves as freshwater replenishment to Strawberry Creek. The improvement should maintain the volume of flows and times of concentration from any given site at pre-development conditions.	LTS
LRDP Impact HYD-4: At all sites outside the Hill Campus, implementation of the 2020 LRDP could alter drainage patterns in the project area and increase impervious surfaces, but would not exceed the capacity of stormwater drainage systems, result in localized flooding, contribute to off-site flooding, nor result in substantial siltation or erosion, given the provisions of the 2020 LRDP and campus best practices.	LTS	Continuing Best Practice HYD-4-a: In addition to Hydrology Continuing Best Practices 1-a, 1-b and 2-c, the campus storm drain system would be maintained and cleaned to accommodate existing runoff.	LTS
		Continuing Best Practice HYD-4-b: For 2020 LRDP projects in the City Environs (excluding the Campus Park or Hill Campus) improvements would be coordinated with the City Public Works Department	

TABLE 2-1 SUMMARY OF IMPACTS, MITIGATION MEASURES AND CONTINUING BEST PRACTICES

Impact	Significance Before Mitigation	Mitigation Measures and Continuing Best Practices	Significance With Mitigation
HYDROLOGY AND WATER QUALITY			
		<p>Continuing Best Practice HYD-4-c: Development that encroaches on creek channels and riparian zones would be prohibited. Creek channels would be preserved and enhanced, especially in the Campus Park area. An undisturbed buffer zone would be maintained between proposed 2020 LRDP projects and creek channels.</p>	
		<p>Continuing Best Practice HYD-4-d: UC Berkeley shall continue to develop and implement a maintenance program for Strawberry Creek, as described in the Strawberry Creek Management Plan and its updates. Actions shall include but not be limited to: clear trash racks, catch basins, channels, ponds, bridges and over-crossing structures of debris that could block flows and increase flooding potential in all campus creeks. Cleaning of debris shall be done during storm events and prior to the start of the rainy season as part of routine campus grounds maintenance.</p>	
		<p>Continuing Best Practice HYD-4-e: UC Berkeley shall continue to manage runoff into storm drain systems such that the aggregate effect of projects implementing the 2020 LRDP is no net increase in runoff over existing conditions.</p>	
<p>LRDP Impact HYD-5: Projects implemented in the Hill Campus under the 2020 LRDP could alter drainage patterns and increase impervious surfaces, which could exceed the capacity of stormwater drainage systems, result in localized flooding, contribute to off-site flooding, and result in substantial siltation or erosion, but the mitigation would ensure this impact is <i>less than significant</i>.</p>	S	<p>LRDP Mitigation Measure HYD-5: In addition to Hydrology Continuing Best Practices 1-a, 1-b, 2-c, 4-a, 4-c and 4-e, projects proposed with potential to alter drainage patterns in the Hill Campus would be accompanied by a hydrologic modification analysis, and would incorporate a plan to prevent increases of flow from the newly developed site, preventing downstream flooding and substantial siltation and erosion.</p>	LTS

TABLE 2-1 SUMMARY OF IMPACTS, MITIGATION MEASURES AND CONTINUING BEST PRACTICES

Impact	Significance Before Mitigation	Mitigation Measures and Continuing Best Practices	Significance With Mitigation
HYDROLOGY AND WATER QUALITY			
LRDP Impact HYD-6: Implementation of the 2020 LRDP could place structures which would impede or redirect flood flows within the 100-year flood hazard area, but the mitigation would ensure this impact is <i>less than significant</i> .	S	LRDP Mitigation Measure HYD-6: In addition to implementation of LRDP Mitigation Measure HYD-5, prior to final design, UC Berkeley will review the plans for all structures to be constructed in the 100-year floodplain for compliance with FEMA requirements for nonresidential structures. This review will include a hydrologic study and recommendations to eliminate any potential impacts to the 100-year floodplain. For structures placed within the 100-year floodplain, flood control devices will be utilized in each development to direct flows toward areas where flood hazards will be minimal. These actions would ensure that the implementation of the 2020 LRDP would not impede or redirect flows in a manner that results in flooding.	LTS
Tien Center Impact HYD-1: Development of the Tien Center would not violate existing surface water quality standards or wastewater discharge requirements.	LTS	See CBPs for LRDP Impact HYD-1.	LTS
Tien Center Impact HYD-2: Development of the Tien Center could increase impervious surfaces but would not provide additional sources of polluted stormwater runoff. Also, construction activities associated with development of the Tien Center would not substantially contribute sediments or other pollutants in stormwater runoff.	LTS	See CBPs for LRDP Impact HYD-2 and HYD-4.	LTS
Tien Center Impact HYD-3: Development of the Tien Center would not interfere with groundwater recharge or contribute to lowering of the local groundwater table.	LTS	See CBPs for LRDP Impact HYD-3.	LTS
Tien Center Impact HYD-4: Development of the Tien Center could alter drainage patterns in the project area and increase impervious surfaces, but would not exceed the capacity of stormwater drainage systems and result in localized flooding, contribute to off-site flooding, nor result in substantial siltation or erosion.	LTS	See CBP for LRDP Impact HYD-4.	LTS

TABLE 2-1 SUMMARY OF IMPACTS, MITIGATION MEASURES AND CONTINUING BEST PRACTICES

Impact	Significance Before Mitigation	Mitigation Measures and Continuing Best Practices	Significance With Mitigation
HYDROLOGY AND WATER QUALITY			
Tien Center Impact HYD-5: The Tien Center would not be constructed in a FEMA-designated flood zone.	LTS	None required.	LTS
LAND USE			
LRDP Impact LU-1: The 2020 LRDP would not conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project, adopted for the purpose of avoiding or mitigating an environmental effect.	LTS	None required.	LTS
LRDP Impact LU-2: The 2020 LRDP would not conflict with local land use regulations such that a significant incompatibility is created with adjacent land uses.	LTS	Continuing Best Practice LU-2-a: New projects in the Campus Park would as a general rule conform to the Campus Park Guidelines. The Guidelines include specific provisions to ensure projects at the city interface create a graceful transition from campus to city. Continuing Best Practice LU-2-b: UC Berkeley would make informational presentations of all major projects in the City Environs in Berkeley to the Berkeley Planning Commission and, if relevant, the Berkeley Landmarks Commission for comment prior to schematic design review by the UC Berkeley Design Review Committee. Major projects in the City Environs in Oakland would similarly be presented to the Oakland Planning Commission and, if relevant, to the Oakland Landmarks Preservation Advisory Board.	LTS

TABLE 2-1 SUMMARY OF IMPACTS, MITIGATION MEASURES AND CONTINUING BEST PRACTICES

Impact	Significance Before Mitigation	Mitigation Measures and Continuing Best Practices	Significance With Mitigation
LAND USE			
		<p>Continuing Best Practice LU-2-c: Each individual project built in the City Environs under the 2020 LRDP would be assessed to determine whether it could pose potential significant land use impacts not anticipated in the 2020 LRDP, and if so, the project would be subject to further evaluation under CEQA. In general, a project in the City Environs would be assumed to have the potential for significant land use impacts if it:</p> <ul style="list-style-type: none"> ▪ Includes a use that is not permitted within the city general plan designation for the project site, or ▪ Has a greater number of stories and/or lesser setback dimensions than could be permitted for a project under the relevant city zoning ordinance as of July 2003. 	
		<p>Continuing Best Practice LU-2-d: Assuming no further substantive changes are made by the city prior to adoption, the University would as a general rule use the design guidelines and standards prescribed in the Southside Plan as its guide for the location and design of projects implemented under the 2020 LRDP within the geographic area of the Southside Plan.</p>	
		<p>Continuing Best Practice LU-2-e: To the extent feasible, University housing projects in the 2020 LRDP Housing Zone would not have a greater number of stories nor lesser setback dimensions than could be permitted for a project under the relevant city zoning ordinance as of July 2003.</p>	

TABLE 2-1 SUMMARY OF IMPACTS, MITIGATION MEASURES AND CONTINUING BEST PRACTICES

Impact	Significance Before Mitigation	Mitigation Measures and Continuing Best Practices	Significance With Mitigation
LAND USE			
Tien Center Impact LU-1: As a project implementing the 2020 LRDP, the Tien Center would not conflict with any applicable land use plan, policy or regulation of an agency with jurisdiction over the project, adopted for the purpose of avoiding or mitigating an environmental effect.	LTS	None required.	LTS
Tien Center Impact LU-2: As a project implementing the 2020 LRDP, the Tien Center would not conflict with local land use regulations such that a significant incompatibility is created with adjacent land uses.	LTS	None required.	LTS
NOISE			
LRDP Impact NOI-1: Implementation of the 2020 LRDP would increase vehicular traffic in the 2020 LRDP planning area, but would not result in a substantial permanent increase in ambient noise levels due to increased vehicular traffic on local roadways.	LTS	None required.	LTS
LRDP Impact NOI-2: Projects implementing the 2020 LRDP would not result in operational noise levels in excess of local standards.	LTS	Continuing Best Practice NOI-2: Mechanical equipment selection and building design shielding would be used, as appropriate, so that noise levels from future building operations would not exceed the City of Berkeley Noise Ordinance limits for commercial areas or residential zones as measured on any commercial or residential property in the area surrounding a project proposed to implement the 2020 LRDP. Controls that would typically be incorporated to attain this outcome include selection of quiet equipment, sound attenuators on fans, sound attenuator packages for cooling towers and emergency generators, acoustical screen walls, and equipment enclosures.	LTS

TABLE 2-1 SUMMARY OF IMPACTS, MITIGATION MEASURES AND CONTINUING BEST PRACTICES

Impact	Significance Before Mitigation	Mitigation Measures and Continuing Best Practices	Significance With Mitigation
NOISE			
<p>LRDP Impact NOI-3: University housing developed under the 2020 LRDP could expose residents to excessive noise levels. This impact is <i>significant and unavoidable</i>.</p>	S	<p>LRDP Mitigation Measure NOI-3: The University would comply with building standards that reduce noise impacts to residents of University housing to the full feasible extent; additionally, any housing built in areas where noise exposure levels exceed 60 L_{dn} would incorporate design features to minimize noise exposures to occupants.</p>	SU
<p>LRDP Impact NOI-4: Noise resulting from demolition and construction activities necessary for implementation of the 2020 LRDP would, in some instances, cause a substantial temporary or periodic increase in noise levels, in excess of local standards prescribed in Section 13.40.070 of the City of Berkeley noise ordinance, at affected residential or commercial property lines. This is a <i>significant and unavoidable</i> impact.</p>	S	<p>Continuing Best Practice NOI-4-a: The following measures would be included in all construction projects:</p> <ul style="list-style-type: none"> ▪ Construction activities will be limited to a schedule that minimizes disruption to uses surrounding the project site as much as possible. Construction outside the Campus Park area will be scheduled within the allowable construction hours designated in the noise ordinance of the local jurisdiction to the full feasible extent, and exceptions will be avoided except where necessary. ▪ As feasible, construction equipment will be required to be muffled or controlled. ▪ The intensity of potential noise sources will be reduced where feasible by selection of quieter equipment (e.g. gas or electric equipment instead of diesel powered, low noise air compressors). ▪ Functions such as concrete mixing and equipment repair will be performed off-site whenever possible. <p>For projects requiring pile driving:</p> <ul style="list-style-type: none"> ▪ With approval of the project structural engineer, pile holes will be pre-drilled to minimize the number of impacts necessary to seat the pile. ▪ Pile driving will be scheduled to have the least impact on nearby sensitive receptors. 	SU

TABLE 2-1 SUMMARY OF IMPACTS, MITIGATION MEASURES AND CONTINUING BEST PRACTICES

Impact	Significance Before Mitigation	Mitigation Measures and Continuing Best Practices	Significance With Mitigation
NOISE			
		<ul style="list-style-type: none"> ▪ Pile drivers with the best available noise control technology will be used. For example, pile driving noise control may be achieved by shrouding the pile hammer point of impact, by placing resilient padding directly on top of the pile cap, and/or by reducing exhaust noise with a sound-absorbing muffler. ▪ Alternatives to impact hammers, such as oscillating or rotating pile installation systems, will be used where possible. 	
		<p>Continuing Best Practice NOI-4-b: UC Berkeley will continue to precede all new construction projects with community outreach and notification, with the purpose of ensuring that the mutual needs of the particular construction project and of those impacted by construction noise are met, to the extent feasible.</p>	
		<p>LRDP Mitigation Measure NOI-4: UC Berkeley will develop a comprehensive construction noise control specification to implement additional noise controls, such as noise attenuation barriers, siting of construction laydown and vehicle staging areas, and the measures outlined in Continuing Best Practice NOI-4-a as appropriate to specific projects. The specification will include such information as general provisions, definitions, submittal requirements, construction limitations, requirements for noise and vibration monitoring and control plans, noise control materials and methods. This document will be modified as appropriate for a particular construction project and included within the construction specification.</p>	

TABLE 2-1 SUMMARY OF IMPACTS, MITIGATION MEASURES AND CONTINUING BEST PRACTICES

Impact	Significance Before Mitigation	Mitigation Measures and Continuing Best Practices	Significance With Mitigation
NOISE			
<p>LRDP Impact NOI-5: Construction of campus facilities under the 2020 LRDP could expose nearby receptors to excessive groundborne vibration, but the mitigation measures would ensure this impact is <i>less than significant</i>.</p>	S	<p>LRDP Mitigation Measure NOI-5: The following measures will be implemented to mitigate construction vibration:</p> <ul style="list-style-type: none"> ▪ UC Berkeley will conduct a pre-construction survey prior to the start of pile driving. The survey will address susceptibility ratings of structures, proximity of sensitive receivers and equipment/operations, and surrounding soil conditions. This survey will document existing conditions as a baseline for determining changes subsequent to pile driving. ▪ UC Berkeley will establish a vibration checklist for determining whether or not vibration is an issue for a particular project. ▪ Prior to conducting vibration-causing construction, UC Berkeley will evaluate whether alternative methods are available, such as: ▪ Using an alternative to impact pile driving such as vibratory pile drivers or oscillating or rotating pile installation methods. ▪ Jetting or partial jetting of piles into place using a water injection at the tip of the pile. ▪ If vibration monitoring is deemed necessary, the number, type, and location of vibration sensors would be determined by UC Berkeley. 	LTS
<p>Tien Center Impact NOI-1: Operation of the Tien Center would not generate a substantial permanent increase in ambient noise levels in the project vicinity.</p>	LTS	See CBP for LRDP Impact NOI-2, above.	LTS
<p>Tien Center Impact NOI-2: Noise levels generated by construction of the Tien Center would not exceed locally established noise standards, nor generate excessive ground-borne vibration or ground-borne noise levels.</p>	LTS	See CBPs and mitigation measures for LRDP Impact NOI-4 and NOI-5, above.	LTS

TABLE 2-1 SUMMARY OF IMPACTS, MITIGATION MEASURES AND CONTINUING BEST PRACTICES

Impact	Significance Before Mitigation	Mitigation Measures and Continuing Best Practices	Significance With Mitigation
POPULATION AND HOUSING			
LRDP Impact POP-1: Implementation of the 2020 LRDP would directly induce population growth in the Bay Region by increasing both enrollment and employment at UC Berkeley, but this growth would in general be accommodated in the Bay Region without significant adverse impacts.	LTS	None required.	LTS
PUBLIC SERVICES			
LRDP Impact PUB-1.1: Implementation of the 2020 LRDP could increase the demand for police services, but is not anticipated to result in construction of new or altered facilities.	LTS	Continuing Best Practice PUB-1.1: UCPD would continue its partnership with the City of Berkeley police department to review service levels in the City Environs.	LTS
LRDP Impact PUB-2.1: Implementation of the 2020 LRDP would result in limited new development in the Hill Campus, but would not expose people or structures in the Hill Campus to a significant risk of loss, injury or death involving wildland fires.	LTS	Continuing Best Practice PUB-2.1-a: UC Berkeley would continue to comply with Title 19 of the California Code of Regulations, which mandates firebreaks of up to 100 feet around buildings or structures in, upon or adjoining any mountainous, forested, brush- or grass-covered lands. Continuing Best Practice PUB-2.1-b: UC Berkeley would continue on-going implementation of the Hill Area Fire Fuel Management program. Continuing Best Practice PUB-2.1-c: UC Berkeley would continue to plan and implement programs to reduce risk of wildland fires, including plan review and construction inspection programs that ensure that campus projects incorporate fire prevention measures.	LTS
LRDP Impact PUB-2.2: Implementation of the 2020 LRDP would not impair or interfere with an adopted emergency response plan or emergency evacuation plan.	LTS	None required.	LTS

TABLE 2-1 SUMMARY OF IMPACTS, MITIGATION MEASURES AND CONTINUING BEST PRACTICES

Impact	Significance Before Mitigation	Mitigation Measures and Continuing Best Practices	Significance With Mitigation
PUBLIC SERVICES			
LRDP Impact PUB-2.3: Implementation of the 2020 LRDP could increase the demand for fire and emergency services, but is not anticipated to result in construction of new or altered facilities.	LTS	Continuing Best Practice PUB-2.3: UC Berkeley would continue its partnership with LBNL, ACFD, and the City of Berkeley to ensure adequate fire and emergency service levels to the campus and UC facilities.	LTS
LRDP Impact PUB-2.4: Implementation of the 2020 LRDP could temporarily result in emergency access constraints, but the mitigations would reduce this impact to a <i>less than significant</i> level.	S	LRDP Mitigation Measure PUB-2.4-a: In order to ensure adequate access for emergency vehicles when construction projects would result in temporary lane or roadway closures, campus project management staff would consult with the UCPD, campus EH&S, the BFD and ACFD to evaluate alternative travel routes and temporary lane or roadway closures prior to the start of construction activity. UC Berkeley will ensure the selected alternative travel routes are not impeded by UC Berkeley activities. LRDP Mitigation Measure PUB-2.4-b: To the extent feasible, the University would maintain at least one unobstructed lane in both directions on campus roadways at all times, including during construction. At any time only a single lane is available due to construction-related road closures, the University would provide a temporary traffic signal, signal carriers (i.e. flagpersons), or other appropriate traffic controls to allow travel in both directions. If construction activities require the complete closure of a roadway, UC Berkeley would provide signage indicating alternative routes. Continuing Best Practice PUB-2.4: To the extent feasible, for all projects in the City Environs, the University would include the undergrounding of surface utilities along project street frontages, in support of Berkeley General Plan Policy S-22.	LTS

TABLE 2-1 SUMMARY OF IMPACTS, MITIGATION MEASURES AND CONTINUING BEST PRACTICES

Impact	Significance Before Mitigation	Mitigation Measures and Continuing Best Practices	Significance With Mitigation
PUBLIC SERVICES			
Tien Center Impact PUB-2.1: As a project implementing the 2020 LRDP, the Tien Center project would not result in the need for new or physically altered fire or emergency medical services facilities.	LTS	See CBP under LRDP Impact PUB-2.3.	LTS
Tien Center Impact PUB-2.2: As a project implementing the 2020 LRDP, the Tien Center project would not impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan.	LTS	See LRDP Impact PUB-2.2.	LTS
Tien Center Impact PUB-2.3: As a project implementing the 2020 LRDP, the Tien Center project would not result in inadequate emergency access.	LTS	See CBP and mitigation measures under LRDP Impact PUB-2.4.	LTS
LRDP Impact PUB-3.1: Implementation of the 2020 LRDP could increase the demand for schools, but is not anticipated to create a need for new or altered facilities.	LTS	None required.	LTS
LRDP Impact PUB-4.1: Implementation of the 2020 LRDP would increase the campus population, but would not increase demand for recreation facilities to an extent that could result in substantial physical deterioration of parks and recreational facilities or the need for new or expanded facilities to maintain acceptable service ratios.	LTS	None required.	LTS
LRDP Impact PUB-4.2: Implementation of the 2020 LRDP is not anticipated to create a need for new or altered parks and recreational facilities.	LTS	None required.	LTS

TABLE 2-1 SUMMARY OF IMPACTS, MITIGATION MEASURES AND CONTINUING BEST PRACTICES

Impact	Significance Before Mitigation	Mitigation Measures and Continuing Best Practices	Significance With Mitigation
PUBLIC SERVICES			
LRDP Impact PUB-4.3: Implementation of the 2020 LRDP could include construction or expansion of recreational facilities, but continuing best practices would ensure this impact is <i>less than significant</i> .	LTS	Continuing Best Practice PUB-4.3: Any new UC Berkeley recreation facilities would be developed in accordance with design principles and guidelines established in the 2020 LRDP. All relevant 2020 LRDP mitigation measures and continuing best practices would be incorporated into the design and construction of new facilities. For each individual project, the University would evaluate potential environmental impacts and prepare all required documents in full accordance with CEQA.	LTS
LRDP Impact PUB-4.4: Implementation of the 2020 LRDP could result in the unanticipated loss of some University owned recreational facilities, which could result in increased use leading to the physical deterioration of remaining facilities, but the mitigation measure would reduce this impact to <i>less than significant</i> .	S	LRDP Mitigation Measure PUB-4.4: Before implementing any change to the use of any existing recreational facility, UC Berkeley will conduct a study to ensure that the loss of recreational use would not result in increased use at other facilities to the extent it would result in the physical deterioration of those facilities. If such deterioration is found to have the potential to occur, then the University will build replacement recreation facilities or take other measures to minimize overuse and deterioration of existing facilities in connection with removal of or reduction in use at the recreation facility in question.	LTS
TRANSPORTATION AND TRAFFIC			
LRDP Impact TRA-1: The 2020 LRDP would not increase hazards to bicyclists due to design features or incompatible uses, nor create unsafe conditions for bicyclists.	LTS	Continuing Best Practice TRA-1-a: UC Berkeley will continue in partnership with the City of Berkeley to develop a City program to: (a) maintain the Southside area between College, Dana, Dwight and Bancroft in a clean and safe condition; and (b) provide needed public improvements to the area (e.g. traffic improvements, lighting, bicycle facilities, pedestrian amenities and landscaping).	LTS

TABLE 2-1 SUMMARY OF IMPACTS, MITIGATION MEASURES AND CONTINUING BEST PRACTICES

Impact	Significance Before Mitigation	Mitigation Measures and Continuing Best Practices	Significance With Mitigation
TRANSPORTATION AND TRAFFIC			
LRDP Impact TRA-2: University housing development in the 2020 LRDP Housing Zone could increase residential density, but given the provisions of the 2020 LRDP and continuing best practices, is not anticipated to result in inadequate parking capacity.	LTS	<p>Continuing Best Practice TRA-1-b: UC Berkeley will continue to do strategic bicycle access planning. Issues addressed include bicycle access, circulation and amenities with the goal of increasing bicycle commuting and safety. Planning considers issues such as bicycle access to the campus from adjacent streets and public transit; bicycle, vehicle, and pedestrian interaction; bicycle parking; bicycle safety; incentive programs; education and enforcement; campus bicycle routes; and amenities such as showers.</p> <p>Continuing Best Practice TRA-2: The following housing and transportation policies will be continued:</p> <ul style="list-style-type: none"> ▪ Except for disabled students, students living in UC Berkeley housing would only be eligible for a daytime student fee lot permit or residence hall parking based upon demonstrated need, which could include medical, employment, academic and other criteria. ▪ An educational and informational program for students on commute alternatives would be expanded to include all new housing sites. 	LTS
		<p>LRDP Mitigation Measure TRA-2: The planned parking supply for University housing projects under the 2020 LRDP would comply with the relevant municipal zoning ordinance as of July 2003. Where the planned parking supply included in a University housing project would make it ineligible for approval under the subject ordinance, UC Berkeley would conduct further review of parking demand and supply in accordance with CEQA.</p>	

TABLE 2-1 SUMMARY OF IMPACTS, MITIGATION MEASURES AND CONTINUING BEST PRACTICES

Impact	Significance Before Mitigation	Mitigation Measures and Continuing Best Practices	Significance With Mitigation
TRANSPORTATION AND TRAFFIC			
<p>LRDP Impact TRA-3: Construction-related activity under the 2020 LRDP would not substantially increase traffic loads or substantially decrease roadway capacity over current conditions. The best practices would continue to be implemented.</p>	LTS	<p>Continuing Best Practice TRA-3-a: Early in construction period planning UC Berkeley shall meet with the contractor for each construction project to describe and establish best practices for reducing construction-period impacts on circulation and parking in the vicinity of the project site.</p>	LTS
		<p>Continuing Best Practice TRA-3-b: For each construction project, UC Berkeley will require the prime contractor to prepare a Construction Traffic Management Plan which will include the following elements:</p> <ul style="list-style-type: none"> ▪ Proposed truck routes to be used, consistent with the City truck route map. ▪ Construction hours, including limits on the number of truck trips during the a.m. and p.m. peak traffic periods (7:00 – 9:00 a.m. and 4:00 – 6:00 p.m.), if conditions demonstrate the need. ▪ Proposed employee parking plan (number of spaces and planned locations). ▪ Proposed construction equipment and materials staging areas, demonstrating minimal conflicts with circulation patterns. ▪ Expected traffic detours needed, planned duration of each, and traffic control plans for each. 	
		<p>Continuing Best Practice TRA-3-c: UC Berkeley will manage project schedules to minimize the overlap of excavation or other heavy truck activity periods that have the potential to combine impacts on traffic loads and street system capacity, to the extent feasible.</p>	

TABLE 2-1 SUMMARY OF IMPACTS, MITIGATION MEASURES AND CONTINUING BEST PRACTICES

Impact	Significance Before Mitigation	Mitigation Measures and Continuing Best Practices	Significance With Mitigation
TRANSPORTATION AND TRAFFIC			
		Continuing Best Practice TRA-3-d: UC Berkeley will reimburse the City of Berkeley for its fair share of costs associated with damage to City streets from University construction activities, provided that the City adopts a policy for such reimbursements applicable to all development projects within Berkeley.	
LRDP Impact TRA-4: Construction-related parking demand associated with implementation of the 2020 LRDP would not be anticipated to exceed baseline levels.	LTS	None required.	LTS
LRDP Impact TRA-5: The 2020 LRDP is expected to generate new transit demand, or alter locations where local transit demand occurs. Given the provisions of the 2020 LRDP and campus best practices, however, significant service problems are not anticipated.	LTS	Continuing Best Practice TRA-5: The University shall continue to work to coordinate local transit services as new academic buildings, parking facilities, and campus housing are completed, in order to accommodate changing demand locations or added demand.	LTS
LRDP Impact TRA-6: The 2020 LRDP would increase vehicle trips and traffic congestion at the intersections listed below, leading to substantial degradation in level of service. The mitigations, if implemented with review and approval of the City Traffic Engineer, would reduce these impacts to a <i>less than significant</i> level.			
LRDP Impact TRA-6-a: The signalized Cedar Street/Oxford Street intersection, which would operate at LOS E during the AM peak hour regardless of the project, and degrade from LOS D to LOS E during the PM peak hour. The project would increase the intersection volume by 7 percent during the AM peak hour, and 7 percent during the PM peak hour.	S	LRDP Mitigation Measure TRA-6-a: The University will work with the City of Berkeley to redesign and, on a fair share basis, implement changes to either the westbound or northbound approach of the Cedar Street / Oxford Street intersection to provide a left-turn lane and a through lane. The University will contribute fair share funding for a periodic (annual or biennial) traffic count to allow the City to determine when an intersection redesign is needed. With the implementation of this mitigation measure, the intersection will operate at LOS B during the AM peak hour and LOS D during the PM peak hour.	LTS

TABLE 2-1 SUMMARY OF IMPACTS, MITIGATION MEASURES AND CONTINUING BEST PRACTICES

Impact	Significance Before Mitigation	Mitigation Measures and Continuing Best Practices	Significance With Mitigation
TRANSPORTATION AND TRAFFIC			
<p>LRDP Impact TRA-6-b: The all-way stop-controlled Durant Avenue/Piedmont Avenue intersection, which would degrade from LOS D to LOS F during the AM peak hour. The project would increase the intersection volume by 10 percent during the AM peak hour.</p>	S	<p>LRDP Mitigation Measure TRA-6-b: The University will work with the City of Berkeley to design and, on a fair share basis, install a signal at the Durant Avenue /Piedmont Avenue intersection, when a signal warrant analysis shows the signal is needed. The University will contribute fair share funding for a periodic (annual or biennial) signal warrant check at this and other impact intersections, to allow the City to determine when a signal is warranted. With the implementation of this mitigation measure, the intersection will operate at LOS B during both AM and PM peak hours.</p>	LTS
<p>LRDP Impact TRA-6-c: The all-way stop-controlled Derby Street/Warring Street intersection, which operates at LOS F during both AM and PM peak hours regardless of the project. The project would increase the intersection volume by 7 percent during the AM peak hour, and 6 percent during the PM peak hour.</p>	S	<p>LRDP Mitigation Measure TRA-6-c: The University will work with the City of Berkeley to design and, on a fair share basis, install a signal at the Derby Street/Warring Street intersection, and provide an exclusive right-turn lane and an exclusive through lane on the westbound approach. The University will contribute fair share funding for a periodic (annual or biennial) signal warrant check at this and other impact intersections, to allow the City to determine when a signal and the associated capacity improvements are warranted. With the implementation of this mitigation measure, the intersection will operate at LOS A during the AM peak hour and LOS C during the PM peak hours.</p>	LTS

TABLE 2-1 SUMMARY OF IMPACTS, MITIGATION MEASURES AND CONTINUING BEST PRACTICES

Impact	Significance Before Mitigation	Mitigation Measures and Continuing Best Practices	Significance With Mitigation
TRANSPORTATION AND TRAFFIC			
<p>LRDP Impact TRA-6-d: The eastbound approach of the side-street stop-controlled Addison Street/Oxford Street intersection from LOS A to LOS E during the AM peak hour and LOS C to LOS E during the PM peak hour. The project would increase the intersection volume by 12 percent during the AM peak hour, and 10 percent during the PM peak hour.</p>	S	<p>LRDP Mitigation Measure TRA-6-d: The University will work with the City of Berkeley to design and, on a fair share basis, install a signal at the Addison Street/Oxford Street intersection, and provide the necessary provisions for coordination with adjacent signals along Oxford Street. The University will contribute fair share funding for a periodic (annual or biennial) signal warrant check at this and other impact intersections, to allow the City to determine when a signal and the associated coordination improvements are warranted. With the implementation of this mitigation measure, the intersection will operate at LOS A during both AM and PM peak hours.</p>	LTS
<p>LRDP Impact TRA-6-e: The eastbound approach of the side-street stop-controlled Allston Way/Oxford Street intersection would degrade from LOS D to LOS E during the AM peak hour. The intersection would continue to operate at LOS E during the PM peak hour. The project would increase the intersection volume by 11 percent during the AM peak hour, and 8 percent during the PM peak hour.</p>	S	<p>LRDP Mitigation Measure TRA-6-e: The University will work with the City of Berkeley to design and, on a fair share basis, install a signal at Allston Way/Oxford Street intersection, and provide the necessary provisions for coordination with adjacent signals along Oxford Street. The University will contribute fair share funding for a periodic (annual or biennial) signal warrant check at this and other impact intersections, to allow the City to determine when a signal and the associated coordination improvements are warranted. With the implementation of this mitigation measure, the intersection will operate at LOS A during both AM and PM peak hours.</p>	LTS

TABLE 2-1 SUMMARY OF IMPACTS, MITIGATION MEASURES AND CONTINUING BEST PRACTICES

Impact	Significance Before Mitigation	Mitigation Measures and Continuing Best Practices	Significance With Mitigation
TRANSPORTATION AND TRAFFIC			
<p>LRDP Impact TRA-6-f: The eastbound approach of the side-street stop-controlled Kittredge Street/Oxford Street intersection from LOS C to LOS F during the AM peak hour. The intersection would continue to operate at LOS F during the PM peak hour. The project would increase the intersection volume by 14 percent during the AM peak hour, and 10 percent during the PM peak hour.</p>	S	<p>LRDP Mitigation Measure TRA-6-f: The University will work with the City of Berkeley to design and, on a fair share basis, install a signal at the Kittredge Street/Oxford Street intersection, and provide the necessary provisions for coordination with adjacent signals along Oxford Street. The University will contribute fair share funding for a periodic (annual or biennial) signal warrant check at this and other impact intersections, to allow the City to determine when a signal and the associated coordination improvements are warranted. With the implementation of this mitigation measure, the intersection will operate at LOS A during both AM and PM peak hours.</p>	LTS
<p>LRDP Impact TRA-6-g: The northbound approach of the side-street stop-controlled Bancroft Way/Ellsworth Street intersection would degrade from LOS D to LOS E during the PM peak hour. The project would increase the intersection volume by 19 percent during the AM peak hour, and 10 percent during the PM peak hour.</p>	S	<p>LRDP Mitigation Measure TRA-6-g: The University will work with the City of Berkeley to design and, on a fair share basis, install a signal at the Bancroft Way/Ellsworth Street intersection, and provide the necessary provisions for coordination with adjacent signals along Bancroft Way. The University will contribute fair share funding for a periodic (annual or biennial) signal warrant check at this and other impact intersections, to allow the City to determine when a signal and the associated coordination improvements are warranted. With the implementation of this mitigation measure, the intersection will operate at LOS B during both AM and PM peak hours.</p>	LTS

TABLE 2-1 SUMMARY OF IMPACTS, MITIGATION MEASURES AND CONTINUING BEST PRACTICES

Impact	Significance Before Mitigation	Mitigation Measures and Continuing Best Practices	Significance With Mitigation
TRANSPORTATION AND TRAFFIC			
<p>LRDP Impact TRA-7: Development under the 2020 LRDP would contribute to the projected unacceptable delay at the all-way stop-controlled Bancroft Way/Piedmont Avenue intersection, which is projected to operate at LOS F during both AM and PM peak hours regardless of the project. The project would increase the intersection volume by 11 percent during the AM peak hour, and 5 percent during the PM peak hour. The mitigation would, if implemented with review and approval of the City Traffic Engineer, reduce this impact to a <i>less than significant</i> level.</p>	S	<p>LRDP Mitigation Measure TRA-7: The University will work with the City of Berkeley to design and, on a fair share basis, install a signal at the Bancroft Way/Piedmont Avenue intersection, and provide an exclusive left-turn lane and an exclusive through lane on the northbound approach. The University will contribute fair share funding for a periodic (annual or biennial) signal warrant check at this and other impact intersections, to allow the City to determine when a signal and the associated capacity improvements are warranted. With the implementation of this mitigation measure, the intersection would operate at LOS B during both AM and PM peak hours.</p>	LTS
<p>LRDP Impact TRA-8: The 2020 LRDP would increase vehicle trips and traffic congestion at the intersections listed below, leading to substantial degradation in level of service. These impacts are <i>significant and unavoidable</i>.</p> <ul style="list-style-type: none"> ▪ The signalized University Avenue / Sixth Street intersection, which is projected to operate at LOS F during both AM and PM peak hours regardless of the project. The project would increase the intersection volume by 7 percent during the AM peak hour, and 6 percent during the PM peak hour. ▪ The signalized University Avenue / San Pablo Avenue intersection, which is projected to operate at LOS F during both AM and PM peak hours regardless of the project. The project would increase the intersection volume by 8 percent during the AM peak hour, and 6 percent during the PM peak hour. 	S	<p>Magnitude of impact reduced through trip reduction measures. No feasible design measures.</p>	SU

TABLE 2-1 SUMMARY OF IMPACTS, MITIGATION MEASURES AND CONTINUING BEST PRACTICES

Impact	Significance Before Mitigation	Mitigation Measures and Continuing Best Practices	Significance With Mitigation
TRANSPORTATION AND TRAFFIC			
LRDP Impact TRA-9: Housing projects in the 2020 LRDP Housing Zone could increase vehicle trips and traffic congestion in the vicinity of project sites, which could lead to substantial degradation in level of service. The mitigation would reduce this impact to a <i>less than significant level</i> .	S	LRDP Mitigation Measure TRA-9: Prior to approving any development outside the City Environs, the University will conduct a traffic study to assess the localized traffic impacts of this development. Mitigations required to ensure that the housing project does not cause LOS deterioration exceeding the stated impact levels would be implemented, if necessary.	LTS
LRDP Impact TRA-10: Development under the 2020 LRDP would cause the following Alameda County CMP Designated System and MTS roadways listed below to exceed the level of service standard established by the CMA. This impact is <i>significant and unavoidable</i> . <ul style="list-style-type: none"> ▪ Ashby Avenue westbound, between Adeline Street and San Pablo Avenue ▪ Ashby Avenue eastbound, Between College Avenue and Domingo Street ▪ University Avenue westbound, between MLK Jr. Way and I-80 ▪ San Pablo Avenue northbound, between Gilman Street and Marin Avenue ▪ Shattuck Avenue southbound, between Dwight Way and Adeline Street ▪ Shattuck Avenue southbound, between Hearst Avenue and University Avenue (MTS only) ▪ Dwight Way westbound, between MLK Jr. Way and Sixth Street (MTS only) 	S	Magnitude of impact reduced through trip reduction measures. No feasible design measures.	SU
LRDP Impact TRA-11: Implementation of the 2020 LRDP could induce a “mode shift” to driving by some commuters who currently take transit, bicycle or walk. This would be inconsistent with the intent of the 2020 LRDP. The mitigation would reduce this impact to a <i>less than significant level</i> .	S	LRDP Mitigation Measure TRA-11: The University will implement the following measures to limit the shift to driving by existing and potential future non-auto commuters: <ul style="list-style-type: none"> ▪ Review the number of sold parking permits in relation to the number of campus parking spaces and demographic trends on a yearly basis, and establish limits on the total number of parking permits sold proportionate to the number of spaces, with the objective of reducing the ratio of permits to spaces over time as the number of spaces grows, thus ensuring that new supply improves 	LTS

TABLE 2-1 SUMMARY OF IMPACTS, MITIGATION MEASURES AND CONTINUING BEST PRACTICES

Impact	Significance Before Mitigation	Mitigation Measures and Continuing Best Practices	Significance With Mitigation
TRANSPORTATION AND TRAFFIC			
<p>LRDP Impact TRA-12: The level of pedestrian growth associated with the LRDP may require physical and operational modifications to the intersections and roadways in the immediate campus vicinity and on major pedestrian routes serving UC Berkeley, to ensure adequate capacity for pedestrian movement and adequate design to protect pedestrian safety. The mitigation would reduce this impact to a <i>less than significant</i> level.</p>	S	<p>the existing space-to-permit ratio without encouraging mode change to single occupant vehicles.</p> <ul style="list-style-type: none"> ▪ As new parking becomes operational, assign a portion of the new or existing parking supply to short-term or visitor parking, thus targeting parkers who choose on-street parking now, and also effectively reserving part of the added supply for non-commuters. ▪ Expand the quantity of parking that is available only after 10:00 a.m., to avoid affecting the travel mode use patterns of the peak hour commuting population, as new parking inventory is added to the system. ▪ Review and consider reductions in attended parking as new parking inventory is added to the system and other impacts do not reduce parking supply. 	LTS
<p>Tien Center Impact TRA-1: The construction of the Tien Center would not substantially increase traffic loads or substantially decrease street system capacity over current conditions.</p>	LTS	None required.	LTS

TABLE 2-1 SUMMARY OF IMPACTS, MITIGATION MEASURES AND CONTINUING BEST PRACTICES

Impact	Significance Before Mitigation	Mitigation Measures and Continuing Best Practices	Significance With Mitigation
TRANSPORTATION AND TRAFFIC			
Tien Center Impact TRA-2: The Tien Center would not adversely impact local pedestrian and bicycle circulation.	LTS	None required.	LTS
UTILITIES AND SERVICE SYSTEMS			
LRDP Impact USS-1.1: Implementation of the 2020 LRDP would increase water demand, but this increase is not anticipated to result in a significant impact on water entitlements and resources, nor result in construction of new or altered facilities.	LTS	Continuing Best Practice USS-1.1: For campus development that increases water demand, UC Berkeley would continue to evaluate the size of existing distribution lines as well as pressure of the specific feed affected by development on a project-by-project basis, and necessary improvements would be incorporated into the scope of work for each project to maintain current service and performance levels. The design of the water distribution system, including fire flow, for new buildings would be coordinated among UC Berkeley staff, EBMUD, and the Berkeley Fire Department.	LTS
LRDP Impact USS-2.1-a: Implementation of the 2020 LRDP may result in increased demand for wastewater treatment, but this increase is not anticipated to result in a significant impact on treatment capacity, nor result in construction of new or altered facilities.	LTS	Continuing Best Practice USS-2.1-a: UC Berkeley will promote and expand the central energy management system (EMS), to tie building water meters into the system for flow monitoring.	LTS
LRDP Impact USS-2.1-b: Implementation of the 2020 LRDP may result in increased demand on wastewater collection systems and the construction of new or altered facilities, but these are not anticipated to have significant environmental impacts.		Continuing Best Practice USS-2.1-b: UC Berkeley will analyze water and sewer systems on a project-by-project basis to determine specific capacity considerations in the planning of any project proposed under the 2020 LRDP.	
		Continuing Best Practice USS-2.1-c: UC Berkeley will continue and expand programs retrofitting plumbing in high-occupancy buildings, and seek funding for these programs from EBMUD or other outside agencies as appropriate.	

TABLE 2-1 SUMMARY OF IMPACTS, MITIGATION MEASURES AND CONTINUING BEST PRACTICES

Impact	Significance Before Mitigation	Mitigation Measures and Continuing Best Practices	Significance With Mitigation
UTILITIES AND SERVICE SYSTEMS			
		<p>Continuing Best Practice USS-2.1-d: UC Berkeley will continue to incorporate specific water conservation measures into project design to reduce water consumption and wastewater generation. This could include the use of special air-flow aerators, water-saving shower heads, flush cycle reducers, low-volume toilets, drip irrigation systems, and the use of drought resistant plantings in landscaped areas.</p>	
		<p>Continuing Best Practice USS-2.1-e: The current agreement under which UC Berkeley makes payments to the City of Berkeley to help fund sewer improvements terminates at the conclusion of academic year 2005-2006 or upon approval of the 2020 LRDP. Any future payments to service providers to help fund wastewater treatment or collection facilities would conform to Section 54999 of the California Government Code, including but not limited to the following provisions:</p> <ul style="list-style-type: none"> ▪ Fees would be limited to the cost of capital construction or expansion. ▪ Fees would be imposed only after an agreement has been negotiated by the University and the service provider. ▪ The service provider must demonstrate the fee is nondiscriminatory: i.e. the fee must not exceed an amount determined on the basis of the same objective criteria and methodology applied to comparable nonpublic users, and is not in excess of the proportionate share of the cost of the facilities of benefit to the entity property being charged, based upon the proportionate share of use of those facilities. ▪ The service provider must demonstrate the amount of the fee does not exceed the amount necessary to provide capital facilities for which the fee is charged. 	

TABLE 2-1 SUMMARY OF IMPACTS, MITIGATION MEASURES AND CONTINUING BEST PRACTICES

Impact	Significance Before Mitigation	Mitigation Measures and Continuing Best Practices	Significance With Mitigation
UTILITIES AND SERVICE SYSTEMS			
LRDP Impact USS-3.1: At all sites outside the Hill Campus, implementation of the 2020 LRDP could alter drainage patterns in the project area and increase impervious surfaces, but would not exceed the capacity of stormwater drainage systems.	LTS	Continuing Best Practice USS-3.1: UC Berkeley shall continue to manage runoff into storm drain systems such that the aggregate effect of projects implementing the 2020 LRDP is no net increase in runoff over existing conditions	LTS
LRDP Impact USS-3.2: Projects implemented in the Hill Campus under the 2020 LRDP could alter drainage patterns and increase impervious surfaces, which could exceed the capacity of stormwater drainage systems, but the mitigation would ensure this impact is <i>less than significant</i> .	S	LRDP Mitigation Measure USS-3.2: In addition to Utilities Best Practice USS-3.1, projects proposed with potential to alter drainage patterns in the Hill Campus would be accompanied by a hydrologic modification analysis, and would incorporate a plan to prevent increases of flow from the newly developed site, preventing downstream flooding and substantial siltation and erosion.	LTS
LRDP Impact USS-4.1: Implementation of the 2020 LRDP would increase demand for steam, but is not anticipated to result in a need for new or altered facilities.	LTS	None required.	LTS
LRDP Impact USS-5.1: Implementation of the 2020 LRDP would not violate any applicable federal, state, and local statutes and regulations related to solid waste.	LTS	Continuing Best Practice USS-5.1: UC Berkeley would continue to implement a solid waste reduction and recycling program designed to reduce the total quantity of campus solid waste that is disposed of in landfills during implementation of the 2020 LRDP.	LTS
LRDP Impact USS-5.2: Implementation of the 2020 LRDP may result in increased generation of solid waste, but is not anticipated to exceed the capacity of permitted sites.	LTS	LRDP Mitigation Measure USS-5.2: In accordance with the Regents-adopted green building policy and the policies of the 2020 LRDP, the University would develop a method to quantify solid waste diversion. Contractors working for the University would be required under their contracts to report their solid waste diversion according to the University's waste management reporting requirements.	LTS
LRDP Impact USS-6.1: Implementation of the 2020 LRDP would result in increased use of energy, but is not anticipated to result in the need for new or altered production and/or transmission facilities.	LTS	None required.	LTS

TABLE 2-1 SUMMARY OF IMPACTS, MITIGATION MEASURES AND CONTINUING BEST PRACTICES

Impact	Significance Before Mitigation	Mitigation Measures and Continuing Best Practices	Significance With Mitigation
UTILITIES AND SERVICE SYSTEMS			
LRDP Impact USS-6.2: Implementation of the 2020 LRDP would not encourage the wasteful or inefficient use of energy.	LTS	None required.	LTS

3.1 2020 LRDP PROJECT DESCRIPTION

Please refer to Chapter 1 for a description of the Scope and Purpose of the 2020 LRDP EIR (1.2), and the intended uses of the 2020 LRDP EIR (1.5). The balance of Chapter 3.1 of this EIR incorporates the UC Berkeley 2020 LRDP in its entirety.

The 2020 LRDP provides a framework for land use and capital investment decisions by the university to meet its academic goals and objectives through the year 2020. It describes the magnitude and distribution of development anticipated within this period, in terms of campus headcount, program space, housing and parking, as well as policies and guidelines to inform the location, scale and design of individual capital projects.

CONTENT OF THE PROJECT DESCRIPTION OF THE 2020 LRDP EIR

This EIR includes several specific elements required by the CEQA Guidelines for all project descriptions:

- Maps showing regional location and geographic scope (3.0)
- A detailed description of the geographic scope of the 2020 LRDP (3.1.2),
- A statement of objectives for the 2020 LRDP (section 3.1.4), and
- A general description of the project's physical, technical, economic and environmental characteristics (sections 3.1.5 – 3.1.18).

Given the purpose of the 2020 LRDP EIR as a first tier program-level EIR, this description consists of objectives, policies and guidelines to inform future project decisions, rather than project-specific characteristics. Toward this end, Chapter 3.1 is organized into the following sections:

INTRODUCTION

- 3.1.1 Purpose of the 2020 LRDP
- 3.1.2 Scope of the 2020 LRDP
- 3.1.3 Academic Principles
- 3.1.4 Objectives of the 2020 LRDP

DESIGN FRAMEWORK

- 3.1.13 Campus Park Framework
- 3.1.14 City Environs Framework
- 3.1.15 Hill Campus Framework

DEVELOPMENT PROGRAM

- 3.1.5 Campus Population
- 3.1.6 Campus Space & Infrastructure
- 3.1.7 Campus Land Use
- 3.1.8 Campus Housing
- 3.1.9 Campus Access
- 3.1.10 Campus Open Space
- 3.1.11 Sustainable Campus
- 3.1.12 Strategic Investment

PROJECT GUIDELINES

- 3.1.16 Location Guidelines
- 3.1.17 Campus Park Design Guidelines
- 3.1.18 Campus Project Approval Process

CONSTRUCTION ACTIVITY UNDER THE 2020 LRDP

The construction of 2020 LRDP projects is expected to continue throughout the life of the 2020 LRDP, at varying levels of intensity and varying locations. The environmental analyses in Chapter 4 assume no more than one million gross square feet of construction would be underway at any one time within the Campus Park, Adjacent Blocks, Southside and Hill Campus land use zones, which is approximately equal to the level of construction underway at the time the Existing Setting data were collected in 2002 and 2003. Thus, the aggregate effects of the maximum level of construction foreseen under the 2020 LRDP are already reflected in the existing setting.

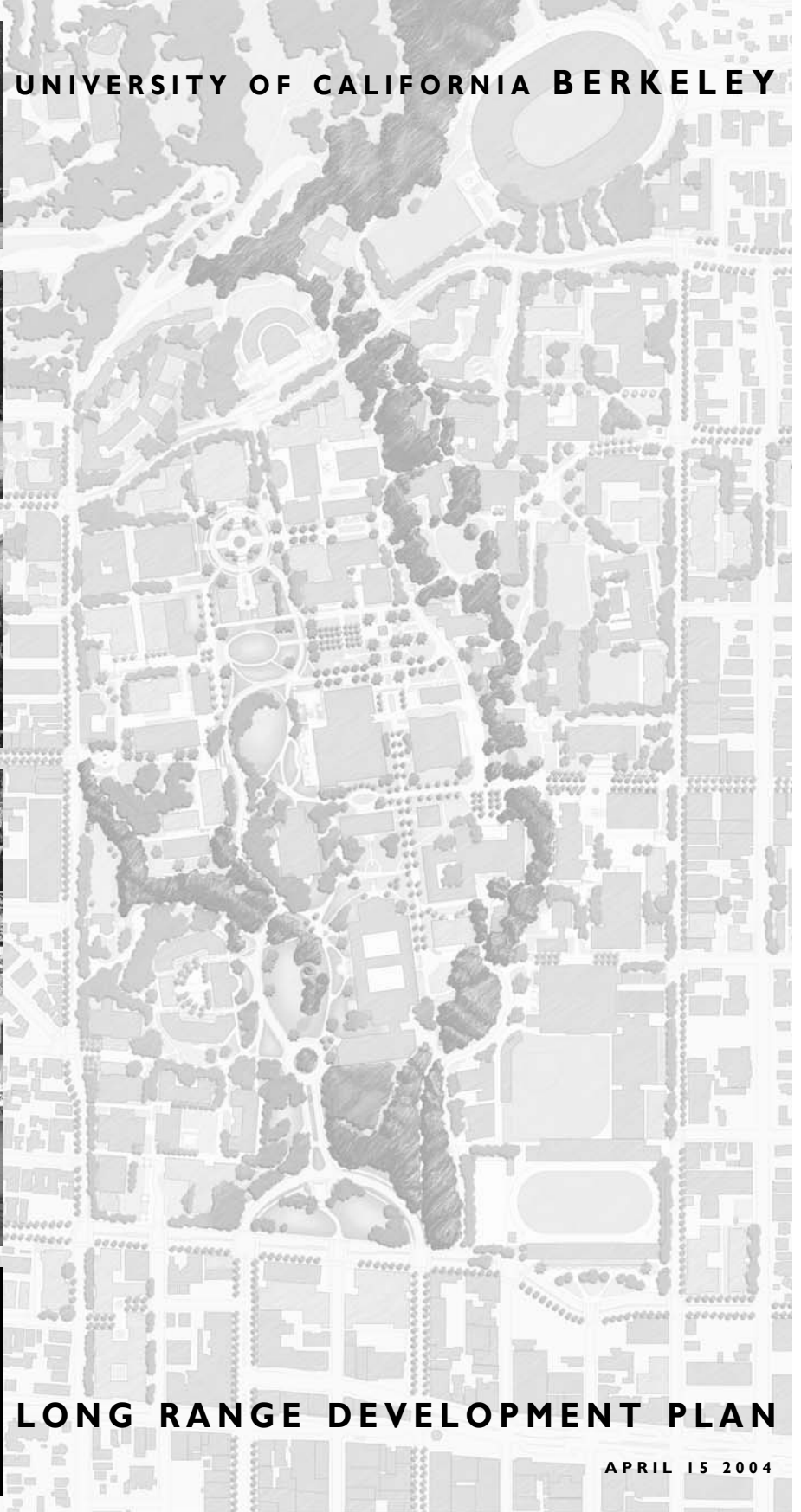


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LONG RANGE DEVELOPMENT PLAN

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INTRODUCTION

PURPOSE OF THE 2020 LRDP	3.1.1
SCOPE OF THE 2020 LRDP	3.1.2
ACADEMIC PRINCIPLES	3.1.3
OBJECTIVES OF THE 2020 LRDP	3.1.4

3.1.1 PURPOSE OF THE 2020 LRDP

Our mission at UC Berkeley is to deliver programs of instruction, research and public service of exceptional quality to the state of California. Over the years, our performance in support of this mission has not only equaled but often outpaced the nation's elite private universities, despite their longer histories and far larger private endowments. The excellence of UC Berkeley is a testament to the vision and public spirit of the people of California, who have sustained us for over a century as a premier research university, while also ensuring a UC Berkeley education remains within reach of the full spectrum of Californians.

Yet, UC Berkeley enters the new century faced with profound challenges:

- to pursue exciting new fields of inquiry and discovery, and achieve excellence in every field we pursue,
- to maintain the unique breadth and variety of our academic programs, and build a strong and vital intellectual community,
- to provide every student with an outstanding education, in which critical inquiry, analysis and discovery are integral to the coursework,
- to strengthen our ability to recruit and retain exceptional individuals, and ensure the campus reflects the full social and cultural spectrum of Californians,
- to provide the space, technology, and infrastructure required to meet the demands of leading edge instruction and research,
- to preserve our extraordinary legacy of landscape and architecture, and become a model of wise and sustainable growth,
- to preserve the character and livability of the city around us, and enhance the economic and cultural synergy of city and university,
- to ensure each capital investment represents the optimal use of public resources, and
- to serve the people of California, and uphold our standard as the best research university in the world.

To enable UC Berkeley to maintain and build upon this standard, the 2020 Long Range Development Plan for UC Berkeley presents a framework for land use and capital investment to meet the academic goals and objectives of the university through the year 2020. It describes both the scope and nature of development anticipated within this timeframe, as well as policies to guide the location, scale and design of individual capital projects.

The 2020 LRDP does not commit the university to any specific project, but rather provides a strategic framework for decisions on those projects. The capital investment program described in the 2020 LRDP does, however, establish a maximum amount of net new growth in the UC Berkeley space inventory during this timeframe, which the campus may not substantially exceed without amending the 2020 LRDP.

ENVIRONMENTAL IMPACT REPORT

The potential environmental impacts of the 2020 LRDP are evaluated in an Environmental Impact Report (EIR), as required by the California Environmental Quality Act (CEQA). The EIR has several purposes:

- to inform university decisionmakers, responsible and interested agencies, and the general public of the environmental implications of the proposed 2020 LRDP,
- to enable the Regents of the University of California to consider the environmental implications of the proposed 2020 LRDP in their consideration of it, and
- to serve as a reference document for the subsequent CEQA review of each individual capital project undertaken to implement the 2020 LRDP.

PROJECT REVIEW

The 2020 LRDP and its EIR provide a framework for the subsequent review of individual projects as they occur at UC Berkeley. Each project with potential to affect the physical environment will be assessed within this framework to determine the appropriate level of CEQA review. Once CEQA review is complete, each individual project must then be approved by the Regents, the President of the University of California, or the Chancellor of UC Berkeley, depending on the scope and nature of the project.

RELATED PLANS

The objectives in the 2020 LRDP support the longterm vision and goals presented in two advisory UC Berkeley documents: the Strategic Academic Plan and the New Century Plan. Both documents were completed in 2002 and published on the campus website. The purpose of both documents is to serve as living, evolving guides for campus decisions, and as such will be revisited and updated at regular intervals as new challenges emerge. The Academic Plan and New Century Plan are advisory: they provide a foundation for the 2020 LRDP, but are not part of the 2020 LRDP. The scope of the 2020 LRDP EIR is represented entirely and exclusively by the contents of the 2020 LRDP.

STRATEGIC ACADEMIC PLAN It is a fundamental principle at UC Berkeley that our capital investment strategy should align with and promote the academic goals of the campus. Toward this end, the Chancellor formed a campus committee in fall 2000 and charged it to prepare a Strategic Academic Plan, which has now been completed. The scope of the Strategic Academic Plan is much broader than the 2020 LRDP, but many of its provisions have significant implications for land use and capital investment, and serve as the foundation for the **Objectives** in the 2020 LRDP.

NEW CENTURY PLAN The New Century Plan presents a design framework of policies, guidelines and initiatives for UC Berkeley based on the principles established in the Strategic Academic Plan. Together, the Strategic Academic Plan and the New Century Plan define a longterm vision for the future of the campus: the 2020 LRDP outlines the scope of capital investment UC Berkeley intends to pursue through 2020, in order to realize this vision.

3.1.2 SCOPE OF THE 2020 LRDP

While the campus functions as a single academic enterprise, the areas that comprise it differ significantly in terms of physical capacity and environmental sensitivity. To allow more precise analysis of both, the 2020 LRDP is organized in terms of the land use zones shown in figure 3.1-1 and described below.

CAMPUS PARK

The historic 180 acre Campus Park, defined by Hearst on the north, Oxford/Fulton on the west, Bancroft on the south, and Gayley/Piedmont on the east, contains 56% of the UC Berkeley space inventory. Although intensively developed, the Campus Park retains a distinctive parklike environment of natural and formal open spaces, as well as an outstanding ensemble of historic architecture. The Campus Park serves both as the center of campus intellectual life and as a scenic and cultural resource for the entire Bay region.

HILL CAMPUS

The Hill Campus consists of roughly 1,000 acres extending east from Stadium Rimway to Grizzly Peak Boulevard. 200 of these acres are managed under the separate jurisdiction of Lawrence Berkeley National Laboratory, and are not within the scope of the UC Berkeley 2020 LRDP. Berkeley Lab operates under its own LRDP and EIR, approved separately by the UC Regents.

While the 800 acre balance contains several UC Berkeley facilities concentrated along Centennial Drive, including the Lawrence Hall of Science, the Botanical Garden, the Space Sciences Laboratory and the Mathematical Sciences Research Institute, the primary use of the Hill Campus is natural open space, including over 300 acres in the Ecological Study Area. The Hill Campus also includes Strawberry Canyon Recreation Area and the adjacent Witter and Levine-Fricke sport fields. The Hill Campus contains 2% of the UC Berkeley space inventory.

CITY ENVIRONS

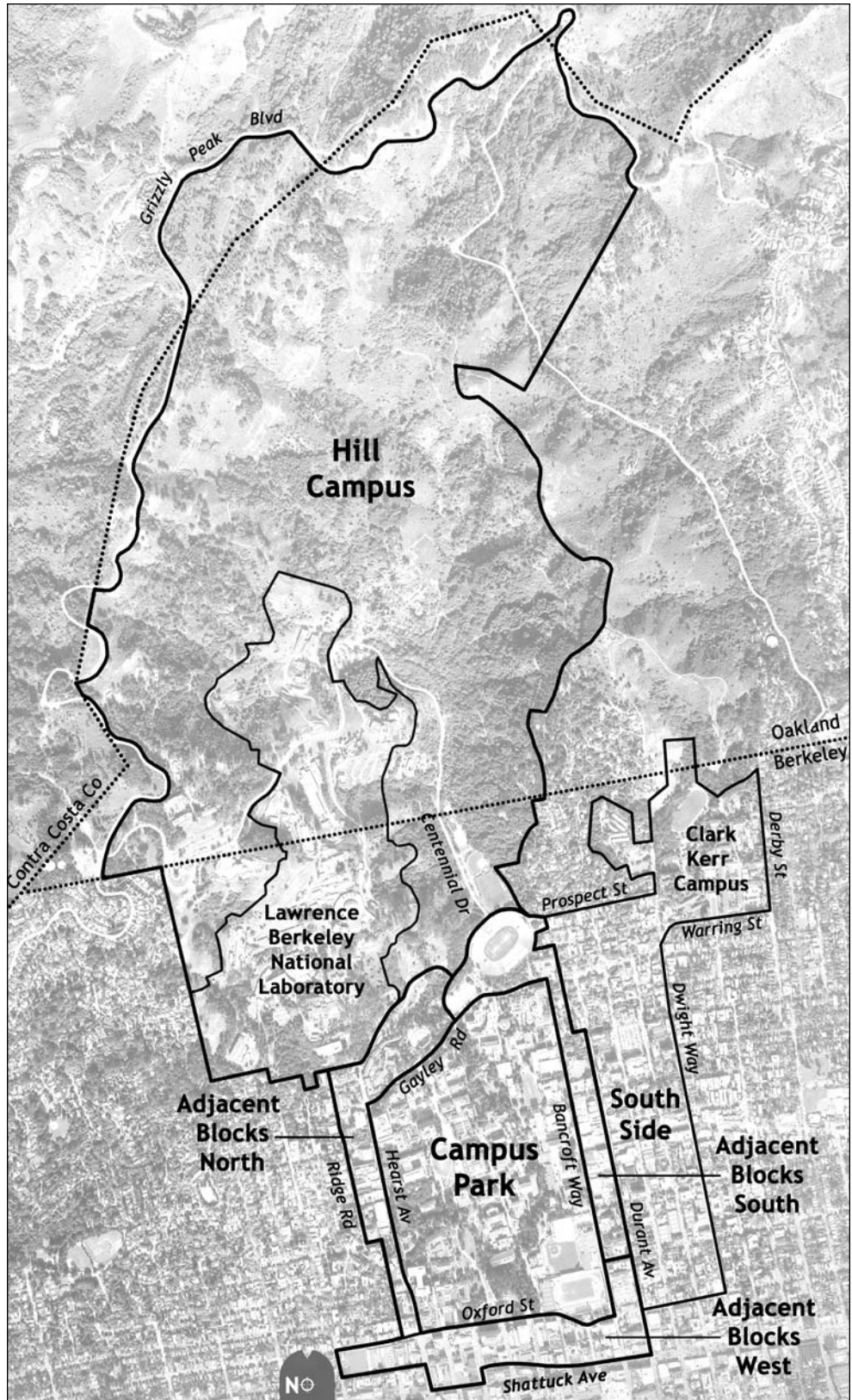
The City Environs are defined to include the Adjacent Blocks, the Southside, Other Berkeley Sites, and the Housing Zone in its entirety: in other words, the entire scope of the 2020 LRDP except for the Campus Park and Hill Campus. The areas within the City Environs are similar in consisting mostly of city blocks served by city streets, and include university properties interspersed with non-university properties.

ADJACENT BLOCKS

This zone includes the blocks adjacent to the north, west, south and east of the Campus Park. Those to the north, west, and south are city blocks defined by city streets, but include numerous major campus facilities. The 'blocks' to the east are owned entirely by the university, but are separated from the Campus Park by Gayley Road and Piedmont Ave: Gayley Road north of Memorial Stadium is owned by the university. For the purpose of land use and environmental analysis, the 2020 LRDP subdivides the adjacent blocks into three subzones, below. The adjacent blocks together contain 14% of the UC Berkeley space inventory, and roughly 45% of the land is owned by the university.

ADJACENT BLOCKS SOUTH, the blocks defined by Ellsworth, Durant, College, the Bancroft frontage from College to Piedmont, Bancroft, Stadium Rimway, and the Campus Park. Major campus facilities on these blocks include Memorial Stadium, International House, University Art Museum, and Tang Health Center.

FIGURE 3.1-1
LAND USE ZONES



ADJACENT BLOCKS WEST, the blocks defined by Oxford, Virginia, Walnut, Hearst, Shattuck, Durant, Ellsworth, and the Campus Park. Major campus facilities on these blocks include the University Printing Plant, University Hall, 2195 Hearst, and the plant research facilities of the Oxford Tract.

ADJACENT BLOCKS NORTH, the blocks defined by the Hill Campus, Berkeley Lab, Ridge, Scenic, the Hearst frontage from Scenic to Oxford, Oxford, and the Campus Park. Major campus facilities on these blocks include Etcheverry Hall, Soda Hall, Goldman School of Public Policy, the Greek Theater, and the Bowles, Stern and Foothill residence halls.

SOUTHSIDE

As defined in the 2020 LRDP, the Southside includes the blocks defined by Durant, Prospect, Dwight, and Fulton, as well as the 50 acre, university owned Clark Kerr Campus and Smyth-Fernwald complex. The Clark Kerr Campus includes student and faculty housing, a recreation center, conference facility, and child care. The university owns roughly 45% of the land in the Southside including the Clark Kerr Campus, primarily student residence halls and apartments. The Southside, including the Clark Kerr Campus, contains 10% of the UC Berkeley space inventory.

As commonly used in Berkeley, the term 'Southside' also includes the Adjacent Blocks South. The 2020 LRDP treats these blocks separately, because they differ from the balance of the Southside in terms of both current land use and the nature of future development proposed by the university. However, as described in the City Environs Framework, projects on the Adjacent Blocks within the area of the City of Berkeley Southside Plan would use the Southside Plan as a guide for project location and design.

HOUSING ZONE

The objectives for the 2020 LRDP include a significant program of new undergraduate, graduate, and faculty housing. These objectives include location criteria:

- New lower division student housing should be within a one mile radius of the center of campus, defined as Doe Library.
- Other student housing should be within this one mile radius or within one block of a transit line providing trips to Doe Library in under 20 minutes.

A transit trip is defined as the time on the transit vehicle to the stop nearest to campus, with no transfers, plus the walking time from the stop to Doe Library. The 2020 LRDP Housing Zone includes all sites which meet the above criteria, except for those sites with residential designations of under 40 units per acre in a municipal general plan as of July 2003. The Housing Zone overlays the other land use zones, as shown in figure 3.1-5.

OTHER BERKELEY SITES

These include all other campus properties in or partly in the City of Berkeley, including 2000 Carleton and 6701 San Pablo: they comprise 5% of the UC Berkeley space inventory.

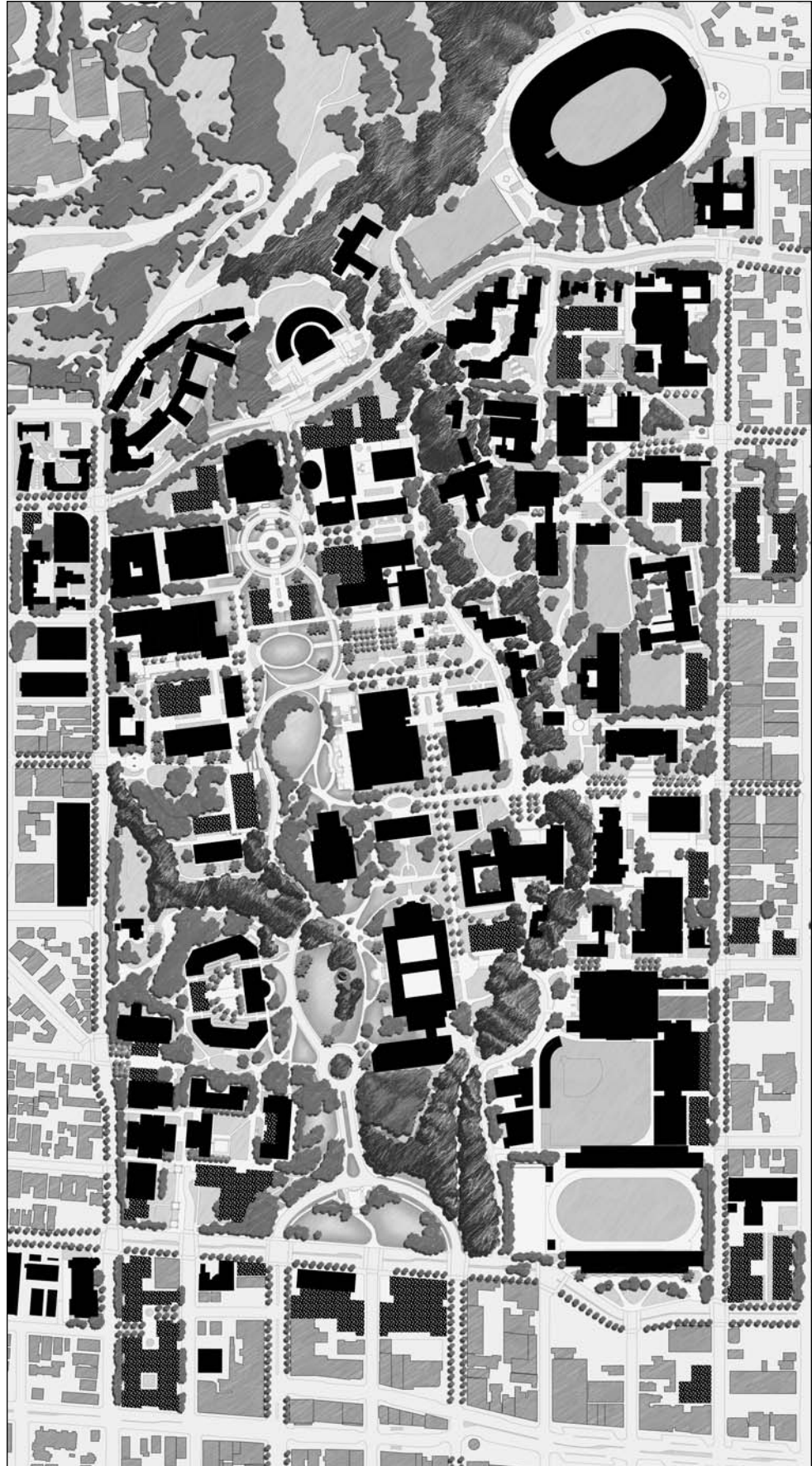
OUTSIDE 2020 LRDP SCOPE

As in the 1990-2005 LRDP, the scope of the 2020 LRDP excludes University Village Albany and Richmond Field Station; it also excludes remote field stations and other campus properties lying entirely outside the City of Berkeley. These sites are sufficiently distant and different from the Campus Park and its environs to merit separate environmental review. The properties in Albany, Richmond and elsewhere together comprise 13% of the UC Berkeley space inventory.

FIGURE 3.1-2
ILLUSTRATIVE CONCEPT



- Existing Campus Buildings
- Potential Campus Buildings



This illustrative concept, from the UC Berkeley **New Century Plan**, depicts one way in which the program described in the 2020 LRDP might be realized on the UC Berkeley campus.

Potential new buildings in this figure are represented as prototypes, based on modular dimensions adaptable to a range of university functions. However, the buildings are configured to respect and enhance campus spatial and architectural relationships, and are meant to inform the design of future projects by depicting building concepts consistent with the **Campus Park Guidelines**.

3.1.3 ACADEMIC PRINCIPLES

At its heart, the 2020 LRDP must reflect and further the core values, articulated in the Strategic Academic Plan, that make UC Berkeley both great and unique:

THE INTEGRATION AND SYNERGY OF EDUCATION AND RESEARCH We strive to provide an education in which critical inquiry, analysis, and discovery are integral to the course work. Our students in turn participate in and contribute to research, under the guidance of faculty and staff engaged in the creation of knowledge.

THE BREADTH AND QUALITY OF ACADEMIC PROGRAMS We believe the rich variety of the academic enterprise at Berkeley creates a setting uniquely conducive to creative thought and insight, through the confluence of different perspectives and paradigms.

A COMPREHENSIVE FOUNDATION IN THE LIBERAL ARTS We believe every Berkeley graduate should possess literacy and numeracy across a broad range of disciplines, and that a solid foundation in the liberal arts is as fundamental to leadership as specific knowledge within an individual discipline.

A PASSION FOR INQUIRY AND DISCOVERY Research provides the energy that drives the modern research university. We believe Berkeley must provide a research environment that optimizes creativity and productivity, and supports vibrant, cutting edge research.

THE SYNERGY OF ACADEMIC AND PROFESSIONAL PROGRAMS We believe professional education at Berkeley must be built on a strong foundation in the liberal arts, and that academic and professional disciplines are both significantly enriched by the insights they gain through interaction.

A VITAL AND DIVERSE INTELLECTUAL COMMUNITY We believe social and cultural diversity are essential to the university. They stimulate creative thought and new paths of inquiry, ensure that the research questions we tackle address the whole of society, and enable us to train leaders who encompass the entire spectrum of Californians.

THE VALUE OF CONTIGUITY We believe a vital intellectual community can only thrive when the entire scope of the academic enterprise is located in close proximity, in order to foster the formal and informal interactions that lead to productive collaboration.

A PARTNERSHIP OF STUDENTS, FACULTY AND STAFF We recognize the contributions of each are both essential and inseparable: no group can excel without the support of the others, and each must have adequate resources for the enterprise as a whole to succeed.

INDEPENDENCE OF MIND IN THE PURSUIT OF KNOWLEDGE Notwithstanding the inherently political nature of a public institution, we believe the pursuit of knowledge must not be constrained by temporal economic or political considerations. The research university is by definition a place where perceived truth is under constant challenge.

THE PRIMACY OF PUBLIC SERVICE Notwithstanding the growing pressure to seek private resources, we recognize our core purpose is to serve and benefit the people of California through the creation, dissemination and application of knowledge, including outreach to underserved communities.

EXCELLENCE IN EVERY ENDEAVOR We must ensure each element of the academic enterprise - teaching, research and public service - continues to maintain the Berkeley standard of excellence. This requires us to recruit and retain the best people from the full talent pool, and to provide the resources they need to excel.

3.1.4 OBJECTIVES OF THE 2020 LRDP

The purpose of the 2020 LRDP is to set forth a framework for land use and capital investment undertaken in support of the campus' academic principles. The 2020 LRDP is driven by the following broad objectives:

- **PROVIDE THE SPACE, TECHNOLOGY AND INFRASTRUCTURE WE REQUIRE TO EXCEL IN EDUCATION, RESEARCH, AND PUBLIC SERVICE.**
- **PROVIDE THE HOUSING, ACCESS, AND SERVICES WE REQUIRE TO SUPPORT A VITAL INTELLECTUAL COMMUNITY AND PROMOTE FULL ENGAGEMENT IN CAMPUS LIFE.**
- **STABILIZE ENROLLMENT AT A LEVEL COMMENSURATE WITH OUR ACADEMIC STANDARDS AND OUR LAND AND CAPITAL RESOURCES.**
- **BUILD A CAMPUS THAT FOSTERS INTELLECTUAL SYNERGY AND COLLABORATIVE ENDEAVORS BOTH WITHIN AND ACROSS DISCIPLINES.**
- **PLAN EVERY NEW PROJECT TO REPRESENT THE OPTIMAL INVESTMENT OF LAND AND CAPITAL IN THE FUTURE OF THE CAMPUS.**
- **PLAN EVERY NEW PROJECT AS A MODEL OF RESOURCE CONSERVATION AND ENVIRONMENTAL STEWARDSHIP.**
- **MAINTAIN AND ENHANCE THE IMAGE AND EXPERIENCE OF THE CAMPUS, AND PRESERVE OUR HISTORIC LEGACY OF LANDSCAPE AND ARCHITECTURE.**
- **PLAN EVERY NEW PROJECT TO RESPECT AND ENHANCE THE CHARACTER, LIVABILITY, AND CULTURAL VITALITY OF OUR CITY ENVIRONS.**
- **MAINTAIN THE HILL CAMPUS AS A NATURAL RESOURCE FOR RESEARCH, EDUCATION AND RECREATION, WITH FOCUSED DEVELOPMENT ON SUITABLE SITES.**



SATHER GATE



HAAS SCHOOL OF BUSINESS

DEVELOPMENT PROGRAM

CAMPUS POPULATION	3.1.5
CAMPUS SPACE & INFRASTRUCTURE	3.1.6
CAMPUS LAND USE	3.1.7
CAMPUS HOUSING	3.1.8
CAMPUS ACCESS	3.1.9
CAMPUS OPEN SPACE	3.1.10
SUSTAINABLE CAMPUS	3.1.11
STRATEGIC INVESTMENT	3.1.12

3.1.5 CAMPUS POPULATION

STABILIZE ENROLLMENT AT A LEVEL COMMENSURATE WITH OUR ACADEMIC STANDARDS AND OUR LAND AND CAPITAL RESOURCES.

The University of California has a clear role in the California Master Plan for Higher Education, which articulates complementary roles for Community Colleges, California State University, and UC. The Master Plan designates UC as the state's primary research institution: UC selects from among the top 12.5% of California high school graduates, as well as the top 4% of graduates of each California high school. Due to the projected growth in the number of college age Californians, by 2010 UC as a whole must increase its enrollment by 63,000 students over the base year 1998 to continue to meet its Master Plan mandate.

As part of this strategy, UC Berkeley has been requested to evaluate the ability to grow by 4,000 full time equivalent students over base year 1998 by 2010. This represents an increase in enrollment of roughly 13%: a significant increase for any campus, but particularly for a mature, urban campus with aging facilities and limited capacity to expand. However, once our current target is reached, at an estimated two-semester average of 33,450 students, enrollment at UC Berkeley should stabilize.

Not only do few undeveloped sites remain on and around the campus, but our capital resources are also very limited. What capital funds the campus does receive from the state are consumed largely by seismic upgrades to existing buildings, and this need will continue for the near future. Moreover, to the extent university land and capital are utilized to accommodate further enrollment growth, they can no longer be utilized for campus renewal. Yet, the renewal of our buildings and infrastructure is crucial to our ability to recruit and retain exceptional individuals, to pursue new paths of inquiry and discovery, and to maintain our historic standard of excellence.

As a result of growth in both education and research, by 2020 we estimate total campus headcount during the regular academic year may increase by up to 12% over what it was in 2001-2002, as shown in table 3.1-1. The estimates for academic and nonacademic staff reflect the impacts of both enrollment growth and growth in external research funds through 2020. Research funds are projected to grow at 3.6% per year: the average rate of growth minus inflation during the last decade of the 20th century.

While UC Berkeley can accommodate some of our new students through growth in summer programs and education abroad, to meet our 4,000 student target also requires an increase in on-campus enrollment during the regular academic year. The enrollment figures in table 3.1-1 are presented in terms of student headcount: the estimates for the regular academic year represent the two-semester average, while the summer estimates represent the number of individual students enrolled in one or more summer courses.

The actual rate at which campus headcount grows in the future depends on a variety of factors, including future demographic trends, state and university policy, and available resources. In the near term, funds may not be available to support further growth in enrollment. However, the projections in the 2020 LRDP are based on underlying demographic needs through the year 2020, rather than on near-term funding considerations.

TABLE 3.1-1 PROJECTED CAMPUS HEADCOUNT

	Actual Headcount 2001-2002	Net Addl Headcount 2020 LRDP	Est Total Headcount 2020
Students			
Regular Terms*	31,800	1,650	33,450
<i>Summer</i>	<i>11,400</i>	<i>5,700</i>	<i>17,100</i>
Employees	12,940	2,870	15,810
Faculty**	1,760	220	1,980
Academic Staff & Visitors**	3,040	1,840	4,880
Nonacademic Staff**	8,140	810	8,950
Other Visitors & Vendors	1,200	800	2,000
Estimated Regular Terms Headcount	45,940	5,320	51,260
Estimated On-Campus Headcount***	44,834		

* Campus population today is counted in two ways: by actual headcounts and by full time equivalents, or FTE. While budgets are calculated in terms of FTE, for the purpose of environmental analysis actual headcount is the better measure, since FTE tends to under-represent peak impacts. For example, two students taking six units each are likely to have a greater impact than one student taking 12 units. The 2020 LRDP therefore uses two-semester average headcount as the measure of campus population.

** All non-student categories exclude student workers to avoid double counting.

*** Excludes off campus programs and other exclusions per April 2002 Population Report to City of Berkeley.

TABLE 3.1-2 PROJECTED SPACE DEMAND

	Actual + Approved UC Berkeley Space	Net Addl Space 2020 LRDP	Est Total 2020
Academic & Support (GSF)	12,107,100	2,200,000	14,307,100
Actual 2001-2002*	11,637,900		
Net Addl Complete Mar 2004	116,600		
Net Addl Underway Mar 2004	352,600		
Housing (bed spaces)		8,190	2,600 ***
Actual UC Owned 2001-2002	6,960		
City Environs**	6,004		
University Village Albany**	956		
Net Addl Complete Mar 2004	120		
Net Addl Underway Mar 2004	1,110		
Parking (spaces)		7,690	2,300
Actual 2001-2002	6,900		
Net Addl Complete Mar 2004	100		
Net Addl CEQA Reviewed	690		

* 2001-2002 A&S space includes all buildings except those primarily housing or parking.

** City Environs includes 74 student family units at Smyth Fernwald and 27 faculty units, counted as one bed space per unit, as well as 585 bed spaces at International House, for consistency with 1990-2005 LRDP. University Village Albany includes 956 student family units counted as one bed space per unit.

*** Includes up to 200 family-suitable units for faculty, staff, or visiting scholars within 2020 LRDP scope. Does not include new student housing proposed for University Village Albany, which is outside the scope of the 2020 LRDP and the subject of a separate CEQA review.

3.1.6 CAMPUS SPACE & INFRASTRUCTURE

PROVIDE THE SPACE, TECHNOLOGY AND INFRASTRUCTURE WE REQUIRE TO EXCEL IN EDUCATION, RESEARCH, AND PUBLIC SERVICE.

Enrollment is only one of many drivers for growth at UC Berkeley. New academic initiatives and continued growth in research also create demand for more space on and around campus. While some of this demand can be met through renovation of existing buildings, new buildings are also required, particularly for programs that demand high performance infrastructure and other advanced features renovated space can not provide.

The impact of change is most severe in laboratory-based research, where many of our older buildings are unable to meet modern standards for power systems, climate and vibration controls, and safety and environmental protocols. Moreover, the entire university has been transformed by the revolution in information technology: infrastructure to support broadband networks have become a necessity in every discipline.

UC Berkeley is the oldest campus of the university, and over half the built space on campus is over forty years old. Both instruction and research have undergone dramatic change in this period, in terms of both the workstyles we employ and the infrastructure we require. Many of our instructors and researchers struggle with spaces and systems compromised not only by time, but also by decades of inadequate reinvestment. The renewal of our physical plant is crucial to our ability to recruit and retain exceptional individuals, and to pursue new topics of research and new models of instruction.

RESEARCH & EDUCATION Research is fundamental to our mission of education. As a research university, UC Berkeley strives to provide our students with a unique experience, one in which critical inquiry, analysis, and discovery are integral to the coursework. Our students expect to play an active role in research, under the guidance of faculty who are themselves engaged in creating, not merely imparting, new knowledge.

While we presently engage our graduate students in research, it is a goal of the Academic Plan to also integrate research-based learning into undergraduate education. In order to do so, we must expand the scope of our research programs to accommodate more direct, mentored participation by undergraduates, and must also provide adequate and suitable space to house those programs.

RESEARCH & SERVICE Research is also fundamental to our mission of public service. The direct public benefits of the research and scholarship undertaken at UC Berkeley range from advances in human and environmental health, to new insights into personal and social behavior, to improved agricultural and industrial productivity. Our limits on space and resources require us to be selective in pursuing new initiatives, but a vital research enterprise is critical to the public service mission of the university.

UC Berkeley has experienced steady growth in research sponsored by external agencies, and this trend is expected to continue. In the last decade of the 20th century, our external research funds increased in real terms by an average of 3.6% per year. Over 95% of those funds came from federal, state, and nonprofit agencies.

More space is also required to accommodate the evolving nature of research. Many of the complex problems explored at UC Berkeley today require a combination of focused, individual work and work in interactive teams, often comprised of several academic disciplines. The campus must provide adequate space for both kinds of work, in buildings that support the high performance technology and infrastructure modern research demands.

NEW ACADEMIC INITIATIVES The state provides the university with incremental operating funds to support future enrollment growth. UC Berkeley intends to use these resources not only to expand the capacity of existing high-demand programs, but also to extend existing programs in promising new directions, and create new interdisciplinary programs to pursue new areas of inquiry.

By 2010, UC Berkeley intends to establish several new interdisciplinary programs that combine education and research. In June 2003 we selected our first set of new interdisciplinary programs: Computational Biology, Nanosciences, Metropolitan Studies, and New Arts Media. While each of these programs will be built on a base of existing core faculty, capital investment will also be required to create or adapt space to house these new endeavors.

SPACE DEMAND

As a result of the overall growth at UC Berkeley under the 2020 LRDP, the space demands of campus academic and support programs may grow by up to 18%, or 2,200,000 GSF, over current and approved space by 2020, as shown in table 3.1-2. The figures in table 3.1-2 represent net new space, and reflect space lost through demolition.

In the 2020 LRDP, the term ‘academic and support space’ includes the entire UC Berkeley space inventory except for housing and parking, which are tabulated separately given their unique program and environmental characteristics. The academic and support category includes a wide range of space types:

- Classrooms and class labs and studios,
- Offices and research labs and studios for faculty, postdocs, researchers, student instructors, and organized research units,
- Libraries, including study facilities as well as collections and operations,
- Other academic resources, including museums and cultural centers, computer resources, plant and animal research facilities, and other program specific facilities,
- Student services, including health, advising, and counseling programs, athletics and recreation, and student organizations, and
- Campus operations, including campus administration, financial operations, human resources, computer and network services, construction and plant operations.

As described above, UC Berkeley requires more space not only to educate a larger student body, but also to support continued growth in research and the increased synergy of research and education. Expansion of the research enterprise is required not only to meet the increased demand from federal, state and other sponsors for UC Berkeley to pursue new areas of inquiry, but also to enable us to integrate research-based learning into undergraduate as well as graduate programs. Up to 700,000 GSF of the space demands of academic and support programs may consist of research laboratories, including some expansion of animal research facilities.

Our estimates of future space needs are not due entirely to future growth: some new space is required just to compensate for the shortages we have today. The most recent survey of academic space at UC Berkeley, in 2001-2002, revealed a deficit of roughly 450,000 GSF in academic programs alone, based on university-wide guidelines for space utilization.

UC Berkeley also has roughly 450,000 GSF of leased space in various locations in and outside Berkeley. Some of this space is deficient in terms of life safety, functionality, or both. Our estimate of future space needs, therefore, also includes a contingency for the strategic replacement of some leased space with new university-owned space.

The actual rate at which new academic and support program space is built in the future depends on both the actual rate and type of growth in space demand and the resources available.

LIFE SAFETY

A program of seismic evaluations undertaken in 1997-1998 rated 102 UC Berkeley structures as 'poor' or 'very poor', indicating a significant hazard to life in a major seismic event. At the time, seismic upgrades to several campus buildings had already been completed, but the campuswide evaluations greatly increased the scope of the improvements program, and the capital investment it requires.

POLICY: ELIMINATE 'POOR' AND 'VERY POOR' SEISMIC RATINGS IN CAMPUS BUILDINGS THROUGH RENOVATION OR REPLACEMENT.

As of 2003, 46% of campus space requiring seismic upgrades had already been improved, and another 25% of space was under construction or in design. However, the balance remains a substantial obligation: the capital funds UC Berkeley now receives from the state are consumed entirely by seismic upgrades, and this is expected to continue for the near future.

POLICY: CONSIDER ENHANCED LEVELS OF SEISMIC PERFORMANCE FOR CRITICAL BUILDINGS.

While UC Berkeley is already committed to ensuring life safety in every campus building, many of our buildings also house equipment, experiments, and other contents of considerable value. Where relevant, the feasibility analyses for new projects should also consider additional structural enhancements to reduce building downtime after a magnitude 7.0 earthquake to no more than 30 days, both to protect its contents and to enable rapid resumption of university operations.

POLICY: MINIMIZE NONSTRUCTURAL HAZARDS TO IMPROVE LIFE SAFETY AND PROGRAM CONTINUITY.

In many campus buildings, the most significant seismic risk to life safety is not structural failure, but rather damage to its contents. Inadequately secured ceilings, fixtures, shelves and equipment pose a serious threat of injury. They also threaten the sustained operation of the campus and the continuity of research, and pose a substantial economic loss: much of our laboratory equipment is both fragile and very expensive. UC Berkeley should ensure all new buildings are designed to minimize nonstructural hazards and operational downtime, and should also continue our programs to mitigate such hazards in existing buildings.

INFORMATION SYSTEMS

While there is no substitute for face-to-face conversation, today it is only one of the ways scholars communicate. The introduction of e-mail alone has transformed the nature of collaboration: many faculty today communicate more often with colleagues in other parts of the world than they do with those in the next office. The revolution in information technology has furnished researchers with new tools for analyzing and discovering patterns and connections in enormous sets of data, leading in turn to changes in the ways we conceptualize and approach problems.

Because the pace of change will only accelerate in the future, the quality of our networks is just as crucial to academic excellence as the quality of our interior and exterior spaces. Because the potential for creative interaction is everywhere, our first principle for information technology should be to ensure the entire campus has access to state-of-the-art high capacity networks.

POLICY: COMPLETE THE NEW CAMPUS INTERBUILDING INFORMATION INFRASTRUCTURE.

While nearly all campus buildings are connected to the campus information network in some way, many are linked to it through ad hoc pathways such as old utility conduits. Many of these conduits are at capacity, many others are damaged or hazardous: in both cases, such conditions limit or preclude further upgrades in capability. The construction of a common interbuilding 'backbone' to replace these ad hoc pathways, and provide capacity for future growth, began in 1985: to date, 4 of the 7 elements have been completed, and funding is approved for element 5, now in design. The campus should continue to pursue the completion of the interbuilding system as a funding priority.

POLICY: INCLUDE UPGRADES TO INTRABUILDING INFORMATION SYSTEMS IN MAJOR RENOVATIONS.

The interbuilding backbone provides service to each building, but the quality of service also depends on the intrabuilding infrastructure, the quality of which varies enormously across the campus. Many of our intrabuilding systems have been unable to keep up with the tremendous growth in performance demand. In response, UC Berkeley has initiated the 'riser project', a phased investment program to equip each building with a modern fiber-optic infrastructure. The riser project will ultimately provide every campus user with equal access to state-of-the-art network service.

Many campus buildings require seismic improvements. Many also require extensive renovation due to the age and condition of their program spaces and systems. UC Berkeley should ensure the requisite improvements to the information infrastructure, as prescribed in the riser project, are undertaken in conjunction with these projects.

UTILITY SYSTEMS

In general, campus utility systems have adequate capacity for current demands, partly as a result of the major upgrades implemented through the Utility Infrastructure Upgrade Project begun in 1999. However, given the increasing reliance on technology and high-performance infrastructure in many disciplines, and the cost and disruption further upgrades would entail, UC Berkeley should pursue a rigorous program of resource conservation in order to minimize both local and general impacts on utility systems.

POLICY: DESIGN FUTURE PROJECTS TO MINIMIZE ENERGY AND WATER CONSUMPTION AND WASTEWATER PRODUCTION.

Sustainable Campus describes a comprehensive strategy to minimize campus power and water consumption. Substantial savings in water and energy consumption can often be achieved through intelligent design at little or no increase in cost: for example, by the careful selection of landscape materials, and by orienting and configuring building volumes and composing building facades to optimize energy performance. The Campus Park Guidelines include several such provisions, which should inform every future project.

3.1.7 CAMPUS LAND USE

BUILD A CAMPUS THAT FOSTERS INTELLECTUAL SYNERGY AND COLLABORATIVE ENDEAVORS BOTH WITHIN AND ACROSS DISCIPLINES.

The breadth and quality of our academic programs are the equal of any university in the world, but UC Berkeley is more than the sum of its parts. A great research university also requires a vital and dynamic intellectual community, one that provides exposure to a wide range of cultures and perspectives, and generates the encounters and interactions that lead to new insight and discovery. For such a community to thrive requires a campus organized and designed to foster those interactions.

Although the academic structure of the campus reflects the traditional disciplines defined over a century ago, those disciplines are no longer insular and self-contained. For example, the health sciences initiative brings researchers from physics, biology and chemistry together to study phenomena at the molecular level, while our programs focused on culture, gender, and ethnicity integrate the humanities and social sciences.

The four new academic initiatives established in 2003 - Nanosciences, Computational Biology, Metropolitan Studies, and New Arts Media - were selected not only because the work to date at UC Berkeley already shows extraordinary promise, but also because the initiatives are broad in scope, are explicitly collaborative, and have significant potential for both undergraduate and graduate student participation. And there are more to come: future anticipated initiatives include the integration of the social, physical, and biological sciences to pursue more holistic investigations of complex environmental problems.

Because the potential for synergy is everywhere at UC Berkeley, our first principle of land use should be to retain and reinforce the contiguity of the academic enterprise, in order to encourage interaction and exchange both within and across disciplines.

POLICY: ACCOMMODATE NEW AND GROWING ACADEMIC PROGRAMS PRIMARILY THROUGH MORE INTENSIVE USE OF UNIVERSITY OWNED LAND ON AND ADJACENT TO THE CAMPUS PARK.

The need for growth, combined with the principle of contiguity, requires an increase in density on and around campus. As shown in figures 3.1-3A and 3.1-3B, the campus and its environs include a number of sites suitable for more intensive development, including surface parking lots and older academic buildings with both seismic and functional deficiencies. However, because UC Berkeley is an urban campus, each of these sites exists within an established physical context that includes many significant natural and cultural resources.




Our goal should be to ensure each new capital project not only respects but enhances its context, and contributes positively to the image and experience of UC Berkeley as a whole. In order to realize this goal, the **Campus Park Framework**, **City Environs Framework**, and **Hill Campus Framework** establish policies for land use and project design specific to each context.

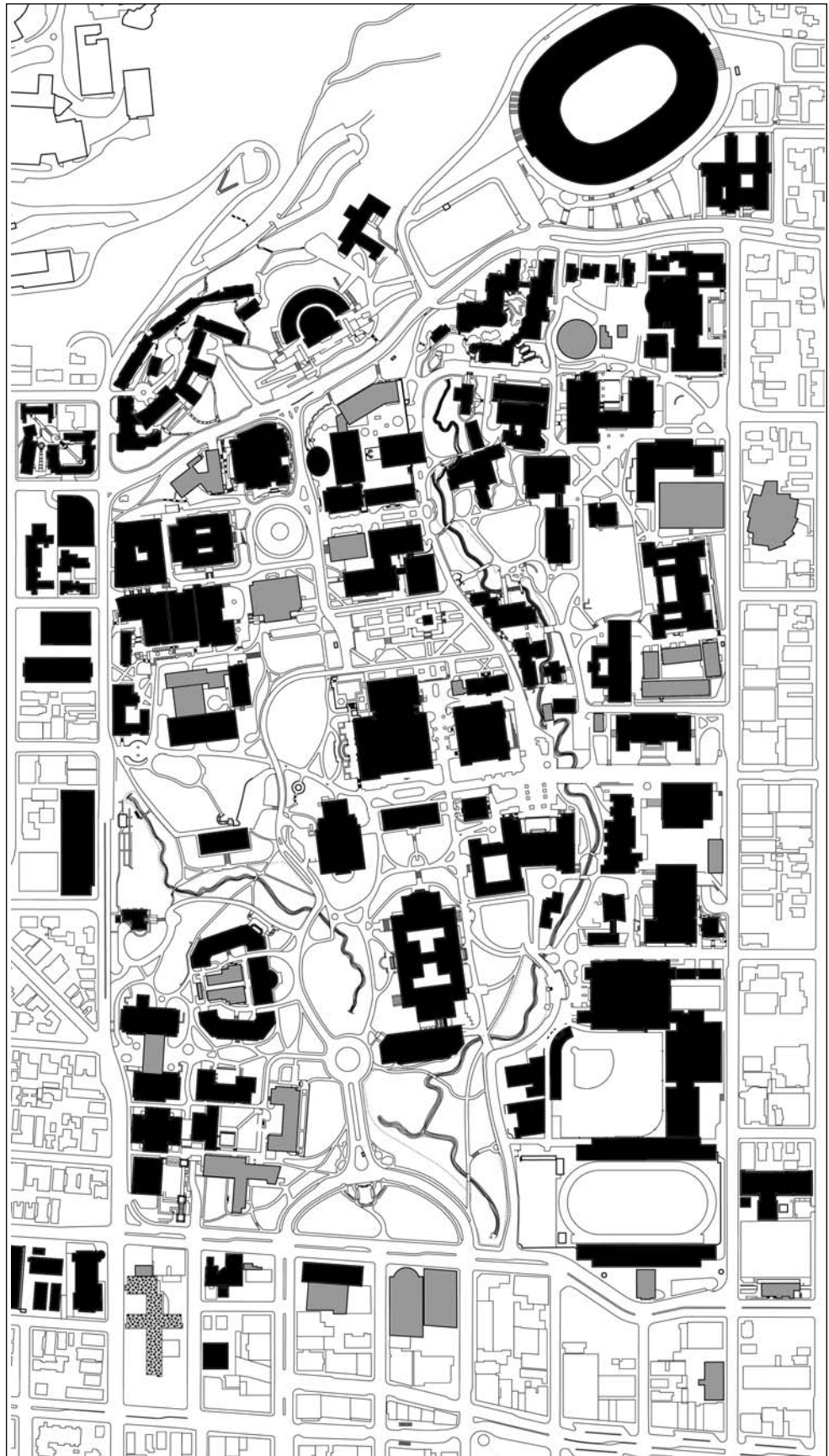
POLICY: PRIORITIZE CAMPUS PARK SPACE FOR PROGRAMS THAT DIRECTLY ENGAGE STUDENTS IN INSTRUCTION AND RESEARCH.

PRIORITIZE SPACE ON THE ADJACENT BLOCKS FOR OTHER RESEARCH, CULTURAL AND SERVICE PROGRAMS THAT REQUIRE CAMPUS PARK PROXIMITY.

FIGURE 3.1-3A
CANDIDATE BUILDINGS
FOR REPLACEMENT



-  Existing/Approved Campus Buildings
-  Replacement Candidates UC Owned
-  Replacement Candidates DHS Site

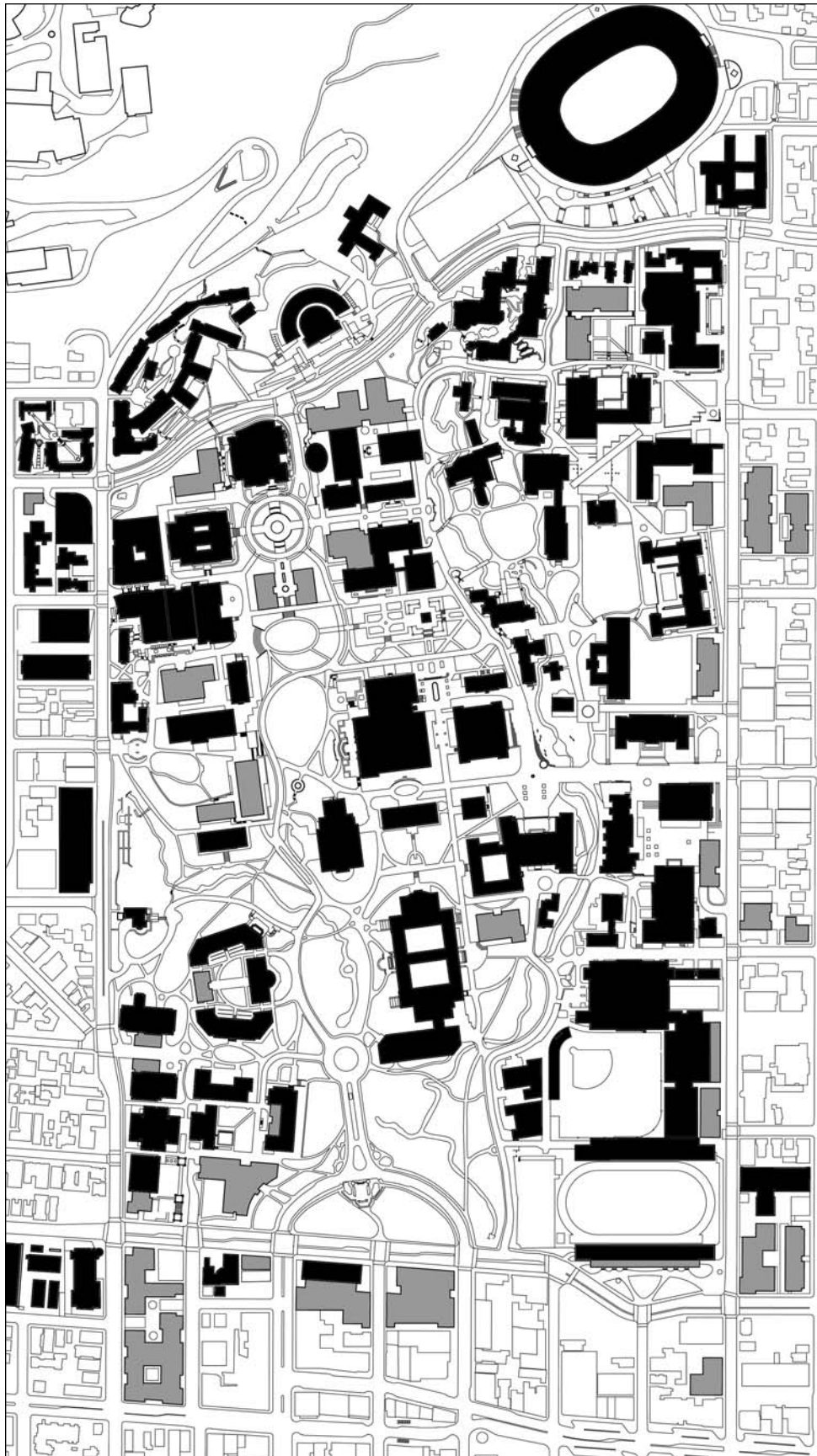


Buildings shown as candidates for replacement include those which have seismic and/or functional deficiencies, or which represent underutilizations of their respective sites.

This figure does not commit the university to replacing these buildings; in some instances renovation may be the better option. As described in **Strategic Investment**, a full range of alternate solutions will be evaluated for each major capital investment.

The stipple pattern indicates the California Department of Health Services facility. The state is relocating these operations to a new facility in Richmond; the university has an option to acquire the site once it is vacated, and intends to do so.

FIGURE 3.1-3B
ILLUSTRATIVE CONCEPT



Existing/Approved
Campus Buildings

Potential Projects

The projects shown in this figure represent one way in which the 2020 LRDP program might be realized on the Campus Park and adjacent blocks, by selectively redeveloping:

- buildings with potential for replacement, as indicated in figure 3.1-3A, and
- other underutilized sites such as surface parking lots.

The figure based on the **New Century Plan** is illustrative only, and does not commit the university to pursuing the projects as shown.

Projects other than those shown may also be pursued in the future, either by the university directly or in collaboration with cities and/or the private sector.

Land at UC Berkeley is a scarce and finite resource, and it is neither feasible nor desirable to house every campus function on or adjacent to the Campus Park. For example, some research and operations units are incompatible with the campus' urban environs due to scale, service, or environmental requirements. In order to optimize the use of campus resources, and ensure space on or adjacent to the Campus Park is reserved for programs that require it, future capital investment at UC Berkeley should be informed by the **Location Guidelines** in section 3.1-16.

SPACE DISTRIBUTION

The contiguity of academic programs is a core principle of the Academic Plan. We believe a vital intellectual community can only thrive when the entire scope of the academic enterprise is located in close proximity, in order to foster the formal and informal interactions that lead to synergy and discovery.

In support of this principle, 90-100% of the estimated future demand for program space is planned to be accommodated on or adjacent to the Campus Park, as shown in table 3.1-3. The figures in table 3.1-3 represent net new program space, and include the removal and replacement of existing facilities as well as construction of new facilities. The land use zones are shown in figure 3.1-1.

In order to provide the campus some flexibility in locating new projects, the sum of the maxima for the individual land use zones is roughly 10% greater than the 2020 LRDP total of 2,200,000 net new GSF of program space. However, the total net new program space within the scope of the LRDP may not substantially exceed 2,200,000 GSF without amending the 2020 LRDP.

TABLE 3.1-3 PROJECTED SPACE DISTRIBUTION BY LAND USE ZONE

	Max Net Addl Academic & Support GSF	Max Net Addl Housing Beds	Max Net Addl Parking Spaces
Campus Park	1,000,000		600
Adjacent Blocks			
North	50,000		
West	800,000		1,300
South	400,000		600
Southside	50,000		
Hill Campus	100,000	100 *	
Other Berkeley	50,000		
Housing Zone			
Students		2,500	
Faculty/Staff		100 *	
Max Net Addl Space NTE	2,200,000 **	2,600	2,300

* Represents up to 100 family-suitable units for faculty and/or staff

** Does not include projects already approved as of January 2004

Note: In order to provide flexibility in siting individual projects, the sum of the maxima for individual land use zones is greater than the maximum 'not to exceed' (NTE) totals for all the zones combined. However, the university may not substantially exceed the NTE totals without amending the 2020 LRDP.

LAND ACQUISITION

Future growth in both program space and parking is planned to be accommodated primarily through more intensive use of university-owned land. As shown in figures 3.1-3A and 3.1-3B, the Campus Park and its adjacent blocks include numerous sites where more intensive use is possible, and university-owned land will always be the first option explored for both program space and parking.

Some new university housing can also be accommodated on current university-owned land. However, in order to meet the targets described in **Campus Housing**, some of this new housing would have to be constructed on land within the Housing Zone which is not presently owned by the university.

The university will explore a full range of delivery options for each such project, including partnerships with private sector developers as well as direct acquisition and construction by the university. In those instances where the university does find it necessary to acquire land, preference should be given to sites which are underutilized, which are not on the tax rolls, and/or where displacement of existing tenants can be minimized.

As described in the **City Environs Framework**, project location and design will be informed by municipal land use policies. Moreover, mixed-use projects with ground-floor retail space, such as the Manville Apartments, will be considered where such projects align with municipal policies and are compatible with neighboring land use.

One acquisition the university does expect to complete within the timeframe of the 2020 LRDP is the California Department of Health Services site at Hearst and Shattuck. The state is relocating its operations to a new facility in Richmond; the university has an option to acquire the site once it is vacated, and intends to do so. The DHS site has the capacity to accommodate a substantial amount of new university program space; however, the ground floor frontage along Shattuck is planned to accommodate retail space.



SPROUL PLAZA

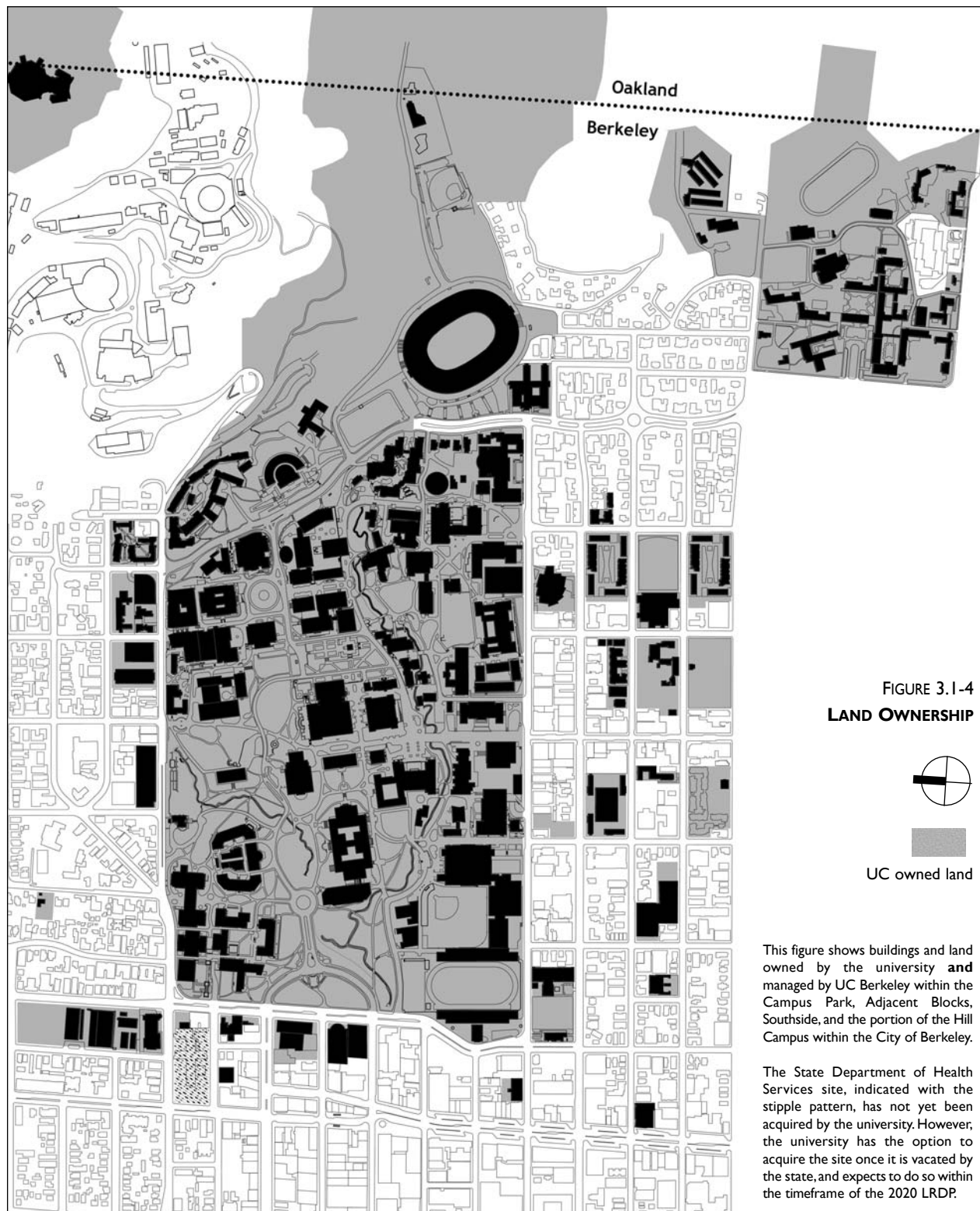


FIGURE 3.1-4
LAND OWNERSHIP

This figure shows buildings and land owned by the university and managed by UC Berkeley within the Campus Park, Adjacent Blocks, Southside, and the portion of the Hill Campus within the City of Berkeley.

The State Department of Health Services site, indicated with the stipple pattern, has not yet been acquired by the university. However, the university has the option to acquire the site once it is vacated by the state, and expects to do so within the timeframe of the 2020 LRDP.

3.1.8 CAMPUS HOUSING

PROVIDE THE HOUSING, ACCESS, AND SERVICES WE REQUIRE TO SUPPORT A VITAL INTELLECTUAL COMMUNITY AND PROMOTE FULL ENGAGEMENT IN CAMPUS LIFE.

The ability of UC Berkeley to recruit, retain, and support outstanding individuals is fundamental to academic excellence. Many of our best student and faculty candidates cite the scarcity of good, reasonably priced housing and child care near campus as key factors in their decisions whether or not to come to UC Berkeley. The problem of housing is particularly acute for students: expanding and improving the supply of housing near campus is critical not only to ensure our students are adequately housed, but also to provide the community of peers and mentors, and the access to campus resources, they require to excel.

The Strategic Academic Plan defines our long-term goals for both student and faculty housing at UC Berkeley:

- provide two years of university housing to entering freshmen who desire it,
- provide one year of university housing to entering transfer students who desire it,
- provide one year of university housing to entering graduate students who desire it,
- maintain the number of university housing units suitable for students with children,
- provide up to 3 years of university housing to new untenured ladder faculty who desire it.

The policies described below represent targets for each of these goals which are feasible within the timeframe of the 2020 LRDP. As shown in table 3.1-2, by 2020 we propose to increase the supply of university housing within the 2020 LRDP scope by up to 32% over current and approved bed spaces.

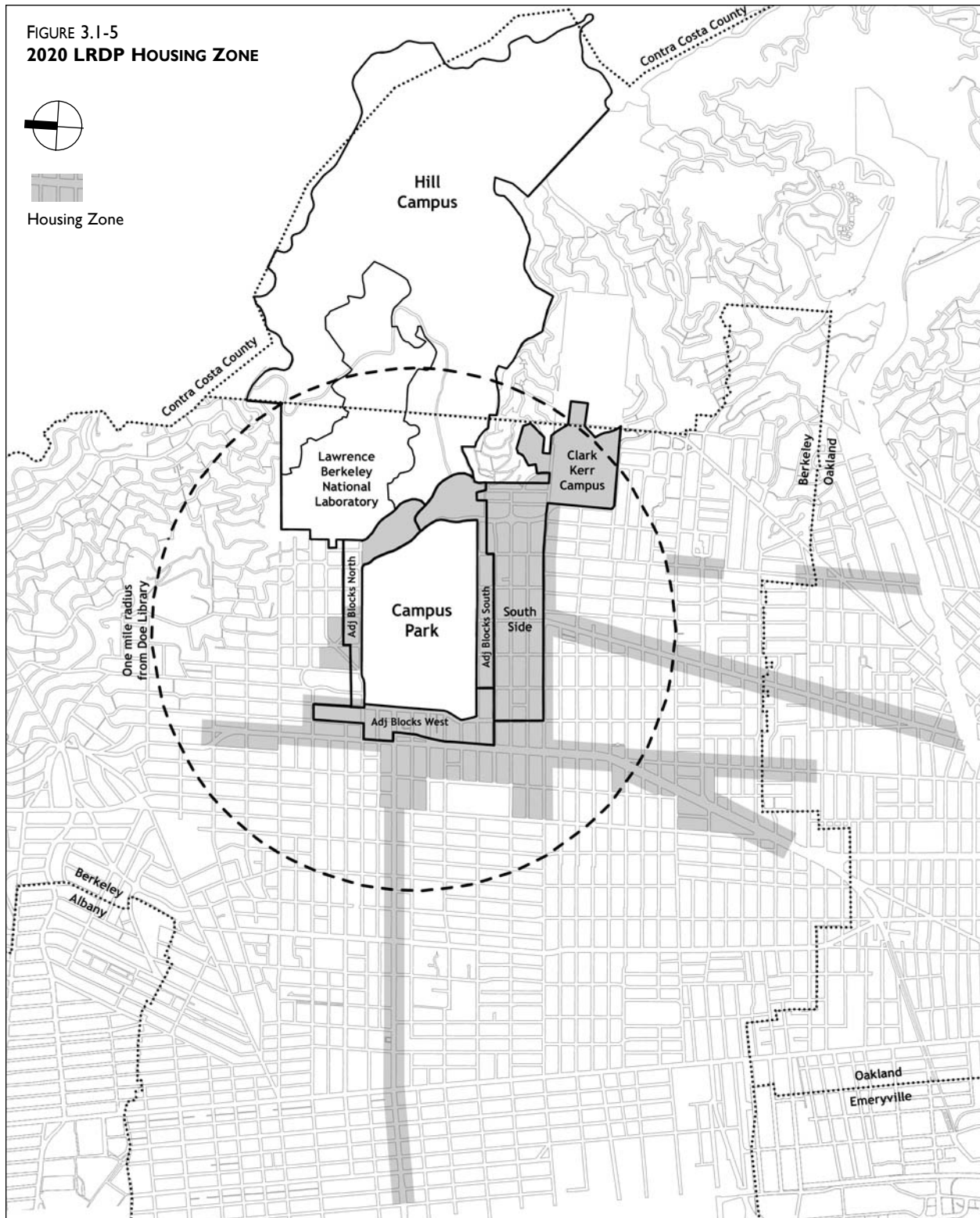
Because the state provides no funds for university housing, the entire cost of housing construction, operation, and maintenance must be supported by rent revenues. Our goals to improve the amount and quality of housing must therefore be balanced by the need to keep rents at reasonable levels, and avoid building surplus capacity. The 2020 targets, and the pace at which we achieve them, may be adjusted in the future to reflect changes in market conditions and demand for university housing.

POLICY: INCREASE SINGLE UNDERGRADUATE BED SPACES TO EQUAL 100% OF ENTERING FRESHMEN PLUS 50% OF SOPHOMORES AND ENTERING TRANSFER STUDENTS BY 2020.

For lower division students, new both to independent living and to the intense demands of university coursework, group housing in close proximity to the educational resources of the campus is the best solution. As well as convenience to campus, such housing also provides its residents with a wide range of on-site counseling, mentoring and academic support programs.

POLICY: INCREASE SINGLE GRADUATE STUDENT BED SPACES TO EQUAL 50% OF ENTERING GRADUATE STUDENTS BY 2020.

As they progress, students gravitate toward peer groups based on their major fields of study or other shared interests. They also continue to mature and acquire the social experience required to live as independent adults. By the third year, it is no longer necessary for UC Berkeley to take as direct a role in creating a residence-based intellectual community. However, we must continue to take a proactive role to ensure our students have access to good and reasonably priced housing.



The 2020 LRDP Housing Zone overlays the other Land Use Zones. It includes all areas within a one mile radius of Doe Library, or within a block of a transit line providing trips to Doe Library in under 20 minutes. The Housing Zone excludes those sites with residential designations of under 40 units per acre in a municipal general plan as of July 2003. This figure shows the extent of the Housing Zone based on transit trips via AC Transit routes as of July 2003. Suitable sites within one block of some BART Stations may also qualify for inclusion in the Zone. The depiction of the Housing Zone is generalized, and may not reflect the precise boundaries of individual parcels or land use designations.

Such housing is particularly critical for first-year graduate students. Not only does the cost and scarcity of housing make it harder for all our students to focus on and excel in their academic endeavors: in the case of first year graduate students, it also makes it far harder to recruit them in the first place. For graduate students, apartments are the best solution, not only because older students tend to prefer a less structured environment, but also because conventional apartments offer a broader range of delivery options, including joint ventures with private developers.

POLICY: MAINTAIN AND UPGRADE THE CURRENT SUPPLY OF UNIVERSITY HOUSING SUITABLE FOR STUDENTS WITH CHILDREN.

It is particularly difficult for students with children to find suitable housing in the constrained Berkeley market. While UC Berkeley operates over 850 units suitable for students with children, many are in need of major repair or replacement. As we pursue these improvements, the supply of units must be maintained.

POLICY: PROVIDE UP TO 3 YEARS OF UNIVERSITY RENTAL HOUSING TO NEW UNTENURED LADDER FACULTY WHO DESIRE IT BY 2020.

While the university has begun to address the long-term housing needs of faculty through its down payment and mortgage subsidy programs, such programs do not address the critical need for good rental housing. As with graduate students, our ability to recruit and retain outstanding individuals depends to a great extent on our ability to ensure good and reasonably priced housing for at least their first years at UC Berkeley.

At projected rates of future faculty hires, this policy may result in construction of up to 100 such units within the LRDP Housing Zone. This housing may be separate or co-located with the graduate and /or student family housing described above. As described further in the **Hill Campus Framework**, up to 100 additional units of faculty housing may be built in the Hill Campus on sites suitable for housing.

POLICY: LOCATE ALL NEW UNIVERSITY HOUSING WITHIN A MILE OR WITHIN 20 MINUTES OF CAMPUS BY TRANSIT.

To ensure university housing improves access to the academic life and resources of the campus, and supports a vital intellectual community, all new housing built under the 2020 LRDP would be located within the Housing Zone shown in figure 3.1-5, namely:

- Within a one mile radius of the center of campus, defined as Doe Library, or
- Within one block of a transit line providing trips to Doe Library in under 20 minutes. A transit trip is defined as the time on the transit vehicle to the stop nearest to campus, with no transfers, plus the walking time from the stop to Doe Library.

POLICY: IMPROVE ACCESS TO QUALITY CHILD CARE FOR STUDENTS, FACULTY AND STAFF.

The need for good and convenient child care is, like housing, a critical factor in our ability to recruit and retain exceptional individuals, and to enable them to participate fully in campus intellectual life. The demand for university child care in spring 2004 was far greater than our capacity of 205 children. Moreover, some of our child care centers are housed in temporary facilities unable to fully support our programmatic goals. Under the 2020 LRDP, UC Berkeley should expand its permanent child care facilities to accommodate both current unmet demand and future campus growth, at locations within easy walking distance of the Campus Park.

3.1.9 CAMPUS ACCESS

PROVIDE THE HOUSING, ACCESS, AND SERVICES WE REQUIRE TO SUPPORT A VITAL INTELLECTUAL COMMUNITY AND PROMOTE FULL ENGAGEMENT IN CAMPUS LIFE.

Access to campus is vital to the work and culture of UC Berkeley. Our faculty, students and researchers depend not only on the academic resources of the campus, but also on their interactions with colleagues that lead to new insights, concepts and methods. Many of our senior faculty with long tenures at UC Berkeley enjoy the convenience of a residence near campus, acquired in the days when a Berkeley home was within reach of even moderate income households.

But more recently, due in large part to the shortage of good and reasonably priced housing near campus, our residential patterns have become more and more dispersed. For those who live beyond walking or bicycling distance or good transit service, the time and inconvenience of travel to and from campus, exacerbated by the shortage of parking, has become a significant disincentive to on-campus presence. This trend undermines the goal of a strong and vital intellectual community, and we must strive to reverse it.

POLICY: ENSURE UNIVERSITY HOUSING AND ACCESS STRATEGIES ARE INTEGRATED AND SYNERGETIC.

The 2020 LRDP objectives for housing would significantly increase the supply of student housing within a mile or a within a 20 minute transit trip of campus: our surveys indicate for most students a mile is a reasonable walking distance. These housing initiatives should be linked to the campus access strategy, to ensure the resources we commit to new housing also serve to reduce the demand for drive-alone trips, and to ensure our parking targets are adjusted to reflect any such reductions.

POLICY: INCREASE THE SUPPLY OF PARKING TO ACCOMMODATE EXISTING UNMET DEMAND AND FUTURE CAMPUS GROWTH.

The demand for parking on and around campus is far greater than the current supply, and this demand will grow as a result of future campus growth. Adequate parking is critical to the mission of UC Berkeley, but given our urban setting, the campus should achieve this through a balanced strategy of parking construction and demand management initiatives.

By California standards, UC Berkeley has an exemplary record of promoting alternatives to the automobile. The 2001 survey of faculty and staff indicated only 51% of faculty and staff, and only 11% of students, drive alone to campus: these percentages compare to the estimate of 46% for all commuters to campus and downtown Berkeley presented in the 2001 City-UC Berkeley Transportation Demand Management Study, and the 2000 Census estimate of 66% for Alameda County as a whole.

By 2020, we propose to increase the amount of university automobile parking by up to 30% over current and approved spaces, as shown in table 3.1-2. The proposed net increase of 2,300 spaces is required to meet the continuing demand for 1,000 net new spaces proposed in the 1990-2005 LRDP, replace the 300 spaces displaced by new construction since 1990, and accommodate future parking demand at a rate of one space per two new campus workers and one space per ten new students.

This estimate of future parking demand is based on target drive-alone rates of 10% for students and 50% for staff and faculty. However, to the extent we are able to further reduce these ratios, through demand reduction initiatives and through construction of new student housing, the objective would be adjusted to reflect these changes.

As with housing, because the state provides no funds for university parking, the full cost of parking construction, operation and maintenance must be supported by revenues. Our objectives to improve the parking supply must therefore be balanced by the need to maintain reasonable fees for those who must drive to campus, and to avoid building surplus capacity. The 2020 targets may be adjusted in the future to reflect changes in market conditions and parking demand.

POLICY: REPLACE AND CONSOLIDATE EXISTING UNIVERSITY PARKING DISPLACED BY NEW PROJECTS.

The previous objectives can not be realized if existing campus parking is displaced without replacement. Our strategy to accommodate future campus growth requires, and in fact depends upon, existing surface lots being replaced by new buildings and open spaces. In order to maintain the campus parking supply, these displaced spaces should be replaced on site or elsewhere, and the scope and budget for each such project should include those replacement spaces. The strategy to replace this parking should also be designed to consolidate it, not only to improve operations but also to reduce congestion caused by multiple-lot searches for available space.

POLICY: REDUCE DEMAND FOR PARKING THROUGH INCENTIVES FOR ALTERNATE TRAVEL MODES.

UC Berkeley presently offers a wide range of incentives for alternatives to drive-alone auto trips, including:

- price subsidies and pre-tax purchase of transit tickets,
- discounted parking to alternate mode users who must occasionally drive alone,
- free parking and reserved parking spaces for carpoolers,
- free emergency rides home for alternate mode users, and
- now in development, a secure bicycle parking program for bike commuters.

Based on the findings of the 2001 City-UC Berkeley Transportation Demand Management Study, UC Berkeley will continue to pursue existing and new incentives for alternative modes of transportation, directly as well as in collaboration with cities and regional transit providers.

POLICY: COLLABORATE WITH CITIES AND TRANSIT PROVIDERS TO IMPROVE SERVICE TO CAMPUS.

While cost and dependent care are often cited as reasons why people drive to work, in our 2001 survey of faculty and staff only 9% and 10%, respectively, selected these reasons. Convenience, at 37%, and travel time, at 30%, were by far the most oft-cited reasons why faculty and staff drive rather than use transit or other alternate modes.

The university is working with transit providers to ensure reasonably priced transit options and adequate service. However, if significant numbers of drivers are to be shifted to transit, convenience and travel time must be improved. Although minor further improvements might be achieved through operational measures, significant improvements require major capital investments.

AC Transit is presently studying a program of capital investments in transit service from the south to the campus and downtown Berkeley. As a major transit destination, UC Berkeley is a key participant in this process. While several design options are presently under consideration, the eventual solution may involve realignments of traffic flow on southside streets and/or the introduction of dedicated transit lanes. UC Berkeley should continue to collaborate with cities and AC Transit on transit improvement plans to optimize their benefit to the campus community.

FIGURE 3.1-6
**CAMPUS PARK
 LANDSCAPE & OPEN
 SPACE INITIATIVES**

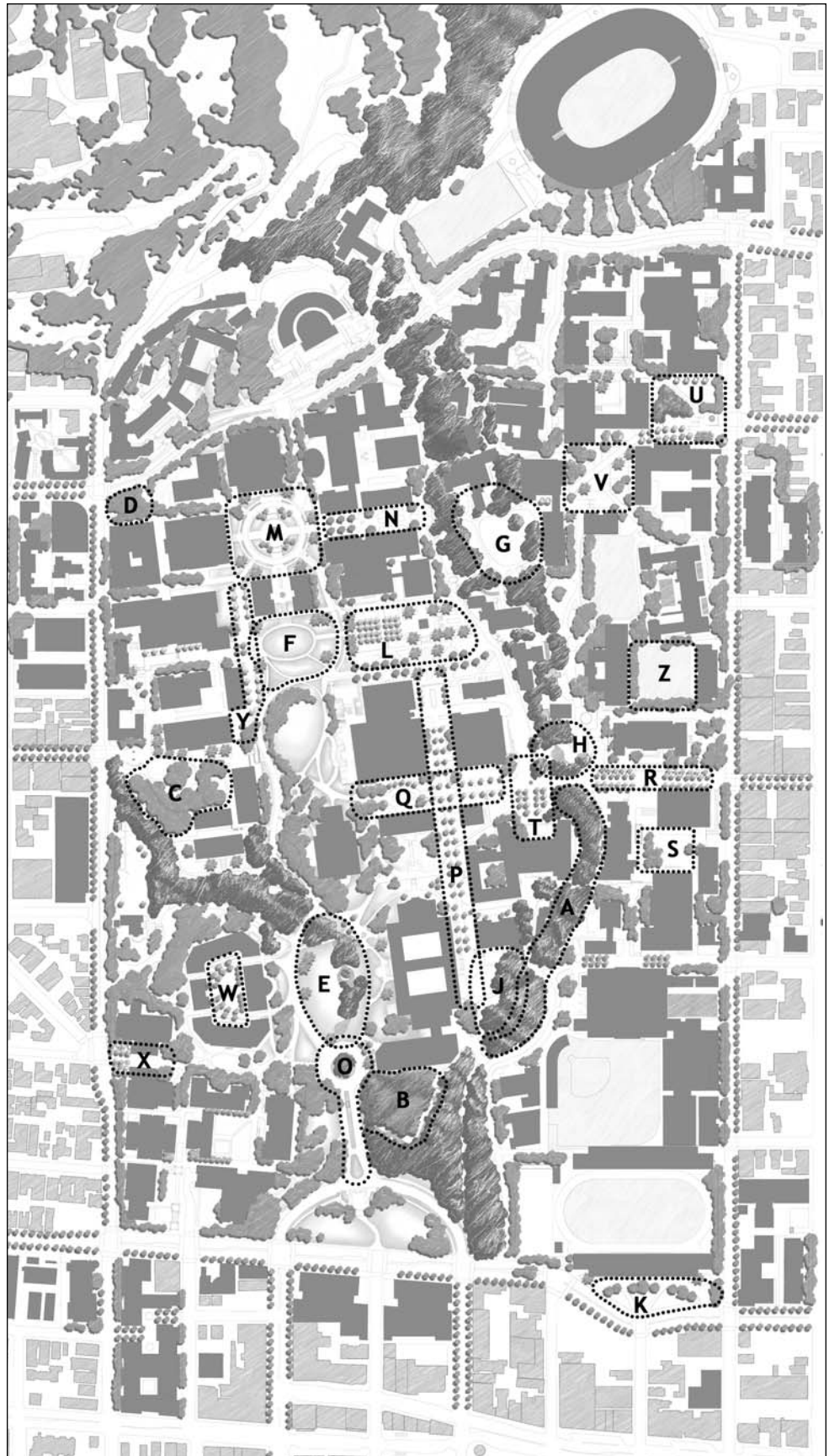


- A South Fork Renewal
- B Eucalyptus Grove
- C Observatory Hill**
- D Founders Rock
- E West Oval Glade**
- F Campanile Glade
- G Faculty Glade**
- H Wheeler Glade**
- J Grinnell Glade
- K Edwards Glade
- L Campanile Environs**
- M Mining Circle**
- N Gilman-LeConte Way
- O West Circle
- P Campanile Way**
- Q Sather Road**
- R Sproul Plaza**
- S Lower Sproul Plaza
- T Wheeler-Dwinelle Plaza**
- U College Plaza
- V Arts Quad
- W Wellman Courtyard
- X Tolman Plaza
- Y University Walk
- Z West Hearst Field

Priority initiatives in **bold**.

The Landscape Master Plan also designates the entire perimeter of the Campus Park as the Edges and Gateways initiatives: this group includes initiatives for each of the four perimeter roads and the entry points to the Campus Park.

This figure includes the potential future projects shown in the illustrative concept in figure 3.1-3B. These potential projects represent only one scenario of how the 2020 LRDP program might be implemented on the Campus Park. However, the potential projects serve as an example of how the **Campus Park Framework** would help guide the location and configuration of future buildings in the Campus Park.



3.1.10 CAMPUS OPEN SPACE

MAINTAIN AND ENHANCE THE IMAGE AND EXPERIENCE OF THE CAMPUS, AND PRESERVE OUR HISTORIC LEGACY OF LANDSCAPE AND ARCHITECTURE.

The UC Berkeley campus is a unique synergy of natural and formal elements. The organic forms of the creek and the sloping terrain contrast with the axial geometry of historic places such as Campanile Way and Esplanade. Together, these elements provide the campus with a rich variety of open spaces, and a peaceful counterpoint to our urbanized environs.

Open spaces for both quiet contemplation and active recreation have always been an integral part of the campus. The removal of the wartime-vintage 'T buildings' and the construction of Memorial Glade restored John Galen Howard's original vision of a grand central open space at the heart of campus. Yet, notwithstanding this one outstanding example, capital investment at UC Berkeley in recent years has focused almost entirely on our aging buildings and infrastructure, rather than the landscape.

OPEN SPACE

The campus landscape is not only an extraordinary natural and visual resource, it also serves as an important complement to spaces within buildings, as a venue for relaxation, recreation, and social and cultural interaction.

POLICY: IMPLEMENT AN ONGOING PROGRAM OF INVESTMENT TO RESTORE AND RENEW THE CAMPUS PARK LANDSCAPE.

To the casual observer, the mature campus landscape seems deceptively stable, but a closer look reveals the impacts of age, intensive use and misuse, and lack of investment. The great beauty of the campus, often taken for granted, is in fact increasingly fragile, particularly in light of the intensive construction activity it must continue to endure for at least the near future. The **Campus Park Framework** and **Guidelines** establish preservation zones to protect and maintain the campus' most significant views, natural areas, and open spaces.

But preservation alone is not enough: investment is also required. Many areas of the campus landscape are dominated by plants nearing the end of their natural life cycles: this problem is particularly acute for the many specimen trees and groves that serve as campus landmarks and frame key vistas. The natural riparian areas along the creek forks reveal the cumulative impacts of erosion, unstable banks, and the displacement of native plants by invasive exotics.

POLICY: IMPLEMENT A PROGRAM OF STRATEGIC INVESTMENT IN NEW AND ENHANCED CAMPUS OPEN SPACES.

The lack of past investment is also evident in the campus' formal open spaces. While few would dispute the value of places such as Sproul Plaza or Campanile Way, due to the lack of funds for renewal these and other campus open spaces have fallen into severe disrepair. Our capital investment program should acknowledge the critical role of our landscape and open spaces in the image and experience of the campus, and include proactive measures to reverse their decline.

In order to guide and prioritize future investment in campus open spaces, the UC Berkeley Landscape Master Plan has identified 29 initiatives, as shown in figure 3.1-6: 25 place-specific initiatives plus the four urban edges of the Campus Park. Both in formulating the campuswide capital program, and in scoping and budgeting individual capital projects, UC Berkeley should address the need to both renew and enhance the campus landscape within the framework of the Landscape Master Plan.

Moreover, this policy is not limited to the Campus Park. Our objective to respect and enhance the City Environs requires more than just sensitive building design: it also requires that each university project in the City Environs contribute its fair share of improvements to the adjacent public realm, including undergrounding surface utilities and improving paving, planting and lighting within the project frontages.

PLACES OF INTERACTION

Of particular importance to the goal of a vital intellectual community are open spaces designed to encourage informal interactions both within and among disciplines. Several of the open spaces shown in figure 3.1-6 have the potential to become true 'places of interaction', because they are located on major pedestrian routes and/or because they are framed by multiple buildings housing a variety of academic programs.

POLICY: CREATE PLACES OF INTERACTION AT KEY NODES OF ACTIVITY.

For such places of interaction, moreover, the program and design of buildings adjacent to these open spaces is as important as the design of the open spaces themselves. Buildings should be programmed and designed so active interior spaces face and observe major pedestrian routes and places of interaction, and help ensure the campus is a safe place to work and study at any hour, as prescribed in the Campus Park Guidelines.

RECREATION

Space for recreation is essential to the health and wellness of the campus community. However, while the campus population continues to grow, recreational facilities have remained constant or, in the case of playfields, considerably declined: Underhill Field was demolished due to seismic hazard, and temporary buildings were constructed on West Hearst Field to provide surge space for seismic retrofit projects. The loss of these two fields, combined with the growth in field space demand for athletics programs, has reduced the amount of recreational field space per student to 40% of what it was in 1990.

POLICY: PRESERVE EXISTING RECREATIONAL FIELDS AND RESTORE THE FIELDS LOST SINCE 1990.

A project to replace Underhill Field has already been planned as part of the 2000 Underhill Area Master Plan. UC Berkeley should also remove the temporary buildings on West Hearst Field and return it to recreational use as soon as possible, preferably as a synthetic turf field over one or more levels of parking. Once restored, these and other campus recreational fields should be protected from future conversion to other uses.

POLICY: PRESERVE AND ENHANCE RECREATIONAL AQUATICS FACILITIES.

Strawberry Canyon Recreation Area is a precious recreational resource for both campus and community, but the 2002 closure of the east pool has significantly increased the pressure on other campus pools to accommodate both athletics and recreational users. UC Berkeley should prepare and implement a plan to improve the pool complex at Strawberry Canyon as part of a comprehensive strategy for campus aquatics facilities.

3.1.11 SUSTAINABLE CAMPUS

PLAN EVERY NEW PROJECT AS A MODEL OF RESOURCE CONSERVATION AND ENVIRONMENTAL STEWARDSHIP.

As one of the world's great research universities, UC Berkeley has a special obligation to serve as a model of how creative design can both minimize resource consumption and enhance environmental quality. Each new capital investment at UC Berkeley has the potential to advance the state of the art in responsible, sustainable design, and thereby contribute to our mission of public service.

In July 2003 the UC Regents adopted a university-wide Green Building Policy and Clean Energy Standard to reduce the consumption of non-renewable energy, through a combination of energy conservation measures, local renewable power measures for both existing and new facilities, and the purchase of energy derived from renewable sources. In support of this policy, UC Berkeley should develop a strategy for the campus that reflects the specific characteristics of our site, climate, and facility inventory.

The principles of sustainable design are not separate and discrete. On the contrary, they are interdependent, and require a comprehensive approach to design. Therefore, while standard criteria can be very useful as a framework for analysis, sustainable design ultimately depends on the integrated efforts of a multidisciplinary project team. This comprehensive approach is particularly critical during the feasibility phase of a project, where a range of alternate solutions is evaluated and the optimal solution is defined.

POLICY: INCORPORATE SUSTAINABLE DESIGN PRINCIPLES INTO CAPITAL INVESTMENT DECISIONS.

The policies in **Strategic Investment** require UC Berkeley to consider a range of alternate solutions at the feasibility phase of the project approval process. This analysis should include an evaluation of how each option supports the principles of sustainable design, which include:

- preserving and restoring the integrity and biodiversity of natural systems,
- minimizing energy use in travel to and within the campus,
- minimizing building energy use and peak energy demand,
- minimizing water use and maximizing on-site conservation and reuse,
- minimizing the use of nonrenewable energy and material resources,
- minimizing adverse impacts to air and water quality,
- optimizing the use, and adaptive reuse, of existing facilities,
- concentrating growth on sites served by existing infrastructure,
- maximizing the productive life of new facilities through durable, flexible design, and
- creating environments that enhance human health, comfort, and performance.

POLICY: BASE CAPITAL INVESTMENT DECISIONS ON LIFE CYCLE COST, INCLUDING THE COST OF KNOWN FUTURE EXPENDITURES.

Sustainable design also depends on analyses based on true life cycle cost. While the best environmental solutions often have a lower life cycle cost, their first cost is often greater. The policies in **Strategic Investment** require the campus to evaluate alternate design solutions based on their life cycle cost, including the discounted costs of future expenditures: the policy is repeated here because it is essential to an effective strategy for sustainable design.

It is also essential to consider initial capital cost in the context of the building as a whole, since an upgrade in one system can sometimes reduce the capital cost of others. For example, investing in a high-performance window system may reduce the required capacity, and thus the initial capital as well as the future operating cost, of the space conditioning systems.

POLICY: DESIGN NEW PROJECTS TO MINIMIZE ENERGY AND WATER CONSUMPTION AND WASTE-WATER PRODUCTION.

Toward this end, substantial savings in water and energy consumption can often be achieved through architecture and landscape design: for example, by the careful selection of landscape materials, and by orienting and configuring building volumes and composing building facades to optimize energy performance. The **Campus Park Guidelines** include several such provisions, which should inform every future capital project.

POLICY: DESIGN NEW BUILDINGS TO A STANDARD EQUIVALENT TO LEED 2.1 CERTIFICATION. DESIGN NEW LABORATORY BUILDINGS TO A STANDARD EQUIVALENT TO LEED 2.1 CERTIFICATION AND LABS 21 ENVIRONMENTAL PERFORMANCE CRITERIA. DESIGN NEW BUILDINGS TO OUTPERFORM THE REQUIRED PROVISIONS OF TITLE 24 OF THE CALIFORNIA ENERGY CODE BY AT LEAST 20 PERCENT.

Many other institutions have adopted the LEED (Leadership in Energy & Environmental Design) system as their reference standard for sustainable design. The LEED system offers a reference standard that is well established and well supported by the design industry. However, it is also generic: it does not address particular building types or physical environments, nor does it address multi-building campus environments. As a research university, with a wide range of laboratories and other specialized buildings, UC Berkeley would be best served in the long run by performance guidelines more specific to our unique facility inventory and our temperate climate.

However, given the intensive pace of new construction and renovation on the Berkeley campus, it is imperative that we begin now to incorporate the principles of sustainable design into every new project. The LEED system is our best option today, and UC Berkeley should use version 2.1 as an interim reference standard while we investigate a more customized approach. Given the importance of sustainable design in laboratory facilities, UC Berkeley should supplement the LEED criteria with LABS 21 (Laboratories for the 21st Century) environmental performance criteria.

Moreover, the aforementioned objectives should serve only as a minimum standard for design. UC Berkeley should strive for a standard equivalent to LEED Silver wherever program needs, site conditions and budget parameters permit.

POLICY: DEVELOP A CAMPUS STANDARD FOR SUSTAINABLE DESIGN SPECIFIC TO OUR SITE, CLIMATE, AND FACILITY INVENTORY.

In consultation with the UC Office of the President, UC Berkeley should develop an internal evaluation and certification standard based on LEED and LABS 21 criteria as well as other sustainable design measures and guidelines, one which reflects both the unique composition of the UC Berkeley facility inventory and our temperate, semi-arid climate.

3.1.12 STRATEGIC INVESTMENT

PLAN EVERY NEW PROJECT TO REPRESENT THE OPTIMAL INVESTMENT OF LAND AND CAPITAL IN THE FUTURE OF THE CAMPUS.

Given the scarcity of both land and capital in relation to the future needs of the university, UC Berkeley must ensure each investment decision represents the best possible use of these limited resources, and the best long-term solution for the campus as a whole.

Capital investment decisions are often strongly influenced by the magnitude of first cost. Seismic retrofits, for example, are often less expensive than new buildings. But seismic retrofits alone do not improve inadequate building systems, dysfunctional layouts, or insensitive design: in fact, they perpetuate and often exacerbate them. Ensuring each decision is based on a full analysis of alternate solutions, and a full recognition of life cycle cost, is critical to the wise use of university resources.

POLICY: EVALUATE A FULL RANGE OF ALTERNATE SOLUTIONS IN CAPITAL INVESTMENT DECISIONS.

As a general rule, the set of options for this analysis should include retrofit, renovation, adaptive reuse, replacement, relocation and, if relevant, noncapital solutions such as reorganization. The options should consider alternate models for project delivery, as described below, and sustainable design features, as described in **Sustainable Campus**.

POLICY: BASE CAPITAL INVESTMENT DECISIONS ON LIFE CYCLE COST, INCLUDING THE COST OF KNOWN FUTURE EXPENDITURES.

For example, an existing building may not only require seismic and other life safety improvements, but may also have one or more building systems past the ends of their useful lives, as well as other systems nearing the same point. In order to make a valid comparison with the replacement option, the retrofit and renovation options should include these known future costs. This comparison should include assessment of the future maintenance requirements for all elements of the building infrastructure in relation to first cost.

POLICY: CONSIDER JOINT VENTURES THAT LEVERAGE UNIVERSITY RESOURCES WITH PRIVATE LAND AND CAPITAL.

While such partnerships have clear advantages in terms of augmenting university resources, advocates also cite their potential to reduce both cost and time to delivery. The advantages a well chosen partner brings to a project include extensive experience with the project type, established relationships with providers of labor, materials, and services, and state-of-the-art management.

However, in considering such models, it is also important to recognize quality has value, given the heavy use and long service expected of campus buildings. The analyses of alternate solutions, particularly for joint ventures, should be based on projects designed to comparable standards of durability and performance.



FACULTY GLADE

DESIGN FRAMEWORK

CAMPUS PARK FRAMEWORK 3.1.13

CITY ENVIRONS FRAMEWORK 3.1.14

HILL CAMPUS FRAMEWORK 3.1.15

3.1.13 CAMPUS PARK FRAMEWORK

MAINTAIN AND ENHANCE THE IMAGE AND EXPERIENCE OF THE CAMPUS, AND PRESERVE OUR HISTORIC LEGACY OF LANDSCAPE AND ARCHITECTURE.

The heart of UC Berkeley is often described as a 'university in a park', and it is this park-like character that unifies its disparate buildings and diverse academic functions, and imparts a unique and memorable identity. UC Berkeley was established on an expansive landscape of rolling hills, framed by the north and south forks of Strawberry Creek. Over the years, two complementary design themes have emerged to define the relationship of buildings and landscape in the Campus Park.

The first theme, pursued in the Frederick Law Olmsted plan of 1866, emphasized the complex natural order of the site in its organic landscape forms and informal clusters of buildings. The second theme, pursued in the John Galen Howard Plan of 1908, sought to overlay on this natural landscape a formal composition of classical buildings, oriented along an east-west axis aligned with the Golden Gate. The unique character of the Campus Park results from the synergy of these two themes, the natural and the formal.

Although intensively developed, the Campus Park today retains a magnificent legacy of natural and formal open spaces, as well as numerous historic buildings and ensembles. Preserving this legacy is a fundamental objective of the 2020 LRDP: each future project should be scoped and designed to enhance the image and experience of the campus, and the quality of campus life.

LAND USE

The Campus Park is also our center of intellectual community, and there is a strong preference among academic programs for Campus Park locations. However, because university land is both scarce and finite, our use of land on and around the Campus Park must be strategic. As described in **Campus Land Use**, space in the Campus Park is prioritized for programs that directly engage students and promote student-faculty interaction.

In response to future space demand by academic and other campus programs, capital investment in the Campus Park through 2020 may result in a net increase of up to 1,000,000 GSF and up to 600 parking spaces, as shown in table 3.1-3.

New space in the Campus Park would be produced through a combination of renovation and expansion of existing buildings, strategic building replacements, and new buildings on underutilized sites. Many of these renovations, expansions and replacements would be done in conjunction with seismic improvements. To ensure its parklike character is preserved, the **Campus Park Guidelines** define preservation zones to protect the campus' most significant open spaces: no new buildings may intrude into those areas.

LANDSCAPE

The Campus Park landscape provides a wide variety of experiences, from the shady peaceful glens along Strawberry Creek, to the broad open lawns of the Central Glades, to the serene geometry of places such as Campanile Way and Esplanade. Located within the densely urbanized Eastbay, the Campus Park is a precious resource for both the university and the city around us.

FIGURE 3.1-7
**CAMPUS PARK
 PRESERVATION AREAS**



Natural riparian areas



Rustic campus woodlands

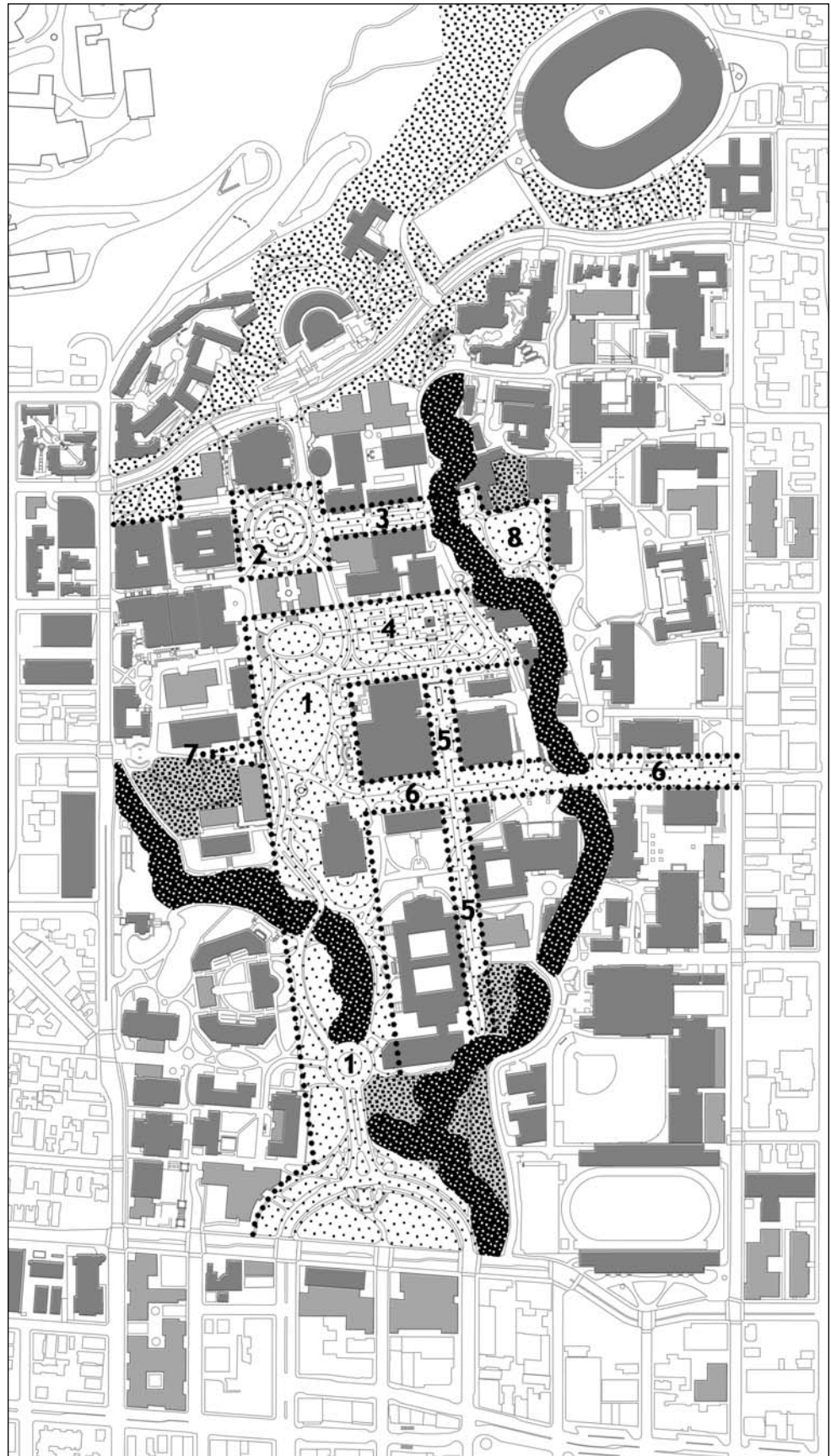


Rustic hill woodlands



View & open space
 preservation zones

Key numbers refer to the zone
 descriptions in the **Campus
 Park Guidelines**.



This figure includes the potential future projects shown in the illustrative concept in figure 3.1-3B. These potential projects represent only one scenario of how the 2020 LRDP program might be implemented on the Campus Park. However, the potential projects serve as an example of how the **Campus Park Framework** would help guide the location and configuration of future buildings in the Campus Park.

However, over the years the integrity of the landscape has been damaged by insensitively sited and designed projects. Sometimes the damage is obvious, such as the location of Evans and Moffitt within the Central Glades, while other times it is more subtle, such as the gradual and cumulative impacts of ongoing construction.

POLICY: PRESERVE AND MAINTAIN SIGNIFICANT VIEWS, NATURAL AREAS, AND OPEN SPACES IN THE CAMPUS PARK.

The 2020 LRDP takes as axiomatic the principle there should be no further degradation of the Campus Park landscape. The first principle of design for the Campus Park, therefore, is to identify those areas of the landscape into which new buildings should not intrude. These 'preservation areas', shown in figure 3.1-7 and described in detail in the **Campus Park Guidelines**, include the campus' most significant natural areas, open spaces, and scenic vistas.

The experience of the Campus Park is created by the synergy of buildings and landscape, and the character of many of our open spaces depends to a great extent on how they are framed and defined by the buildings around them. For this reason, some of the preservation areas described in the **Campus Park Guidelines** include setback and build-to lines, to ensure their character is maintained and reinforced by new buildings.

POLICY: IMPLEMENT AN ONGOING PROGRAM OF INVESTMENT TO RESTORE AND RENEW THE CAMPUS PARK LANDSCAPE.

IMPLEMENT A PROGRAM OF STRATEGIC INVESTMENT IN NEW AND ENHANCED CAMPUS PARK OPEN SPACES.

The section on **Campus Open Space** describes the principles for future investment in the public realm of the Campus Park. The above policies are repeated in this section to emphasize the point that protection alone is essential but not sufficient to achieve this objective: the landscape must be continuously renewed in order to thrive.



STRAWBERRY CREEK WOODLAND

FIGURE 3.1-8
**CAMPUS PARK
 ARCHITECTURE &
 CULTURAL RESOURCES**



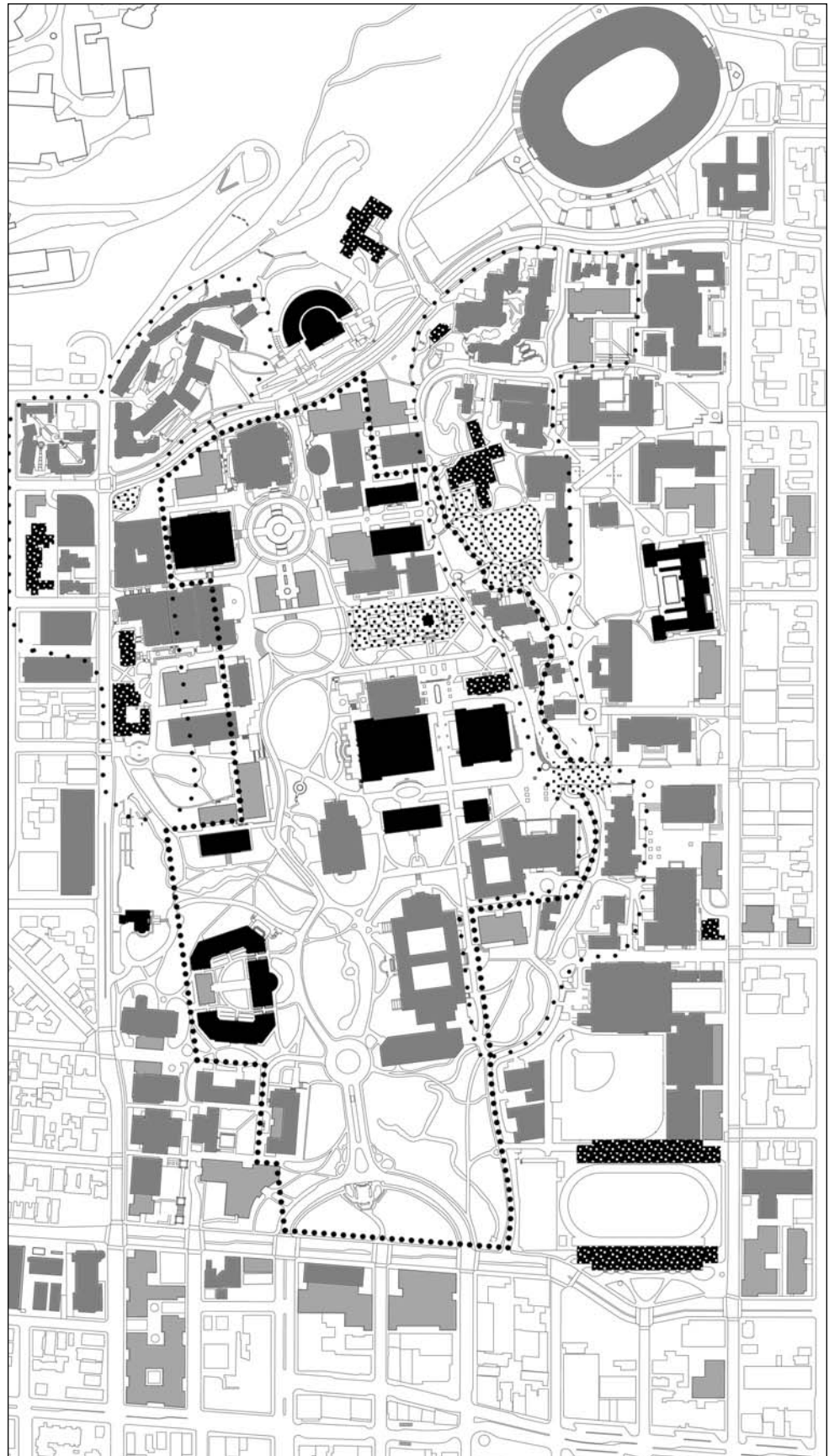
.....
 Classical core

.....
 Picturesque ensemble

■
 National Register:
 classical buildings

■
 National Register:
 other buildings

■
 National Register:
 sites & landscapes



This figure includes the potential future projects shown in the illustrative concept in figure 3.1-3B. These potential projects represent only one scenario of how the 2020 LRDP program might be implemented on the Campus Park. However, the potential projects serve as an example of how the **Campus Park Framework** would help guide the location and configuration of future buildings in the Campus Park.

ARCHITECTURE

While the campus does not have a single, coherent architectural vocabulary, it does have many buildings of great distinction, and the best of these comprise the 'classical core': the beaux-arts ensemble designed primarily by John Galen Howard, the first campus architect. The classical symmetry of these buildings, and their common palette of granite facades, tile roofs, and copper trim, impart a sense of unity and dignity to the heart of campus.

UC Berkeley includes 50 sites, structures, and districts on the National Register of Historic Places, and two more are in the process of nomination. As shown in figure 3.1-8, 27 are located on the Campus Park and Adjacent Blocks: the majority are neoclassical buildings located primarily within the classical core, with the balance comprised of picturesque buildings located primarily along the historic route of Strawberry Creek.

The classical core represents a unique cultural resource, in terms of both its architectural merit and the open spaces its buildings frame and define. For this reason, new projects within the classical core, as shown in figure 3.1-8, should be sited, configured and designed to reinforce and enhance this ensemble, as prescribed in the **Campus Park Guidelines**.

The campus identity is also shaped by another, more subtle ensemble: the variety of picturesque buildings along the creek, which also includes a number of historic structures. In contrast to the formality of the classical core, these picturesque buildings are designed as informal, highly articulated volumes that respond to the natural contours and features of the site. As exemplified by the Haas School of Business, new projects within the areas of picturesque influence should respect and continue these traditions.

POLICY: ENSURE FUTURE CAMPUS PARK PROJECTS CONFORM TO THE CAMPUS PARK GUIDELINES.

PREPARE PROJECT SPECIFIC DESIGN GUIDELINES FOR EACH MAJOR NEW PROJECT.

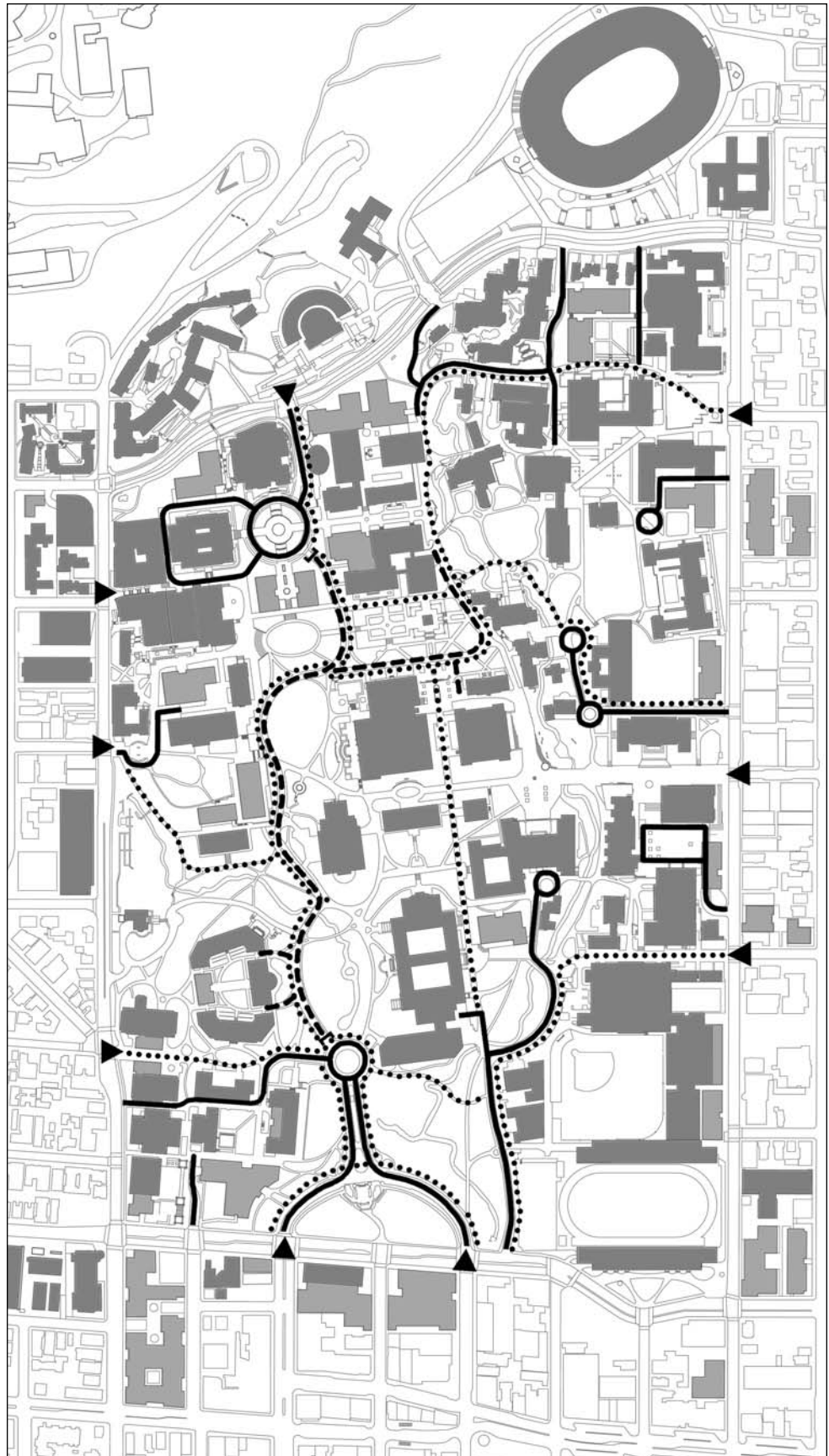
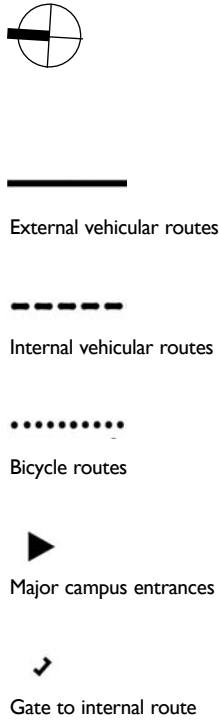
While the design of each campus building should reflect its own time and place, it should also reflect the enduring values of elegance and quality, and contribute to a memorable identity for the campus as a whole. Toward this goal, major capital projects should be reviewed at each stage of design by the UC Berkeley Design Review Committee: a majority of DRC participants should be external to the campus.

The **Campus Park Guidelines** should guide these reviews to ensure they both reflect a coherent esthetic vision and support the academic goals of the campus. The **Guidelines** prescribe general design principles for the Campus Park as a whole, as well as more prescriptive criteria in selected areas to ensure:

- projects within the classical core enhance the architectural integrity of the ensemble, and complement rather than compete with historic buildings,
- projects at the city interface create a graceful transition from campus to city, and enhance the visual image and pedestrian experience of the campus edge,
- projects facing places of interaction provide enclosure and security, admit sunlight, and have active ground level uses that observe and activate the place.

Moreover, given the variety of site conditions present in the Campus Park, project specific design guidelines should be prepared for each major project, based on the **Campus Park Guidelines**, and should be reviewed by the campus DRC prior to selection of the project design team. The project specific design guidelines should specify the landscape and open space improvements to be incorporated into the project scope and budget.

FIGURE 3.1-9
**CAMPUS PARK
VEHICULAR ACCESS**



This figure includes the potential future projects shown in the illustrative concept in figure 3.1-3B. These potential projects represent only one scenario of how the 2020 LRDP program might be implemented on the Campus Park. However, the potential projects serve as an example of how the **Campus Park Framework** would help guide the location and configuration of future buildings in the Campus Park.

The UC Berkeley Design Review Committee should include at least one architectural historian or other person with equivalent experience and knowledge in historic preservation. As part of project review, the DRC should assess potential adverse impacts on cultural resources and recommend measures to minimize such impacts.

CIRCULATION

A vital intellectual community depends on a safe, pedestrian- and bicycle-friendly environment, accessible to people with both full and limited mobility. The intricate web of internal campus routes should not only have a clear wayfinding system, but their design should reflect a clear hierarchy of purpose and minimize conflicts with vehicles.

The work of the university today also has no defined 'working hours': study and research go on day and night, and the campus should provide a safe and secure environment for those who use the campus after dark. Well-lit routes should link key campus destinations, as well as places of interaction framed and observed by active interior spaces.

POLICY: IMPLEMENT A PROGRAM OF STRATEGIC INVESTMENT IN CAMPUS PARK PEDESTRIAN AND BICYCLE ROUTES.

ENSURE THE CAMPUS PARK PROVIDES FULL ACCESS TO USERS AT ALL LEVELS OF MOBILITY.

The Campus Park is an intensively developed environment, laced with an intricate web of circulation systems that are complex and often confusing in their purpose, hierarchy, and linkages. There is a lack of signage leading to the campus, and a lack of a legible wayfinding system within it. Moreover, some primary routes of travel on campus include segments that are not accessible for those with impaired mobility.

The Campus Park presently has only one well-developed bicycle route: other paths are designated but not well developed for bicycles. As a result, cyclists often use pedestrian routes. Improvements to campus required to limit vehicle traffic should also incorporate investments to separate bicycle, vehicle and pedestrian traffic, and improve paving, lighting and signage on bicycle routes.

Many of the improvements required to improve campus routes and wayfinding about potential future building projects, and should be timed to coincide with those projects. As prescribed in **Campus Open Space**, adequate funds for those improvements should be defined at the feasibility stage of each project and incorporated into the project budget, and not diverted later to other project elements.

POLICY: MINIMIZE PRIVATE VEHICLE TRAFFIC IN THE CAMPUS PARK.

LOCATE NEW CAMPUS PARKING AT THE EDGE OR OUTSIDE THE CAMPUS PARK.

While the Campus Park is often described as a 'pedestrian' environment, in fact a wide variety of vehicles enter the campus on a typical workday: not just campus vehicles, but service and maintenance trucks, package service vans, construction vehicles and private cars. Not only do they pose a hazard to pedestrians, particularly on busy routes such as Sather Road and Campanile Way, they also cause paving and landscape damage which the campus has very limited funds to repair. As the campus becomes more and more congested due to both growth and construction activity, the unregulated flow of private vehicles through the Campus Park should be managed more assertively.

Many campus buildings can be served via short access roads directly from city streets: these are shown as 'external routes' in figure 3.1-9. In general, these external routes do not cause serious conflicts. Vehicles on internal routes, however, not only interfere with major pedestrian routes and places, but also degrade the serenity and historic quality of the heart of campus. The longterm goal for the campus should be to limit access to internal routes to two points, east and west gate, and by permit only from 8 am to 5 pm, to minimize vehicular movement on campus during peak times of instruction.

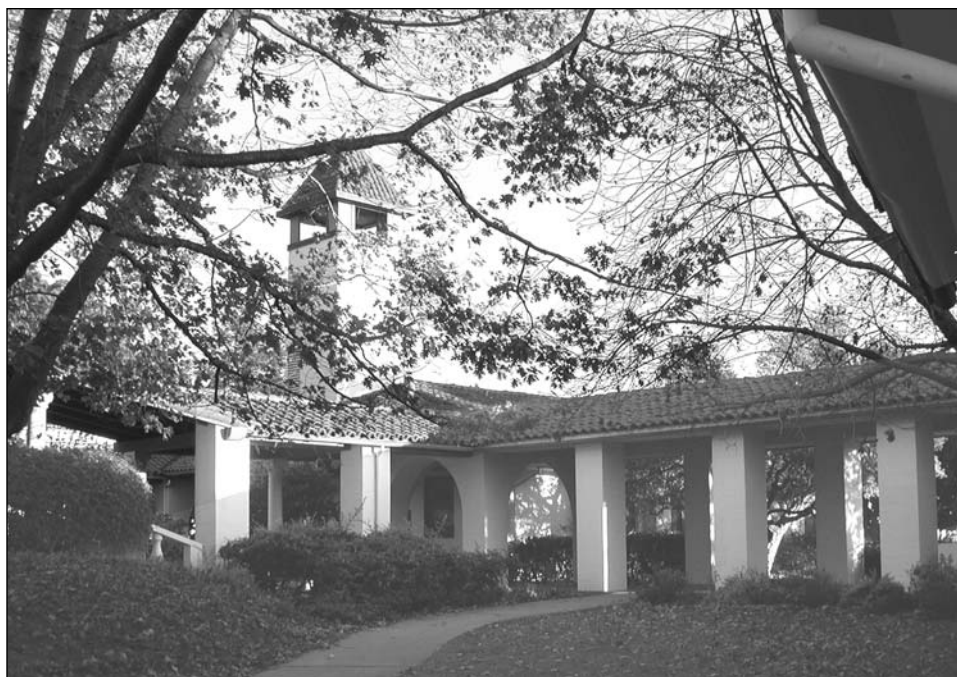
Surface parking located within the Campus Park not only encourages vehicle traffic, it is a poor use of scarce and valuable land. In general, campus parking, except for spaces required for service, loading, and disabled parking, should be consolidated in structures at the perimeter or outside the Campus Park, accessed directly from city streets.

CITY INTERFACE

Projects at the edge of the Campus Park should be designed to enhance its visual quality and create a graceful, yet clear and distinctive, transition to the Campus Environs. The **Campus Park Guidelines** prescribe special criteria for the city interface, to create a campus edge more coherent in design and more responsive to its urban context.

POLICY: PARTNER WITH THE CITY AND LBNL ON AN INTEGRATED PROGRAM OF ACCESS AND LANDSCAPE IMPROVEMENTS AT THE CAMPUS PARK EDGE.

The streets that define the Campus Park - Bancroft, Oxford/Fulton, Hearst, and Gayley/Piedmont - should be re-envisioned as 'seams' linking the Campus Park and its adjacent blocks, rather than dividers. UC Berkeley should collaborate with the City of Berkeley and Lawrence Berkeley National Laboratory to define, and jointly seek funds for, an integrated program of capital investments to improve the visual quality, pedestrian safety, functionality, amenity, bicycle access and transit service on these streets.



CLARK KERR CAMPUS

3.1.14 CITY ENVIRONS FRAMEWORK

PLAN EVERY NEW PROJECT TO RESPECT AND ENHANCE THE CHARACTER, LIVABILITY, AND CULTURAL VITALITY OF OUR CITY ENVIRONS.

UC Berkeley is an urban campus, and the City Environs are as much a part of the Berkeley experience as the campus itself. The quality of city life, including its diverse and dynamic mix of students and non-students, is a large part of what makes UC Berkeley a unique and desirable place to learn, work, and live.

LAND USE

As defined in the 2020 LRDP, the City Environs include the Adjacent Blocks, the Southside, Other Berkeley Sites, and the Housing Zone in its entirety: in other words, the entire scope of the 2020 LRDP except for the Campus Park and Hill Campus. The areas within the City Environs consist mostly of city blocks served by city streets, and include university properties interspersed with non-university properties.

It is not possible to accommodate all projected future space demand through 2020 on Campus Park sites. The **Location Guidelines** prioritize Campus Park space for programs that directly engage students and promote student-faculty interaction: at least some of the growth in other programs must be accommodated elsewhere within the City Environs.

ADJACENT BLOCKS

The Adjacent Blocks include several campus facilities intermixed with other properties. They also include the State Department of Health Services (DHS) facility, now being vacated by the state: the university has an option to acquire this site once it is vacated, and expects to do so. The **Location Guidelines** prioritize space on the Adjacent Blocks for programs that require locations near, but not on, the Campus Park.

In response to future space demand by campus programs, capital investment on Adjacent Blocks through 2020 may result in a net increase in program space of up to 1,250,000 GSF, and up to 1,900 net new parking spaces. New space on the Adjacent Blocks would be produced by more intensive redevelopment of existing university owned sites, as well as the DHS site if acquired by the university. New space may also be produced on other sites by the university directly or through joint ventures.

As shown in table 3.1-3, the majority of this space would be developed on the Adjacent Blocks West, and these blocks offer enormous potential to enhance the synergy of campus and city. Viewed on a map, the juxtaposition of downtown Berkeley and the grand west entrance to the campus might suggest an elegant, vibrant interface of town and gown: but this potential is largely unrealized. While the downtown BART station and bus lines from the north and west ensure a steady flow of people through the blocks west of campus, the visible university presence on these blocks in 2003 consisted of a parking structure, the printing plant, the bus garage, and administrative offices.

Given both its superior transit access and its established mixed-use character, downtown Berkeley should be the primary focus of future university investment in new research, cultural and service functions that require locations near, but not on, the Campus Park, as described above. However, these future investments should be planned not merely to accommodate the program needs of the university, but also to invigorate the downtown and create an inviting, exciting 'front door' to the UC Berkeley campus. They should also be planned to enable university land and capital to be leveraged through creative partnerships with other public and private sector organizations.

For example: the Berkeley Art Museum, now housed in a building with a poor seismic rating, and the Pacific Film Archive, now in a temporary facility, would both greatly benefit from a move to a downtown site, not only for the improved visibility and transit access, but also for the synergy with other downtown cultural and retail activity, including the thriving arts district along Addison Street. This new complex could also include exhibit spaces for other campus museums, as well as the campus visitor center.

Downtown is also the logical place for a hotel and conference center, a critical and long-standing need of the campus, as well as the city and its many public and private organizations. UC Berkeley should seek to encourage a privately developed and operated conference center: one flexible enough to serve a variety of users and events, but also large enough to meet the demand generated by both the campus and other users.

SOUTHSIDE

In response to future space demand by campus programs, capital investment in the Southside through 2020 may result in a net increase in program space of up to 50,000 GSF. New space in the Southside would be produced by more intensive redevelopment of existing university owned sites. New space may also be produced on other sites by the university directly or through joint ventures.

In 1982 the university executed a Declaration of Covenants and Restrictions with neighboring property owners and a Memorandum of Understanding with the City of Berkeley, both of which commit the university to a site plan and land use program on the Clark Kerr Campus for a period of 50 years. While many of its 26 buildings require extensive repairs and upgrades, including seismic upgrades, no significant change in either the use or physical character of the Clark Kerr Campus is proposed in the 2020 LRDP.

LRDP HOUSING ZONE

The housing objectives for the 2020 LRDP require that all new lower division undergraduate housing be located within a mile of the center of the Campus Park, defined as Doe Library, and all other student housing either within this radius or within one block of a transit line providing trips to Doe Library in under 20 minutes. In the 2020 LRDP, this Housing Zone is defined to exclude those areas with residential designations of under 40 units per acre in a municipal general plan as of July 2003.

In support of the campus' academic goals, capital investment in the Housing Zone through 2020 may result in a net increase of up to 2,600 bed spaces, including up to 100 units suitable for faculty or staff. New student housing in the Housing Zone would be produced by more intensive redevelopment of existing university owned sites, as well as on other sites by the university directly or through joint ventures.

OTHER BERKELEY SITES

The 'Other Berkeley Sites' category includes all land within the 2020 LRDP scope but outside any other defined land use zone. University owned sites within this zone include 2000 Carleton Street and 6701 San Pablo Avenue. In response to future space demand by campus programs, capital investment in this zone through 2020 may result in a net increase in program space of up to 50,000 GSF. New space may be produced by more intensive redevelopment of existing university owned sites, as well as on other sites by the university directly or through joint ventures.

PROJECT DESIGN

UC Berkeley serves the entire state of California, and thus has a mission that can not always be met entirely within the parameters of municipal policy. In the City Environs, however, the objectives of UC Berkeley must be informed by the plans and policies of neighboring cities, to respect and enhance their character and livability through new university investment.

POLICY: USE MUNICIPAL PLANS AND POLICIES TO INFORM THE DESIGN OF FUTURE CAPITAL PROJECTS IN THE CITY ENVIRONS.

USE THE SOUTHSIDE PLAN AS A GUIDE TO THE DESIGN OF FUTURE CAPITAL PROJECTS IN THE SOUTHSIDE.

PREPARE PROJECT SPECIFIC DESIGN GUIDELINES FOR EACH MAJOR NEW PROJECT.

ADJACENT BLOCKS

City of Berkeley land use regulations for the Adjacent Blocks in place as of July 2003, particularly the height and density provisions of the zoning ordinance, reflect a strong preference toward residential and mixed-use projects. However, in order to meet the demands for program space created by enrollment growth and by ongoing growth in research, sites on the Adjacent Blocks must provide adequate capacity to accommodate these demands, in order to maintain UC Berkeley as the compact, interactive campus described in **Campus Land Use**.

Major capital projects would be reviewed at each stage of design by the UC Berkeley Design Review Committee, based on project specific design guidelines informed by the provisions of the Berkeley General Plan and other relevant city plans and policies. The university would make informational presentations of all major projects on the Adjacent Blocks to the City of Berkeley Planning Commission and, if relevant, the City of Berkeley Landmarks Commission for comment prior to schematic design review by the UC Berkeley Design Review Committee.

Projects on the Adjacent Blocks within the area of the Southside Plan would as a general rule use the Southside Plan as a guide to project design, as described below.

SOUTHSIDE

The university owns roughly 45% of the land in the Southside, and students comprise over 80% of Southside residents. For both reasons, the Southside has always been the area of Berkeley where a positive, shared city-campus vision is most urgently required, and the lack of such a vision most acutely felt.

In 1997 the City of Berkeley and UC Berkeley signed a Memorandum of Understanding, which states 'the city and the university will jointly participate in the preparation of a Southside Plan ... the campus will acknowledge the Plan as the guide for campus developments in the Southside area'. The city and university have since collaborated on a draft Southside Plan, which as of March 2004 was being finalized for formal city adoption.

Given the mixed-use character of the Southside and the constant influx of new student residents, it is important to remember the Southside is, first and foremost, a place where people live. While the Southside Plan recognizes there are many areas within the Southside suitable for new non-residential projects, it also recognizes such projects must be planned to enhance the quality of life for all Southside residents.

Assuming no further substantive changes are made by the city prior to adoption, the university should as a general rule use the Southside Plan as its guide for the location and design of future projects in the Southside, as envisioned in the Memorandum of Understanding

Major capital projects would be reviewed at each stage of design by the UC Berkeley Design Review Committee, informed by the provisions of the Southside Plan. The university would make informational presentations of all major projects within the Southside Plan area to the City of Berkeley Planning Commission and, if relevant, the City of Berkeley Landmarks Commission for comment prior to schematic design review by the UC Berkeley Design Review Committee.

OTHER BERKELEY SITES

Major capital projects would be reviewed at each stage of design by the UC Berkeley Design Review Committee, based on project specific design guidelines informed by the provisions of the Berkeley General Plan and other relevant city plans and policies. The university would make informational presentations of all major projects on Other Berkeley Sites to the City of Berkeley Planning Commission and, if relevant, the City of Berkeley Landmarks Commission for comment prior to schematic design review by the UC Berkeley Design Review Committee.

2020 LRDP HOUSING ZONE

The housing objectives for the 2020 LRDP require that all new lower division undergraduate housing be located within a mile of the center of the Campus Park, defined as Doe Library, and all other student housing either within this radius or within one block of a transit line providing trips to Doe Library in under 20 minutes. In the 2020 LRDP, this Housing Zone is defined to exclude those areas with residential designations of under 40 units per acre in a municipal general plan as of July 2003.

The definition of the Housing Zone not only serves the objectives of improving student access to the intellectual and cultural life of the campus and minimizing vehicle trips, it also aligns with our goal to concentrate new housing development along transit routes. While future university housing projects must have adequate density to support reasonable rents, they should also be designed to respect and enhance the character and livability of the cities in which they are located. Therefore, to the extent feasible university housing projects in the Housing Zone should not have a greater number of stories nor have setback dimensions less than could be permitted for a project under the relevant city zoning ordinance as of July 2003.

Major capital projects would be reviewed at each stage of design by the UC Berkeley Design Review Committee, based on project specific design guidelines informed by the provisions of the relevant city general plan and other relevant city plans and policies. The university would make informational presentations of all major projects in the Housing Zone to the relevant city planning commission and landmarks commission for comment prior to schematic design review by the UC Berkeley Design Review Committee.

3.1.15 HILL CAMPUS FRAMEWORK

MAINTAIN THE HILL CAMPUS AS A NATURAL RESOURCE FOR RESEARCH, EDUCATION AND RECREATION, WITH FOCUSED DEVELOPMENT ON SUITABLE SITES.

The Hill Campus consists of roughly 1,000 acres extending east from Stadium Rimway to Grizzly Peak Boulevard. 200 of these acres are managed under the separate jurisdiction of Lawrence Berkeley National Laboratory, and are not within the scope of the UC Berkeley 2020 LRDP. Lawrence Berkeley National Laboratory operates under its own LRDP and EIR, approved separately by the UC Regents.

While the 800 acre balance managed by UC Berkeley contains several campus public and research facilities concentrated along Centennial Drive, including the Lawrence Hall of Science, the Botanical Garden, the Space Sciences Laboratory and the Mathematical Sciences Research Institute, the primary use of the Hill Campus is natural open space, including the 300 acre Ecological Study Area.

Roughly 85% of these 800 acres lie within the City of Oakland, while the westernmost 10% lie within the City of Berkeley, and the easternmost 5% within unincorporated Contra Costa County. The western third of the Hill Campus abuts low-density private residential areas to the north and south, while the eastern two-thirds of the site abuts the largely undeveloped lands of the East Bay Regional Park District and the East Bay Municipal Utility District.

From a base elevation of roughly 400 feet at its western edge, the Hill Campus rises to nearly 1800 feet at Chaparral Hill at its eastern edge. Slopes range from moderate to steep, but in general the terrain is rugged: few sites within the Hill Campus are suitable for development without extensive site alterations.

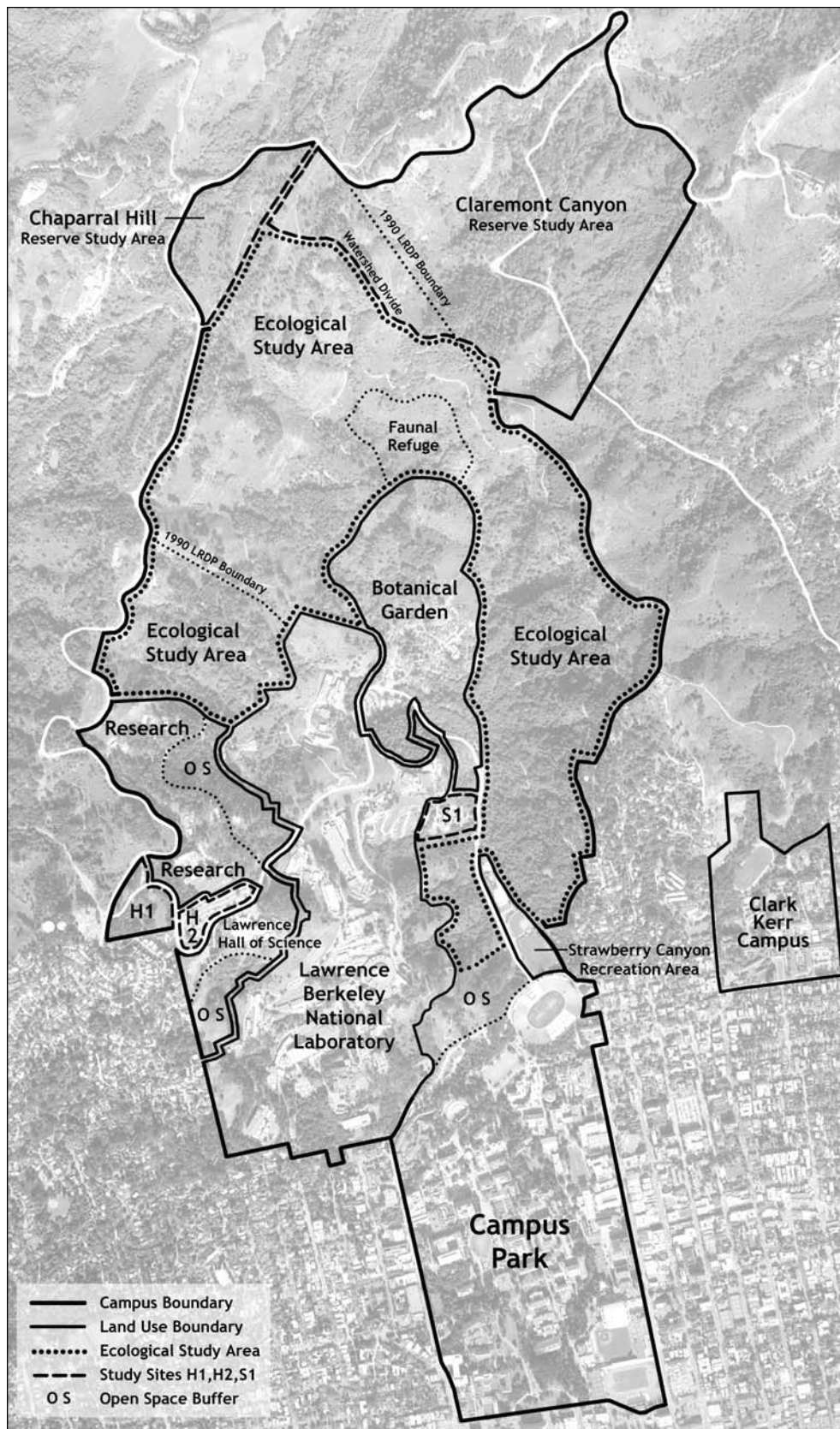
The most dramatic physical feature of the Hill Campus is Strawberry Canyon, a watershed of roughly one square mile drained by the south fork of Strawberry Creek. This water supply helped convince the trustees of the College of California to acquire the ranch lands along the creek in 1868 as the site for their new campus. At the time, the hills above the campus were a mix of grassland, oak savannah and open chaparral. It was not until speculators in the next decade planted eucalyptus, in a failed scheme to grow and harvest them for commercial use, that the hills began to acquire their present, largely forested look.

The Hill Campus landscape today is a mosaic of wet and dry north coastal scrub intermixed with stands of trees: oak-bay woodland and clusters of redwoods as well as pine and eucalyptus plantations. The pattern of vegetation has changed significantly from the original mix of grassland and oak savannah, due not only to the decline of grazing, but also to human introduction of eucalyptus and conifers as well as invasive perennials such as brooms and euphorbia, and to the fact the introduced species often out-compete natives.

LAND USE

While the Hill Campus is over four times the size of the Campus Park, its potential to accommodate new development is limited by several factors. First, the Hill Campus is a scenic and recreational resource for the entire East Bay, and is part of the continuous greenbelt of park and watershed land that extends the length of the East Bay Hills from Richmond to Hayward. A greenbelt of such size and integrity, in such close proximity to densely urbanized areas, is a unique feature of the region and contributes significantly to the quality of East Bay life.

FIGURE 3.1-10
 HILL CAMPUS LAND USE



Second, the mix of scrub and conifer and eucalyptus stands makes the East Bay Hills, including the Hill Campus, a regular seasonal fire risk. This risk becomes particularly pronounced during the periodic one- or two-day shifts from the normal northwesterly winds to 'Diablo' winds blowing in from the warm, dry regions to the east. 20th century Diablo wind fires have burned over ten times the acreage of normal wind condition fires, and include the firestorms of 1923 and 1991. The steep terrain and poor access and infrastructure in the Hill Campus present enormous obstacles to fire response, and some areas such as Claremont Canyon may be indefensible in Diablo wind conditions.

Third, the steep terrain and the poor access and infrastructure also make development itself more disruptive and costly. Over 75% of the Hill Campus has a slope over 40%, and over 90% has a slope over 20%. Areas with slopes under 20% are scattered throughout the Hill Campus, often in locations not served by either roads or utilities. With few exceptions, substantial regrading would be required for new projects, and in many areas infrastructure extensions or upgrades would also be required. Lastly, the physical separation of the Hill Campus is itself a serious obstacle to productive working relationships with Campus Park units, due to time lost in travel and the absence of informal interaction.

In response to future space demand by academic and other campus programs, capital investment in the Hill Campus through 2020 may result in a net increase in program space of up to 100,000 GSF, as well as up to 100 units of housing suitable for faculty, staff, and/or visiting scholars. As shown in figure 3.1-10, the 2020 LRDP divides the Hill Campus into seven land use categories, described below, that reflect their environmental characteristics and their current and planned future use.

ECOLOGICAL STUDY AREA

The use of Strawberry and Claremont Canyons for instruction and research related to the natural environment, and their preservation in a primarily natural state, has been a longstanding policy of the campus. The mix of native and introduced trees established a wide variety of flora and fauna, making the Hill Campus a useful resource for field study, and led to the initial designation of a 'primitive area' in the 1930s.

The Hill Campus was recognized as an 'invaluable asset' to instruction and research by a faculty advisory committee, in their 1958 proposal that 'the guiding principle in the development of Strawberry Canyon and the Hill Campus should be ... maximum use consistent with conservation of native values.' This proposal led ultimately to the designation of a 300 acre Ecological Study Area (ESA) in 1968.

The 1990-2005 LRDP proposed three expansions of the ESA boundary, and also designated a faunal refuge area at the center of the ESA. The 2020 LRDP incorporates these expansions, as well as a further expansion to extend the ESA boundary west to the Field Station for Behavioral Research. The 2020 LRDP also adjusts the eastern boundary of the ESA to align with the watershed divide separating Claremont and Strawberry Canyons.

The purpose of the Ecological Study Area is to preserve the area for education and research. Yet the potential value of the ESA to academic programs is largely unrealized due to inadequate management. Because the campus has no formal mechanism for recording and tracking individual research projects in the hills, those projects are often neither informed of one another nor protected from public intrusion and damage. The trails within the ESA also represent a significant recreational resource to both campus and community, but there is no management entity to balance the needs of recreational users with those of researchers and instructors.

POLICY: ESTABLISH A MANAGEMENT AUTHORITY FOR THE ECOLOGICAL STUDY AREA.

The Ecological Study Area management authority would:

- maintain a registry of all instructional and research projects in the ESA,
- track external funding prospects for new research initiatives,
- implement strategies to improve coexistence of recreation, education, and research,
- implement strategies for protection from invasive plants, animals and humans, and
- collaborate with other campus service units to implement management practices that both reduce fire risk and help restore a mosaic of native vegetation.

BOTANICAL GARDEN

The oldest campus-operated Botanical Garden in the country was established in the Campus Park in 1891, and moved to its present location in 1926. The Garden is located on a 34 acre site, split into north and south sections by Centennial Drive. Strawberry Creek flows through the southern section and is incorporated into the Garden design. Ranging in elevation from 600 to 900 feet, the site provides a unique variety of micro-climates that accommodate over 13,000 plant species and varieties, organized by geographic origin.

Expansion of the Garden grounds to the east has been proposed in several previous campus plans, including the 1984 Task Force Report and the 1990-2005 LRDP, which recommends an expansion of roughly 40 acres. The 2020 LRDP incorporates this expansion, as shown in figure 3.1-10, which is consistent with the objective of the Botanical Garden to triple its student, faculty and public visitors by 2020. However, before this expansion occurs, the plans for both its improvement and long-term management must be clearly defined.

POLICY: ENSURE THE FUTURE MANAGEMENT OF, AND INVESTMENTS IN, THE ECOLOGICAL STUDY AREA AND THE BOTANICAL GARDEN ARE INTEGRATED AND SYNERGETIC.

The Botanical Garden requires a new master plan to replace the plan completed in 1981. The new master plan should not only describe the proposed site expansion, but also describe how its interface with the Ecological Study Area, and in particular the Faunal Refuge Area, should be designed and managed. A goal of the master plan, and of the management strategies for both resources, should be to improve the synergy of Botanical Garden and Ecological Study Area programs.

RESEARCH

The Hill Campus is home to several research facilities, including the Silver Space Sciences Laboratory, the Mathematical Sciences Research Institute, and the Field Station for Behavioral Research. The Hill Campus also includes the Lawrence Hall of Science, a museum and resource center for bay area schools and residents, which draws over 300,000 visitors a year. None of these facilities presently anticipates significant physical expansion within the timeframe of the 2020 LRDP. While LHS projects the number of visitors to double by 2020, it expects to accommodate this growth through internal renovation to increase the amount of usable space, not by expansion.

While the 2020 LRDP does include a modest amount of net new capacity in the Hill Campus to accommodate research and other program growth, this growth should be limited to future expansion of existing Hill Campus programs and other programs that may benefit from a setting removed from the busy urban environs of the campus.

In general, new research space at UC Berkeley should be concentrated at sites on and adjacent to the Campus Park, as prescribed in **Campus Land Use**.

RECREATION

The campus corporation yard was removed in 1959 to make way for the Strawberry Canyon Recreation Area, composed of the Haas Clubhouse, Stern Pool, tennis courts and a turf athletic field. The East Pool was subsequently completed in 1967. As proposed in the 1990-2005 LRDP, the tennis courts were removed and the parking lots reconfigured in 1993 to create the present Witter and Levine-Fricke Fields. Strawberry Canyon Recreation Area should remain in its present form, albeit with potential renovation and expansion, or replacement, of the buildings and pools.

The upper, east portion of the Hill Campus includes several heavily used trails that connect with trails in the adjacent East Bay Regional Park District lands. Many points within the Hill Campus offer magnificent views of the Bay and Golden Gate.

HOUSING

Housing as a Hill Campus use is not only a relatively adaptable and nondisruptive building type compared to large research facilities, it would also provide an after-hours presence in the Hill Campus that could improve safety and security. Moreover, a supply of good, reasonably priced faculty housing would provide a significant strategic benefit to the entire campus, as described in **Campus Housing**.

However, Hill Campus housing must be sited and designed with extreme care to minimize both environmental damage and wildfire risk. Figure 3.1-10 indicates two potential sites, H1 and H2, where new housing may be feasible: both are directly served by existing infrastructure and roads, and have already experienced some level of site disturbance or are adjacent to already developed areas. Other housing sites may be disclosed as a result of future investigation..

UC Berkeley also has a substantial demand for housing for visiting scholars, as does LBNL. While the needs of short-term conference visitors can be met by the hotel/conference center described in the **City Environs Framework**, the longer stays typical of visiting scholars suggest an alternate housing type, more residential in character. This housing type would not involve extensive on-site conference facilities, would have modest service demands, and thus, if properly designed, could be suitable for one or more Hill Campus sites, instead of or in conjunction with faculty housing.

STUDY SITE

The upslope area of the former Poultry Husbandry site, shown as S1 in figure 3.1-10, is now used by the campus as a materials storage and vehicle parking site. This site was designated in the 1990-2005 LRDP as a reserve site for a future research facility. While the current use may remain as an interim use in the near term, a feasibility study should be conducted to identify a more suitable long term use for this site and a more suitable location for the current use.

RESERVE SITES

The 1990-2005 LRDP designated several 'reserves' for future study. The two largest such sites are Claremont Canyon and Chaparral Hill, and they are similar in several respects: they are remote from the Campus Park, they would require substantial infrastructure investment to support new development, and no clear demand for more intensive campus use of either site has emerged since the 1990-2005 LRDP.

The roughly 40 acre site at Chaparral Hill is defined by the ridgeline of Strawberry Canyon on the west and Grizzly Peak Boulevard on the east. Due to its relatively gentle slopes, it has been designated as a potential development site in numerous past campus studies. More intensive use of this site is severely constrained by the distance to campus: roughly 3.5 miles from Memorial Stadium.

The site lacks utility infrastructure, and protected natural open space surrounds the site: regional parklands on the north, east, and south, and the ESA on the west. Moreover, the south-facing slopes of the site represent a potential colonization habitat for the endangered Alameda Whipsnake. While some very limited future development of the north-facing slopes might be possible, it would be constrained by the need to preserve the integrity of the adjacent habitat.

The roughly 200 university owned acres in Claremont Canyon lie south of the ridge dividing the Claremont and Strawberry Creek watersheds, and is nearly as distant from campus: roughly 2.5 miles from Memorial Stadium. Unlike Chaparral Hill, most of Claremont Canyon consists of steep terrain, much of which is heavily forested.

The only feasible campus uses of Chaparral Hill or Claremont Canyon are those for which physical separation from the Campus Park is not a major disadvantage. Faculty housing is one potential use: a campus retreat center is another. However, as described in this section and in the **City Environs Framework**, other more promising near-term options exist for both faculty housing and conference venues, and these options must be fully explored before either reserve site is given serious consideration. Both Chaparral Hill and Claremont Canyon should retain their current designations as reserve sites, pending further study.

PROJECT DESIGN

While the Hill Campus contains a number of sites suitable for clustered development, future projects should be designed to respect its scenic and recreational value to both UC Berkeley and the larger East Bay community.

POLICY: MAINTAIN THE VISUAL PRIMACY OF THE NATURAL LANDSCAPE IN THE HILL CAMPUS.

New building projects should conform to the contours of the land, and grading should be minimized. Project landscaping should utilize native plant materials and reflect the rustic style of adjacent natural areas, and should incorporate the fire management provisions described below.

Buildings should be clustered to minimize site disturbance, and should utilize articulated volumes to reduce the perception of building mass. Exterior colors and materials should be selected to help the buildings blend into rather than contrast with the landscape. Flamboyant or decorative architectural treatments are strongly discouraged, as are those imitative of historical styles. Rather, architectural design should strive for a simple elegance of form, details and materials that respects and complements rather than competes with the natural setting.

Major capital projects in the Hill Campus would be reviewed at each stage of design by the UC Berkeley Design Review Committee. Project specific design guidelines based on the above principles should be prepared for each major project to guide the DRC reviews.

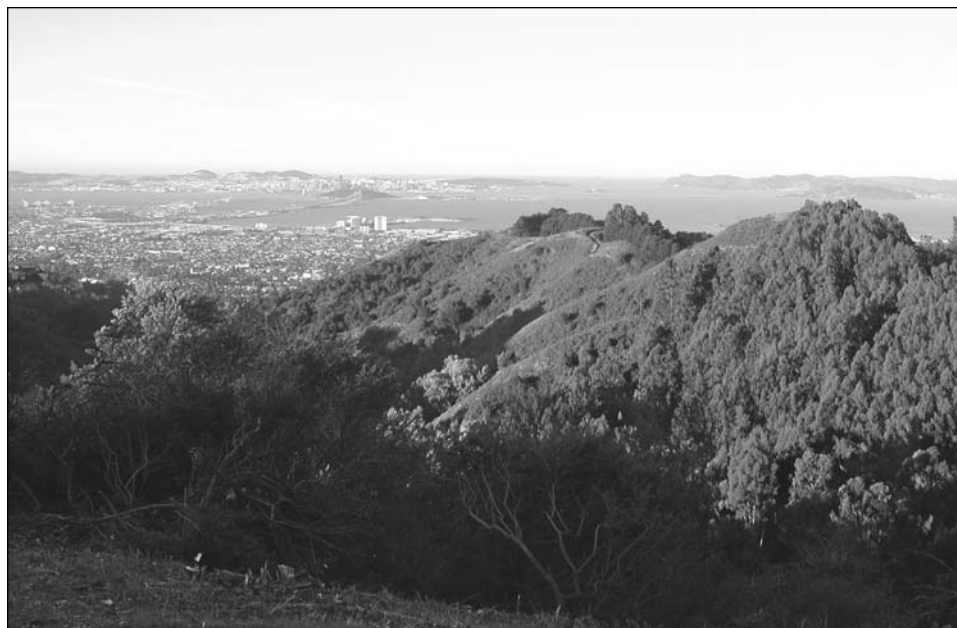
POLICY: MANAGE THE HILL CAMPUS LANDSCAPE TO REDUCE FIRE AND FLOOD RISK AND RESTORE NATIVE VEGETATION AND HYDROLOGY PATTERNS.

UC Berkeley maintains an ongoing program of fire fuel management in the Hill Campus to reduce fire risk to the campus, LBNL, neighboring residents, and recreational visitors to adjacent park and watershed lands. While the treatment used in a given area must be customized to address its specific conditions, including vegetation type, access, and proximity to roads and structures, in general the treatments are designed to meet one or more of the following goals:

- reducing fuel load by removing dead material, reducing plant density, and favoring species with lower fuel content,
- reducing horizontal spread by reducing fine fuel material and by separating dense clusters of vegetation with areas of lower fuel load, and
- reducing vertical fire spread by increasing separation of understory and crown fuels.

Whenever feasible, future fuel management practices should include the selective replacement of high-hazard introduced species with native species: for example, the restoration of native grassland and oak-bay woodland through the eradication of invasive exotics (broom, acacia, pampas grass) and the replacement of aged Monterey pines and second-growth eucalyptus. Such conversions must be planned with care, however, to avoid significant disruptive impacts to faunal habitats.

New building projects within the Hill Campus should be designed to minimize fire risk to neighbors as well as occupants, but this should be achieved as part of a larger, holistic design strategy. Some older areas of LBNL, for example, include extensive alteration of natural contours and large areas of built and paved surfaces. While this does reduce fire risk, it also increases runoff and degrades habitat and scenic value. Risk mitigation measures, such as low-fuel buffers and fire-resistive materials, should be incorporated into the design of Hill Campus projects in ways that respect the integrity, ecology, and visual quality of the natural landscape.



CLAREMONT CANYON



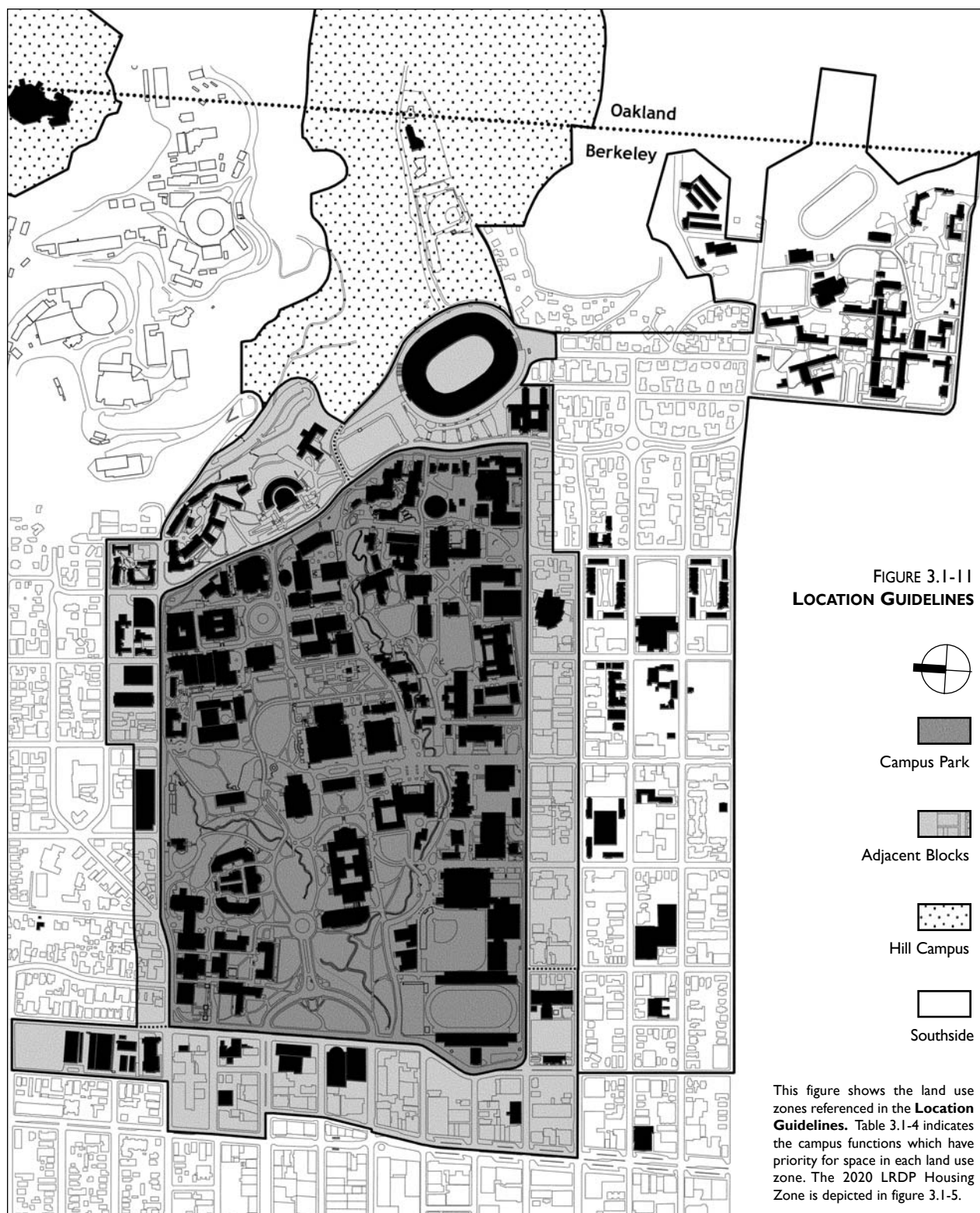
HEARST MEMORIAL MINING BUILDING

PROJECT GUIDELINES

LOCATION GUIDELINES 3.1.16

CAMPUS PARK DESIGN GUIDELINES 3.1.17

CAMPUS PROJECT APPROVAL PROCESS 3.1.18



3.1.16 LOCATION GUIDELINES

Land at UC Berkeley is a scarce and finite resource, and it is neither feasible nor desirable to house every campus function on or adjacent to the Campus Park. In order to optimize the use of campus resources, future capital investment and space utilization at UC Berkeley shall be informed by the **Location Guidelines** shown below. For each new capital project, the policy reviews undertaken at phase 1 and phase 2 of the **Campus Project Approval Process**, described in section 3.1.18, shall include a finding that the project conforms to the Location Guidelines, or state why an exception is warranted.

TABLE 3.1-4 LOCATION PRIORITY BY LAND USE ZONE

	Location Priority
Academic Programs	
Instructional spaces	Campus Park
Faculty office, research and conference spaces	
Academic Support	
Libraries and student workspaces	Campus Park
Academic administration	
Museums and performance venues	Adjacent Blocks
Research Programs	
Research activities with substantial student engagement & participation	Campus Park
Research activities without substantial student engagement & participation	Adjacent Blocks or Hill Campus
Research activities incompatible with on- or near-campus locations due to scale, service requirements, or environmental impacts	Urban Eastbay
Institutional Support	
Chancellor and units requiring frequent direct interaction w/Chancellor	Campus Park
Critical on-site plant operations services	
Visitor-intensive: frequent visitors from outside campus	Adjacent Blocks
Service-intensive: frequent visits to & from Campus Park units	
Process-intensive: primarily document-based or computer-based functions with limited, infrequent face to face interactions	Urban Eastbay
Computer and telcom centers, industrial production, materials handling and storage, vehicle service and storage, plant operations administration	
Student Services	
Service-intensive: frequent face to face interactions	Campus Park
Process-intensive: primarily document-based or computer-based functions with limited, infrequent face to face interactions	Adjacent Blocks
Fitness, recreation, intercollegiate athletics	Campus Park Hill Campus Adjacent Blocks Southside
Public Programs	
University extension	Urban Eastbay
University Housing	
Student housing	Housing Zone
Faculty and staff housing	Housing Zone or Hill Campus

Note: Urban Eastbay includes cities of Berkeley, Oakland, Emeryville, Albany, El Cerrito and Richmond

3.1.17 CAMPUS PARK DESIGN GUIDELINES

This section includes general design and program guidelines for the Campus Park as a whole, as well as for certain place types in the Campus Park with particular design conditions. However, each major project also requires project-specific guidelines, to ensure the unique features of the site and environs are respected.

The provisions of the Guidelines are not meant to entirely preclude alternate design solutions. The best solution for a site should not be rejected just because we could not imagine it in advance. In practice, however, while the project designers may present a concept which departs from the Guidelines, they must also present a concept which conforms entirely to the Guidelines. As a rule, the campus should not depart from the Guidelines except for solutions of extraordinary quality.

DESIGN GUIDELINES

Campus design has always been diverse. John Galen Howard himself broke with the classical vocabulary of his first several campus buildings to design the gothic-inspired Stephens Union; and the classical buildings themselves were departures from the earlier Victorian styles of North and South Halls. However, while the design of each building should reflect its own time and place, it should also reflect the enduring values of elegance, quality and durability, and form a coherent and memorable identity for the campus as a whole. Moreover, there are several specific locations on campus where more prescriptive guidelines are required:

- New construction and renovation within the Classical Core should enhance the integrity of this ensemble, and complement rather than compete with existing historic buildings.
- New buildings facing Places of Interaction should be designed to shape these places, provide enclosure and security, and admit sunlight. Ground level spaces within these buildings should house uses that observe and activate the place.
- Buildings at the City Interface should be designed to create a graceful transition from campus to city, and to enhance the visual and experiential quality of the street.

GUIDELINE G.1 PRESERVATION AREAS

The preservation areas described below and in figure 3.1-12 protect the major elements of the campus landscape armature, as well as its most significant historic exterior spaces. No new buildings should intrude into the preservation areas.

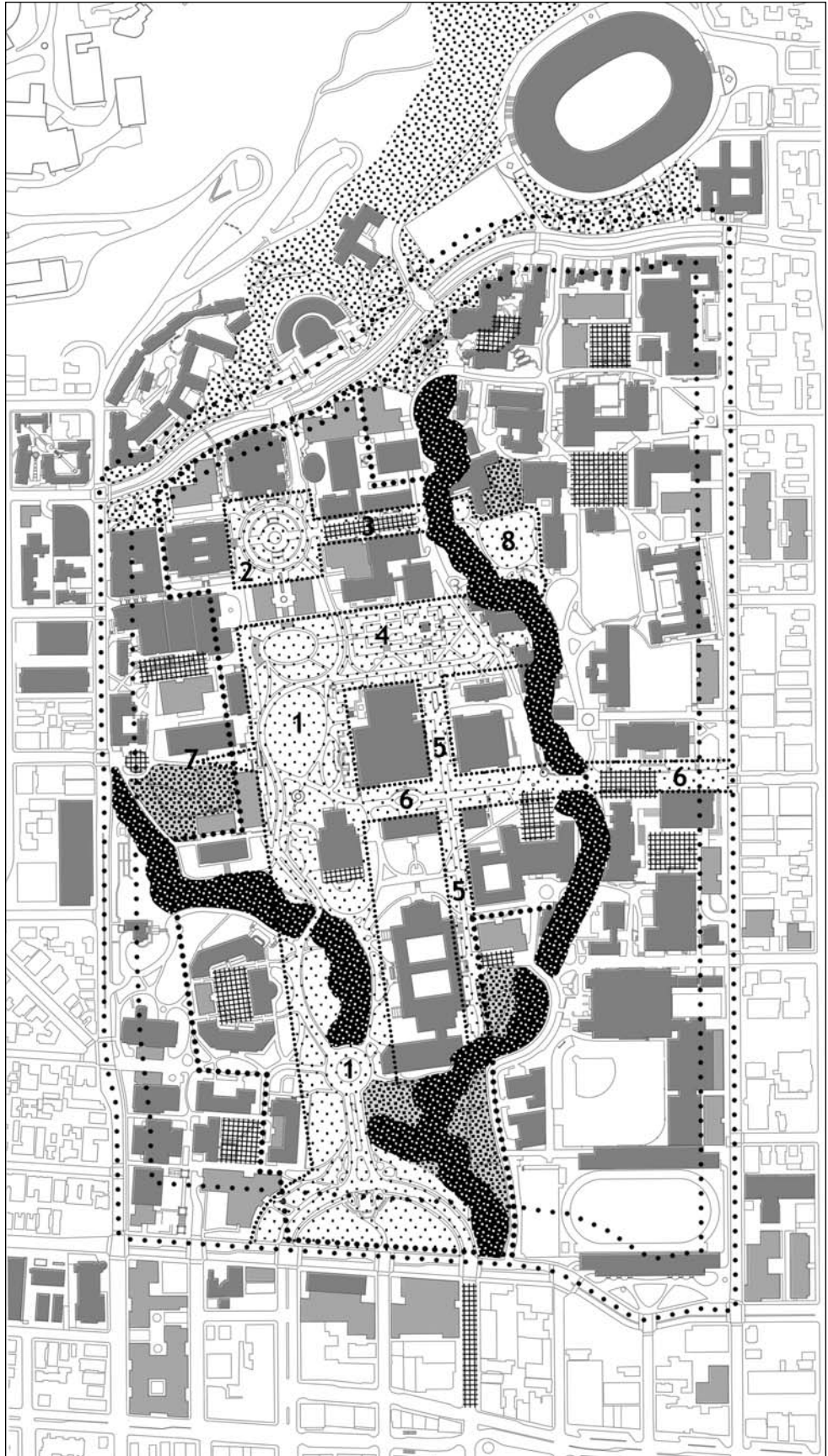
NATURAL PRESERVES The natural landscape along the two forks of the creek requires careful ecological management, as well as protection from development and the impacts of adjacent development. The natural preserves are comprised of two subzones: the riparian areas along the streamcourse, and other rustic woodlands adjacent to these riparian areas.

- The riparian areas are dominated by native and naturalized plants forming dense woodlands along the streamcourse. Their width may vary in response to local conditions, but in general should be at least 100', centered on the streamcourse.
- The rustic campus woodlands have a strong complementary relationship to the creek, and may also have a strong visual identity in their own right, such as Eucalyptus Grove or Observatory Hill.

FIGURE 3.1-12.
**COMPOSITE CAMPUS PARK
 DESIGN GUIDELINES**



-
Classical core
 -
City interface
 -
Natural riparian areas
 -
Rustic campus woodlands
 -
Hill woodlands
 -
Places of interaction
 -
View & openspace preservation zones
- Key numbers refer to the zone descriptions in guideline G.1



This figure includes the potential future projects shown in the illustrative concept in figure 3.1-3B. These potential projects represent only one scenario of how the 2020 LRDP program might be implemented on the Campus Park. However, the potential projects serve as an example of how the **Campus Park Guidelines** would help guide the location and configuration of future buildings in the Campus Park.

Management of the natural preserves should be based on ecological principles, including replacing invasive exotic plants with native plants suited to this biotic zone, replacing unhealthy plants and plants at the ends of their natural lives, and preserving and enhancing the habitat value of the zone.

HILL WOODLANDS While the woodlands east of Gayley Road are comprised primarily of introduced species, they provide a forested backdrop to the campus, and a graceful transition to the hills. Those woodlands that remain west of LBNL should be maintained as a preservation zone, to retain the unique rustic character they impart to the student residences, the Greek Theatre, and Gayley Road.

CENTRAL GLADES (1) The preservation zone for the Central Glades reflects the axial geometry of the classical ensemble of buildings that frame and define them. No building to the north or south should intrude within 180' of the east-west axis of the Glades: these setbacks coincide with the facades of Doe Library and McLaughlin Hall. The east edge of the preservation zone coincides with the east edge of Campanile Esplanade, below. At the west end of campus, the preservation zone widens to an arc 100' from the curblineline of the West Crescent.

MINING CIRCLE (2) The preservation zone is defined as a square 360' by 360' centered on the Circle. In order to reinforce the formal character of the Mining Circle as an outdoor room framed and defined by buildings, at least 75% of any new building facade should lie on the setback line.

GILMAN-LECONTE WAY (3) The preservation zone is defined as 50' on either side of the north-south axis centered on the Mining Circle and extending to the creek zone. To reinforce the continuity of spatial enclosure, at least 75% of any new building facade should lie on the setback line.

CAMPANILE ESPLANADE (4) The preservation zone for Campanile Esplanade reflects the formal geometry defined by the north-south axis of Sather Tower, and is defined as 100' east and 200' west of this axis: these setbacks coincide with the facades of Birge Hall and Bancroft Library. To reinforce the continuity of spatial enclosure, at least 75% of any new building facade should lie on the setback line.

CAMPANILE WAY (5) The preservation setback is defined as 50' on either side of the east-west axis centered on Sather Tower and extending to the creek zone. To reinforce the continuity of spatial enclosure, at least 75% of any new building facade should lie on the setback line.

SPROUL PLAZA & SATHER ROAD (6) This 120' wide zone preserves the primary north-south route through campus as a gracious, generous space with unobstructed views of Sather Gate. The zone is defined by the facades of Doe Library, Wheeler and Sproul Halls on the east and King Union, Durant and California Halls on the west.

NORTH GATE (7) This zone is defined as a view cone originating at the entry plaza to McCone Hall, with the east and west sides aligned with the corners of the north facade of Doe Library.

FACULTY GLADE (8) The preservation zone for Faculty Glade is defined by the Strawberry Creek natural preserve to the north and west, Morrison Hall to the south, and Hertz Hall and Faculty Club to the east.

Setbacks prescribed in Guidelines G.1 and G.2 apply to all above-grade structures. Below-grade structures may extend into the setbacks, but only if they are invisible at the surface; provide soil depth adequate to support landscaping at grade; and do not compromise the integrity of sensitive landscapes. Any elements that project above grade, such as vents, entry pavilions, or skylights, should be sited outside the setback.

GUIDELINE G.2 CITY INTERFACE

Campus edges and entrances should create a positive first image of both the campus itself and its synergy with the city around it. New buildings at the city interface should be sited and designed to accommodate a more coherent and unifying landscape treatment.

HEARST & BANCROFT FRONTAGES Buildings should be set back at least 20' from the curbline to accommodate a formal, urban, but generous landscape treatment along both frontages. The Landscape Master Plan should define a palette of planting and paving materials and typical details for these setbacks.

OXFORD FRONTAGE The majority of the Oxford frontage is comprised of green open space: the Crescent, the Creek, and the proposed Edwards Green. In order to create a more coherent landscape treatment in the picturesque style along this frontage, new buildings along Oxford should be set back a minimum of 60' from the curbline.

GAYLEY & PIEDMONT FRONTAGES One of the most memorable aspects of the campus is its setting at the base of the East Bay hills, and Gayley Road should be reinforced as the 'seam' linking the campus with the hill landscape. Each building should be set back an average of 40' from the curbline to accommodate an informal landscape treatment along both sides of the roadway. While building edges should be articulated to vary the setback depth, no portion of a building should be closer than 20' to the curbline.

Individual sites at the city interface may have spatial relationships that require wider setbacks: for example, to align facades with neighboring buildings. These should be prescribed in the project-specific guidelines.

GUIDELINE G.3 BUILD-TO LINES

Guideline G.1 prescribes build-to lines for certain historic campus open spaces. While some variation is desirable to allow for entrances and facade articulation, at least 75% of the facade should lie on the build-to line.

GUIDELINE G.4 ORIENTATION & EXPOSURE

Each new building should be oriented and designed to take advantage of solar angles and wind direction to reduce energy consumption. The design should include consideration of shading options on south and west exposures to reduce heat gain in summer but admit natural light in winter. Shading options include landscape elements, such as deciduous trees, as well as architectural elements.

The design should also include consideration of facade treatments that respond to the characteristics of each exposure with respect to heat, light and ventilation. For example: more glass on the north and east exposures, less glass and greater thermal mass on the south and west, and vents and operable windows located and designed to optimize natural airflow.

CLASSICAL CORE Within the classical core the axial, orthogonal relationships of the historic ensemble should take precedence in determining building orientation.

GUIDELINE G.5 ACTIVE FRONTAGES

PLACES OF INTERACTION Ground level spaces in each building facing a place of interaction should house functions with a high frequency of human presence and public activity, such as lounges, libraries, cafes, display spaces, and walk-up services. The main building entrance should be located in the facade facing the place of interaction.

CITY INTERFACE In the city General Plan, several sections of blocks adjacent to campus are designated 'commercial': ground level spaces in university buildings within those areas should include retail and/or storefront services at ground level. Other university buildings at the campus perimeter or on adjacent blocks should house functions with a high frequency of human presence and activity at ground level.

GUIDELINE G.6 ENTRANCES

Each new building should be sited and designed to create a plaza or terrace at the main entrance, to serve as a casual gathering place for its users. The plaza or terrace should be distinguished as a place by design treatment - paving, lighting, furnishings - and must provide direct access for persons with special mobility needs.

GUIDELINE G.7 SERVICES

All bulk trash containers and building equipment should be concealed within enclosures designed as integral elements of the architecture. Loading docks should be concealed and secured when not in use.

GUIDELINE G.8 HEIGHT

PLACES OF INTERACTION Buildings facing places of interaction should be scaled to admit sunlight to the place and impart a comfortable human scale. As shown in figure 3.1-15, buildings to the south and west of the place should be no greater than 65' in height within 75' of the build-to line. Beyond this distance, height may increase 1' for every 1.5' of distance from the build-to line.

Individual sites may present spatial relationships that require lower heights along the build-to line: for example, to align cornice lines in order to create a more formal sense of enclosure. These should be specified in the project-specific guidelines.

CITY INTERFACE Buildings at the campus edge should be designed to create a graceful transition in scale from campus to city. Along the Hearst and Bancroft frontages of the Campus Park, buildings should be no greater than 65' in height within 100' of the curblin. On sloping sites, parts of the building may be greater than 65' but not over 80' in height, but the average height within the 100' wide zone should be no greater than 65'.

Along the Oxford frontage, buildings should be no greater than 95' in height within 200' of the curblin. On sloping sites, parts of the building may be greater than 95' but not over 110' in height, but the average height within the 200' wide zone should be no greater than 95'.

Under guideline G.8, the height of buildings with flat roofs is defined as the vertical distance from grade to the top of the exterior wall plane, including parapet. For buildings with sloped, hip, or gable roofs, height is defined as the vertical distance from grade to the average of the height at the ridge and the height at the exterior wall. Nonhabitable elements of the building such as equipment, vents, and other similar elements may extend above these height limits, but should conform to the enclosure provisions of guideline G.10.

GUIDELINE G.9 COMPOSITION

Large buildings should be designed to reduce their perceived mass and impart a human scale to the campus. Each building with a horizontal dimension greater than 200' should incorporate changes in both facade plane and vertical height to reduce its perceived scale and bulk, as shown in figure 3.1-13.

Each building over 3 stories should have both an articulated base and an articulated top, as shown in figure 3.1-14. Flamboyant architectural gestures are discouraged: rather, the top should create a simple and graceful terminus for the building.

CLASSICAL CORE Each new building within the classical core should be composed of elements orthogonal in plan and composition, and sited to reinforce the axial relationships of the historic core buildings and the Central Glades.

GUIDELINE G.10 ROOF FORMS

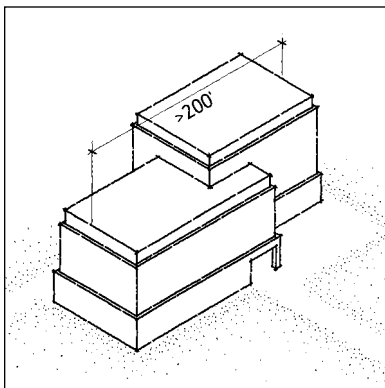
Roof top equipment should be enclosed so the equipment itself is not visible, and the enclosure should be designed as an integral element of the building architecture. In new buildings, the design should include consideration of roof forms that accommodate passive and active solar energy devices and/or green roof structures as elements integral to the building architecture.

CLASSICAL CORE Each new building within the classical core should have a hip or gable roof, with a pitch similar to existing historic core buildings.

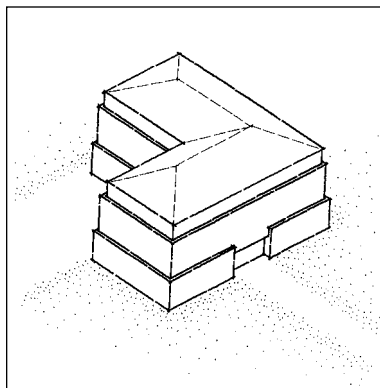
GUIDELINE G.11 FACADES

Each building should be a coherent architectural composition, and should employ a single, unifying vocabulary of forms, details and materials on all building facades. Facades should be composed primarily of solid planes with punched windows. While metal and glass wall systems may be employed as special architectural features, in general the pattern of solid and transparent elements should respect the structural grid.

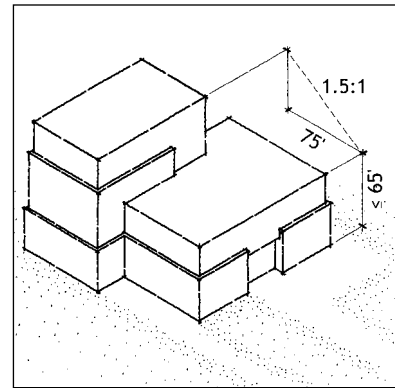
CLASSICAL CORE Each new building within the classical core should be fenestrated exclusively with individual punched windows, having a greater vertical than horizontal dimension. Windows and doors should be inset at least 6" from the exterior wall surface. Windows may be large and paned, but should not span structural elements.



3.1-13 Variations in plane and height in long buildings.



3.1-14 Articulated base and top. (Pitched roof form required only within the classical core.)



3.1-15 Heights of buildings facing places of interaction on the south and west.

GUIDELINE G.12 ARCHITECTURAL MATERIALS

Exterior materials should be selected to convey an image of quality and durability. Suitable primary exterior materials include granite, concrete and true plaster. Metal and glass wall systems may be used sparingly as special architectural features; however, dark, opaque or reflective glass is prohibited.

Visual interest should be created by the articulation of planes and volumes, not by arbitrary changes in materials. Changes in materials should occur only at the inside corners of changes in surface plane.

CLASSICAL CORE Each new building within the classical core should utilize the following materials palette:

- Roofs: unglazed red clay mission tile.
- Walls: light grey granite or architectural concrete, sand finish.
- Windows: clear or lightly tinted glass, copper or bronze frames.
- Skylights: copper or bronze frames.

GUIDELINE G.13 SITE & LANDSCAPE MATERIALS

The UC Berkeley Landscape Master Plan prescribes more detailed palettes of site and landscape materials for the campus.

PLANT MATERIALS Landscapes within the Natural Preserves should follow the provisions of guideline G.1 for plant selection. Elsewhere, plant materials should be selected to fit the desired structural form and function, while also contributing to a campuswide landscape which is both diverse and well suited to its site, climate, and intensive use.

In general, plants with similar water and maintenance needs should be grouped into zones to optimize both water use and maintenance. High maintenance zones should be limited to building entrances and other heavily used places.

SITE MATERIALS Presently nearly all routes on the central campus are surfaced with asphalt. While this material is suitable for vehicular roads and narrow, secondary pathways, major plazas and pedestrian routes deserve better: not only to improve their visual quality, but also to clarify the hierarchy of routes and the primacy of the pedestrian.

Suitable paving materials for major plazas and primary pedestrian routes include brick, cast and natural stone, and concrete. Paving materials, lighting and furnishings should be selected with care to ensure the identity and continuity of pedestrian routes are clearly discernable.

Paving materials should be selected for durability and safety, and should not pose slip or trip hazards. Paving should also be selected to maximize the amount of pervious surface: materials that allow water infiltration are encouraged, particularly for secondary paths and roads.

PROGRAM GUIDELINES

Campus buildings endure far longer than their initial contents, and should be designed to maximize their flexibility and adaptability. Although the future is unpredictable, a few basic conventions should be followed in the design of all new buildings to ensure these major investments have a long and productive life.

GUIDELINE G.14 GROUND FLOOR SPACES

Guideline G.5 prescribes specific programming for buildings facing Places of Interaction and at the City Interface. However, the program of every new building on campus should seek to optimize its contribution to the quality of campus life. The ground level spaces of each building should be reserved for its most public functions, and those spaces facing public areas should be as transparent as the program allows. Main entry lobbies should be designed as inviting places for waiting and engagement, with features commensurate with the scale and functions of the building.

GUIDELINE G.15 FLOOR HEIGHTS

Each new building in the Campus Park should have a floor-to-floor height of at least 15', in order to accommodate a wide range of instruction and research functions and the infrastructure they require. A greater height on the ground floor may be desirable to accommodate larger public and assembly spaces, such as libraries or lecture halls.

GUIDELINE G.16 FLOOR CONFIGURATION

Each new building should be configured to accommodate a broad range of functions. The need to provide for a specific program in the near term must be balanced against the rapid pace of cultural and technological change, and the long lives of campus buildings. In general, a building width of 75-80' can accommodate a variety of office, lab and classroom layouts.

GUIDELINE G.17 INTERNAL PARTITIONS

Each new building should be designed to consolidate fixed, immovable elements at the core and perimeter, and minimize or eliminate such elements elsewhere. Spaces should be demised with easily reconfigurable partitions.

GUIDELINE G.18 TOP FLOOR SPACES

In tall buildings, particularly those with a view to the west, at least some top floor space with views should be reserved for conference/event rooms available for use by the entire campus. This is an emerging campus tradition, begun in Barrows and continuing through Wurster, Tan and Haas, and should be encouraged as a way to foster intellectual collaboration.

3.1.18 CAMPUS PROJECT APPROVAL PROCESS

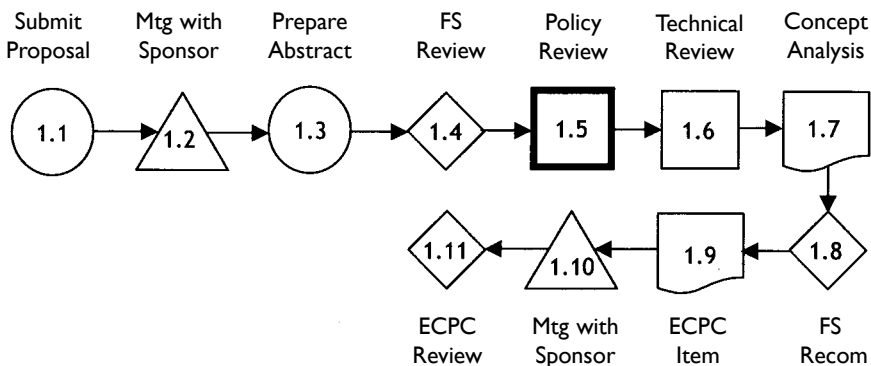
A strategic plan is only as effective as its means of implementation. The UC Berkeley campus has been the subject of many outstanding analyses over the years, yet decisions on individual projects have often been ad hoc: not because the campus lacks sound decisionmaking principles, but because there has been no clear linkage of those principles to a practical decision sequence.

UC Berkeley has already taken the first steps to change this paradigm, by forming the Executive Campus Planning Committee (ECPC) and by establishing a new, clear approval process for capital projects. This section describes how the policies and guidelines articulated in the 2020 LRDP shall be integrated into the campus approval process, to ensure investment decisions both optimize the use of resources and conform to the vision and policies in the 2020 LRDP.

Because UC Berkeley is a dynamic organization, the names of organizational units and the details of each task sequence in the process may evolve over time, but the overriding concept of a comprehensive, deliberative evaluation of each project at each stage of program and design would continue for the duration of the 2020 LRDP.

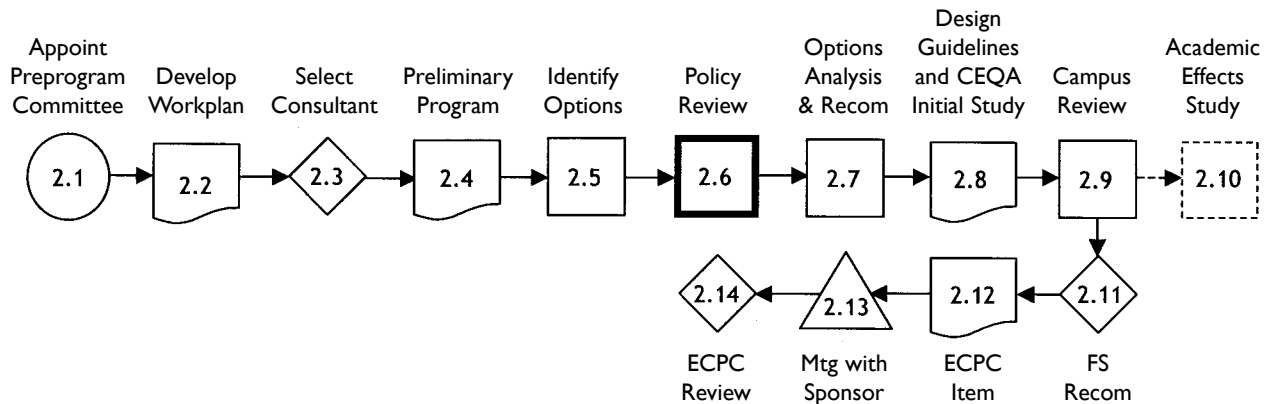
PHASE I: CONCEPT REVIEW (PROJECTS OVER \$1 MILLION)

- 1.1 Sponsor submits proposal with VC signature, including funding strategy
- 1.2 Facilities Services meets with Sponsor to explain process
- 1.3 Sponsor prepares abstract of proposal: objectives, justification, alternatives considered, and funding strategy; Facilities Services consults with sponsor on range of alternatives.
- 1.4 Facilities Services reviews abstract for adequacy of information
- 1.5 Facilities Services manages **Policy Review**
 - 1.5a Facilities Services reviews for conformance with 2020 LRDP
 - 1.5b University Relations and Budget & Finance confirm funding strategy
- 1.6 Facilities Services manages **Technical Review**: technical implications and preliminary budget projection
- 1.7 Facilities Services prepares **Concept Analysis** and action recommendation
- 1.8 VC Facilities Services reviews analysis, confirms recommendation
- 1.9 Facilities Services prepares draft ECPC item
- 1.10 Facilities Services reviews draft ECPC item with Sponsor
- 1.11 ECPC recommendation and Chancellor approval
(projects under \$5 million may be delegated to Vice Chancellors' Administrative Council)
- 1.12 Funds allocated to cover phases 2 and 3



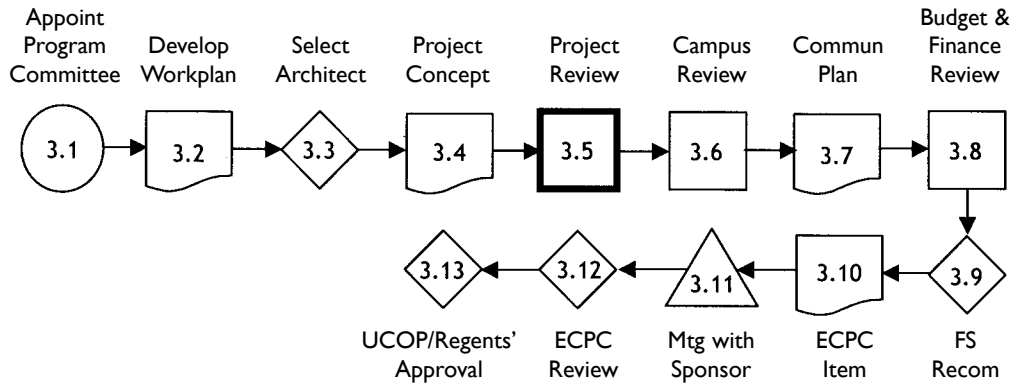
PHASE 2: FEASIBILITY ANALYSIS (PROJECTS OVER \$1 MILLION)

- 2.1 Sponsoring VC appoints Preprogram Committee
- 2.2 Facilities Services prepares workplan for phase 2: scope, timeline, staff budget and, if required, consultant budget
- 2.3 If required: Facilities Services prepares scope of consultant services, identifies prospective consultants, obtains and reviews proposals, and recommends selection to Preprogram Committee
- 2.4 Facilities Services or Consultant develops preliminary space program and diagrams
- 2.5 Facilities Services identifies options: range of alternate solutions plus ‘no action’
- 2.6 Facilities Services manages **Policy Review**: conformance with 2020 LRDP
- 2.7 Facilities Services prepares **Options Analysis** and proposed solution
- 2.8 Facilities Services prepares project design guidelines and environmental initial study based on proposed solution
- 2.9 Facilities Services manages **Campus Review**
 - 2.9a University Relations and Community Relations
 - 2.9b Campus Design Review Committee
 - 2.9c Space Assignment & Capital Improvements Committee
 - 2.9d Committee on Academic Planning & Resource Allocation
- 2.10 Academic Effects Study completed prior to start of phase 3
- 2.11 VC Facilities Services confirms proposed solution
- 2.12 Facilities Services prepares draft ECPC item
- 2.13 Facilities Services reviews draft ECPC item with Sponsor
- 2.14 ECPC recommendation and Chancellor approval



PHASE 3: PROGRAM DEVELOPMENT (PROJECTS OVER \$1 MILLION)

- 3.1 EVC/Provost appoints Program Committee
- 3.2 Facilities Services prepares workplan for phase 3: scope, timeline, staff and consultant budget
- 3.3 Facilities Services selects architect for project
- 3.4 Architect and Program Committee prepare program and design concept: space program, conceptual site plan, conceptual floor plans, conceptual massing, proposed budget and schedule
- 3.5 Facilities Services manages **Project Review** of program and design concept
 - 3.5a Facilities Services reviews for conformance with design guidelines
 - 3.5b Facilities Services begins environmental review based on initial study, to be completed prior to start of phase 6
 - 3.5c Facilities Services prepares surge analysis
- 3.6 Facilities Services manages **Campus Review**
 - 3.6a University Relations and Community Relations
 - 3.6b Campus Design Review Committee
 - 3.6c Space Assignments & Capital Improvements Committee
 - 3.6d Committee on Academic Planning & Resource Allocation
- 3.7 University Relations and Community Relations prepare communications plan
- 3.8 Budget & Finance reviews project in relation to capital budget
- 3.9 VC Facilities Services confirms program and design concept, budget, schedule
- 3.10 Facilities Services prepares draft ECPC item
- 3.11 Facilities Services reviews draft ECPC item with Sponsor
- 3.12 ECPC recommendation and Chancellor approval
- 3.13 UCOP/Regents' approval of budget/capital improvement program amendment (*extent of UCOP/Regents' review depends on size of project budget*)
- 3.14 Funds allocated to cover phase 4



PHASE 4: SCHEMATIC DESIGN (PROJECTS OVER \$1 MILLION)

- 4.1 Architect completes schematic design
- 4.2 Facilities Services reviews for conformance with project design guidelines
- 4.3 Facilities Services manages **Campus Review**
 - 4.3a Design Review Committee
 - 4.3b Seismic Review Committee
 - 4.3c Committee on Removal of Architectural Barriers
 - 4.3d Program Committee (*if changes to scope/budget/schedule*)
 - 4.3e Space Assignments & Capital Improvements Committee (*if changes to scope/budget/schedule*)
- 4.4 Facilities Services presents schematic design to ECPC, plus any scope/budget/schedule changes
- 4.5 ECPC recommendation and Chancellor approval
- 4.6 UCOP/Regents' environmental and design approvals to be completed prior to start of phase 6 (*extent of UCOP/Regents' review depends on size of project budget*)
- 4.7 Sources for 85% of project funds must be identified before starting phase 5

PHASE 5: DESIGN DEVELOPMENT (PROJECTS OVER \$1 MILLION)

PHASE 6: WORKING DRAWINGS (PROJECTS OVER \$1 MILLION)

- 5.1/6.1 Architect completes design development (phase 5) or working drawings (phase 6)
- 5.2/6.2 Facilities Services reviews for conformance with project design guidelines and schematic design
- 5.3/6.3 Facilities Services manages **Campus Review**
 - 5.3a/6.3a Design Review Committee (*if changes to exterior design*)
 - 5.3b/6.3b Seismic Review Committee (*if changes to structural design*)
 - 5.3c/6.3c Program Committee (*if changes to scope/budget/schedule*)
 - 5.3d/6.3d Space Assignments & Capital Improvements Committee (*if changes to scope/budget/schedule*)
- 5.4/6.4 ECPC review (*if changes to design or scope/budget/schedule*) and Chancellor approval
- 6.5 100% of funds must be in place before awarding construction contract

PHASE 7: BID AND CONSTRUCTION (PROJECTS OVER \$1 MILLION)

- 7.1 Budget augmentations require review and recommendation by Vice Chancellors' Administrative Council
- 7.2 Augmentation requests must identify source of additional funds
- 7.3 Chancellor approval

Projects \$1 - 5 million may be delegated to the Vice Chancellors' Administrative Council (VCAC) following Concept Review approval.

Projects Under \$1 million are reviewed by VCAC: they may proceed directly from Concept Review approval to a combined Program and Design phase, and then to Bid and Construction.

3.2 TIEN CENTER PROJECT DESCRIPTION

The proposed Chang-Lin Tien Center for East Asian Studies includes two buildings: Phase 1 and Phase 2. The Phase 1 building would house the East Asian Library. The Phase 2 building would house the Institute of East Asian Studies and the Department of East Asian Languages and Culture. The Tien Center buildings are proposed for construction along the southern and western perimeter of Observatory Hill, as shown in Figures 3.2-1 through 3.2-6.

In addition to the two buildings of the Tien Center, conceptual studies were developed for the Memorial Stair, which would connect the site with the adjacent Memorial Glade, while improving ADA and emergency services access to the Tien Center. A possible second landscape element would develop Campanile Glade, an initiative of the campus Landscape Master Plan referenced in Chapter 3.1, in the area north of Campanile Esplanade.

At the time of this writing, only general outlines of the conceptual proposals are available for the Phase 2 building, the Memorial Stair, and the Campanile Glade components of the Tien Center project. This EIR addresses impacts of these components to the extent they are known; prior to consideration for review and approval, each component will be evaluated for CEQA compliance.

3.2.1 OBJECTIVES OF THE TIEN CENTER

The Tien Center project is driven by the following objectives:

- **CREATE A CENTRAL LOCATION FOR RESEARCH AND SCHOLARSHIP BY STUDENTS AND FACULTY IN ALL FIELDS OF THE ARTS, HUMANITIES, SOCIAL SCIENCES AND PROFESSIONAL DISCIPLINES WITH A FOCUS ON EAST ASIA.**
- **PROVIDE A SINGLE AND CONSOLIDATED, STATE OF THE ART FACILITY ON THE CAMPUS PARK TO HOUSE THE COLLECTIONS OF THE EAST ASIAN LIBRARY, INCLUDING ADEQUATE STORAGE, RESEARCH, OFFICE AND CONFERENCE SPACE FOR BOTH CURRENT REQUIREMENTS AND FUTURE GROWTH.**
- **PROVIDE A SINGLE AND CONSOLIDATED, STATE OF THE ART FACILITY ON THE CAMPUS PARK TO HOUSE THE INSTITUTE OF EAST ASIAN STUDIES AND THE DEPARTMENT OF EAST ASIAN LANGUAGES AND CULTURE, INCLUDING ADEQUATE TEACHING, RESEARCH, OFFICE AND CONFERENCE SPACE FOR BOTH CURRENT REQUIREMENTS AND FUTURE GROWTH.**
- **DESIGN THE CENTER TO ENHANCE THE IMAGE AND EXPERIENCE OF THE CAMPUS PARK, AND PRESERVE AND COMPLEMENT ITS HISTORIC LEGACY OF LANDSCAPE AND ARCHITECTURE.**

UC Berkeley has developed a reputation as a world-class center for the study of Asian languages and cultures. The Chang-Lin Tien Center for East Asian Studies will enhance this reputation by serving all three components of East Asian studies at Berkeley: the East Asian Library, the Institute of East Asian Studies, and the Department of East Asian Languages and Cultures.

The purpose of the Tien Center project is to eliminate the existing space deficiencies of three campus units that constitute the core of the campus's East Asian Studies programs, and to consolidate those programs in state-of-the-art facilities at a single Campus Park site, in order to accommodate a coherent and vibrant program in East Asian Studies for the foreseeable future. Those programs, the East Asian Library, the

Department of East Asian Languages and Cultures, and the Institute of East Asian Studies, are currently housed in inadequate and dysfunctional space in four different buildings scattered across the campus. The Tien Center would be implemented in two phases due to funding constraints.

Phase 1, a new East Asian Library, would bring together in a single facility one of the world's finest East Asian collections, for the first time in over a hundred years. The Phase 2 project would complete the complex by providing teaching, office, study, and conference spaces for faculty, students, and scholars from the Department of East Asian Languages and Cultures and the Institute of East Asian Studies. When complete, the Tien Center project would provide enough space to meet the projected needs of these programs for many years to come. It would also correct various access, fire and life safety, and environmental control deficiencies for the programs and collections, and would provide state of the art technology and infrastructure.

The East Asian Library is at the heart of Berkeley's research and teaching in East Asian studies. Its Chinese, Japanese, and Korean collections are ranked among the top four academic library collections in the United States, and attract visiting scholars from around the world. The Center for Chinese Studies Library, a branch of the East Asian Library, offers more than 68,000 volumes and serves as the nation's leading academic resource for research on contemporary China.

The Institute of East Asian Studies unites the Centers for Chinese, Japanese, and Korean studies, the Chao Yuen Ren Center for Chinese Linguistics, and the Group in Asian Studies in an interdisciplinary undergraduate and graduate degree program. The Institute aims to strengthen the teaching program on East Asia, to promote research on East Asia in all of the disciplines and professional programs, to disseminate information about East Asia through outreach programs both inside and outside the university, and to establish close ties with Asian research institutes.

The Department of East Asian Languages and Cultures is a core teaching department for the study of East Asia at Berkeley. It is the one department where all East Asian Studies students, no matter what their discipline, can attain the language skills necessary for their degrees and later professional work. It offers full four-year sequences of modern standard Chinese, Japanese, and Korean, along with training in the classical languages of China and Japan. The department currently grants B.A., M.A. and Ph.D. degrees in Chinese and Japanese, and plans to expand its programs in Korean literature and culture. Undergraduate classes using materials translated into English allow access to the cultures of East Asia for those not specializing in or not yet competent in an East Asian language. Advanced undergraduate classes study Chinese, Japanese or Korean literature, culture and linguistics in the original languages, while doctoral seminars treat specialized research topics at a highly advanced level.

3.2.2 TIEN CENTER PHASE I

PROJECT PROGRAM

Phase 1 would be a four-story building of approximately 45,300 ASF (67,500 GSF) to house the East Asian Library. In addition to the book stacks, the building would house a rare book collection, a media and digital materials center, reference and periodical

reading rooms, study rooms, offices, and a book-processing center. The lower two floors would house the majority of stacks, and the top two floors would house the public elements of the library. A total of 28 permanent staff and 18 workers will be housed in the Phase 1 building. Since the current East Asian Library has 23 full time staff and 18 student workers, the net new population in Phase 1 would be 5 future new employees.

SITE PLAN

The site plan in Figure 3.2-2 shows the Phase 1 building context with its primary entrance on the east side of the building. The siting of the Phase 1 building follows the 2020 LRDP Campus Park Guidelines with respect to both the Preservation Areas and the formal, orthogonal relationships of Doe Library, Haviland Hall, and other buildings within the classical core ensemble. The Phase 1 building would displace an existing surface parking lot with 34 spaces: this parking would be replaced as part of the 2020 LRDP parking program.

ARCHITECTURE

The architectural treatment of the Phase 1 building follows the 2020 LRDP Campus Park Guidelines with respect to orientation, form and materials, while also utilizing those elements to create a modern building of its own time. The building structure would be reinforced concrete construction with a steel truss roof. The upper portion of the building would be sheathed in granite, with a concrete base and a red tile hip roof, as depicted in the study model shown in Figures 3.2-5 through 3.2-6.

3.2.3 TIEN CENTER PHASE 2

PROJECT PROGRAM

The Phase 2 building is planned to accommodate up to 43,000 GSF. The building would house the Institute for East Asian Studies and the Department of East Asian Languages and Cultures, including offices, lounges, an auditorium, classrooms and seminar rooms. The intent of the program is to consolidate two existing campus departments into one building.

SITE PLAN

The Phase 2 building would be located on the western base of Observatory Hill, north of the proposed Phase 1 building, and directly east of Haviland Hall. A common circulation/plaza space would be renovated between the two buildings. The project design guidelines prepared for the Phase 2 building suggest the primary entrance to the Phase 2 building would be across from the Haviland east entrance. The project guidelines further establish the following design objectives for Phase 2:

- Design a distinctive modern structure that mediates the contrasting relationship of the classical Haviland Hall to the adjacent naturalistic setting of Observatory Hill.
- Design a new landscape sensitive to the classical character of Haviland Hall, yet respecting and integrating the rustic character of the Observatory Hill landscape.
- Minimize the impact to Observatory Hill by merging the building into the hill.
- Retain and preserve specimen trees in the site vicinity to the extent feasible.
- Provide a means for disabled individuals to travel from North Gate to the Phase 2 building.

ARCHITECTURE

The design of the exposed west façade of the building would respect and complement the classical forms and composition of Haviland Hall, a National Register building. Detailed building plans would be developed when funding becomes available.

3.2.4 MEMORIAL STAIR

The Memorial Stair design provides a new open space element for the campus along the primary north-south pedestrian route through the Campus. This element would serve as an extension of the current design for the East Asian Library (Phase 1) to create a more generous and cohesive link from North Gate to Memorial Glade.

3.2.5 CAMPANILE GLADE

Campanile Glade is a proposed new open space within the Central Glade to the west of Evans Hall. The concept envisioned in the campus Landscape Master Plan is to create a formal oval lawn with a perimeter walk on axis with Sather Tower and pedestrian links to the College of Engineering to the north. Like Memorial Glade, the completion of Campanile Glade would represent another major step toward restoring the original concept of the Central Glade as envisioned in the plans of John Galen Howard. Development of this component would permit fill removed from the Tien Center site to be managed internally within the campus.

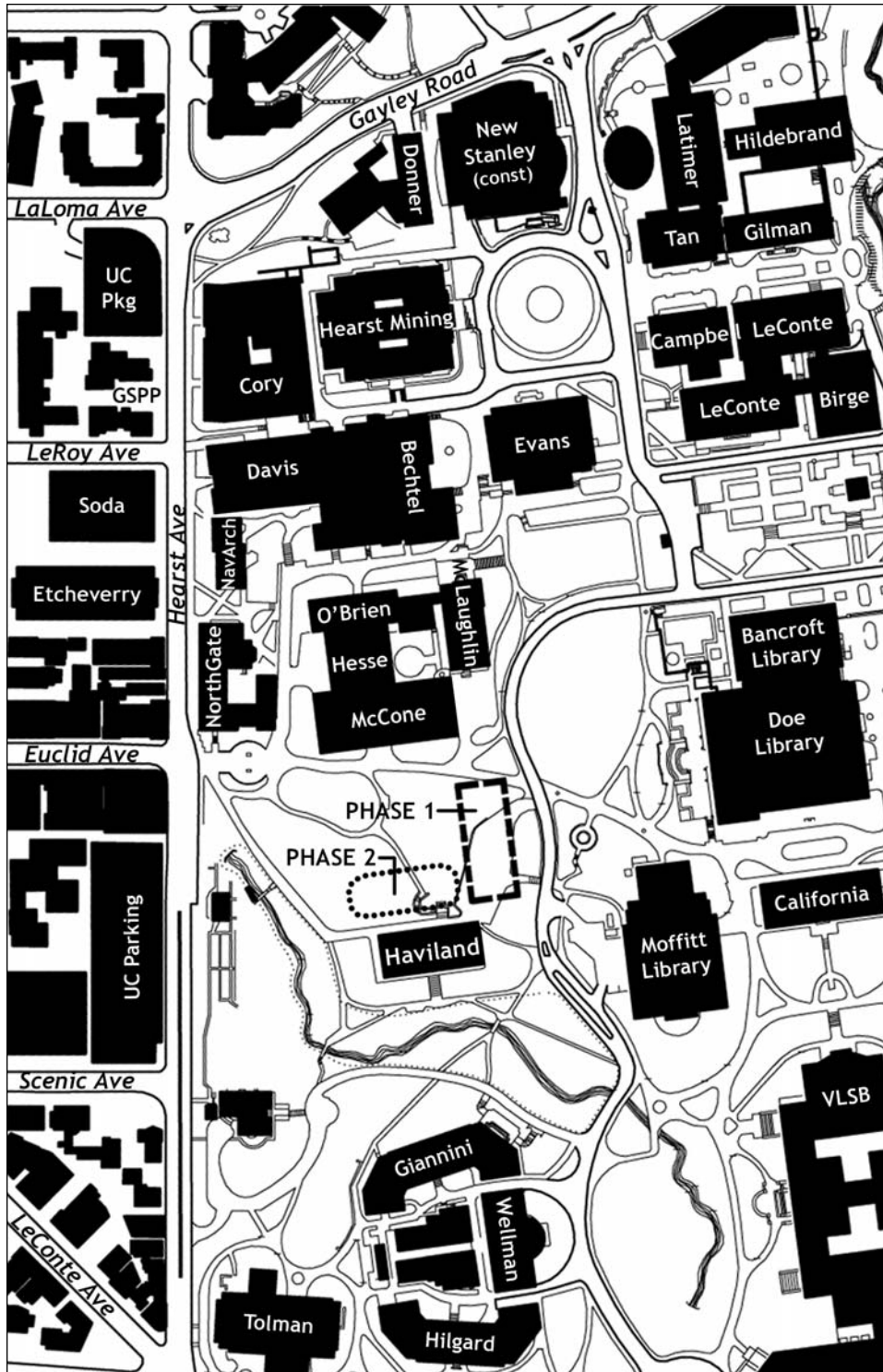


FIGURE 3.2-1
TIEN CENTER LOCATION MAP

UNIVERSITY OF CALIFORNIA, BERKELEY
2020 LRDP DRAFT EIR
3.2 PROJECT DESCRIPTION: TIEN CENTER

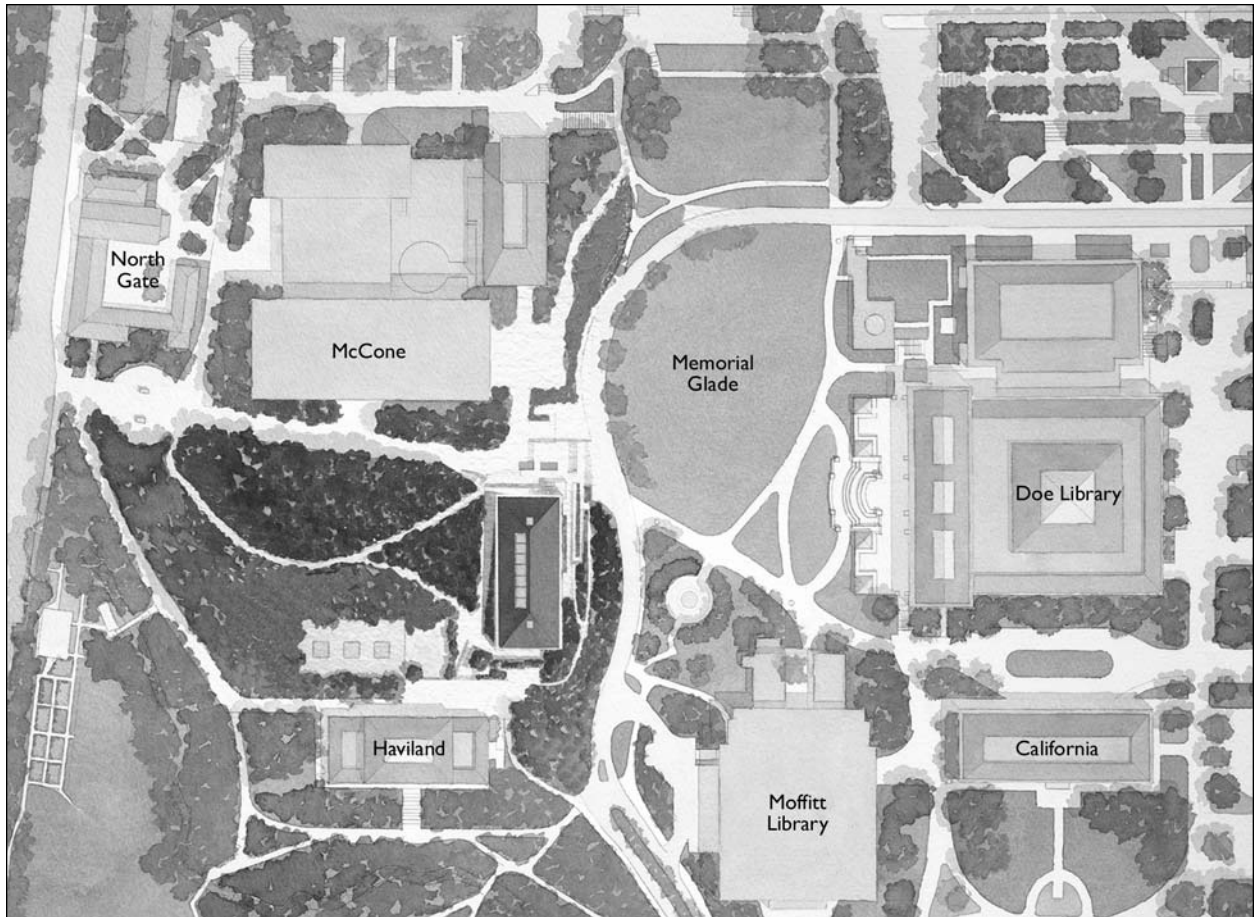


FIGURE 3.2-2
TIEN CENTER SITE PLAN
(PHASE 2 CONCEPTUAL ONLY - NOT YET DESIGNED)



FIGURE 3.2-3 TIEN CENTER VIEW FROM DOE LIBRARY : BEFORE (TOP) AND AFTER (BOTTOM)

This figure represents a massing study of the Phase I building at the schematic stage of design. Since the study was completed, the architectural treatment of the Phase I building has become more defined, as shown in the study models depicted in figures 3.2-5 and 3.2-6.

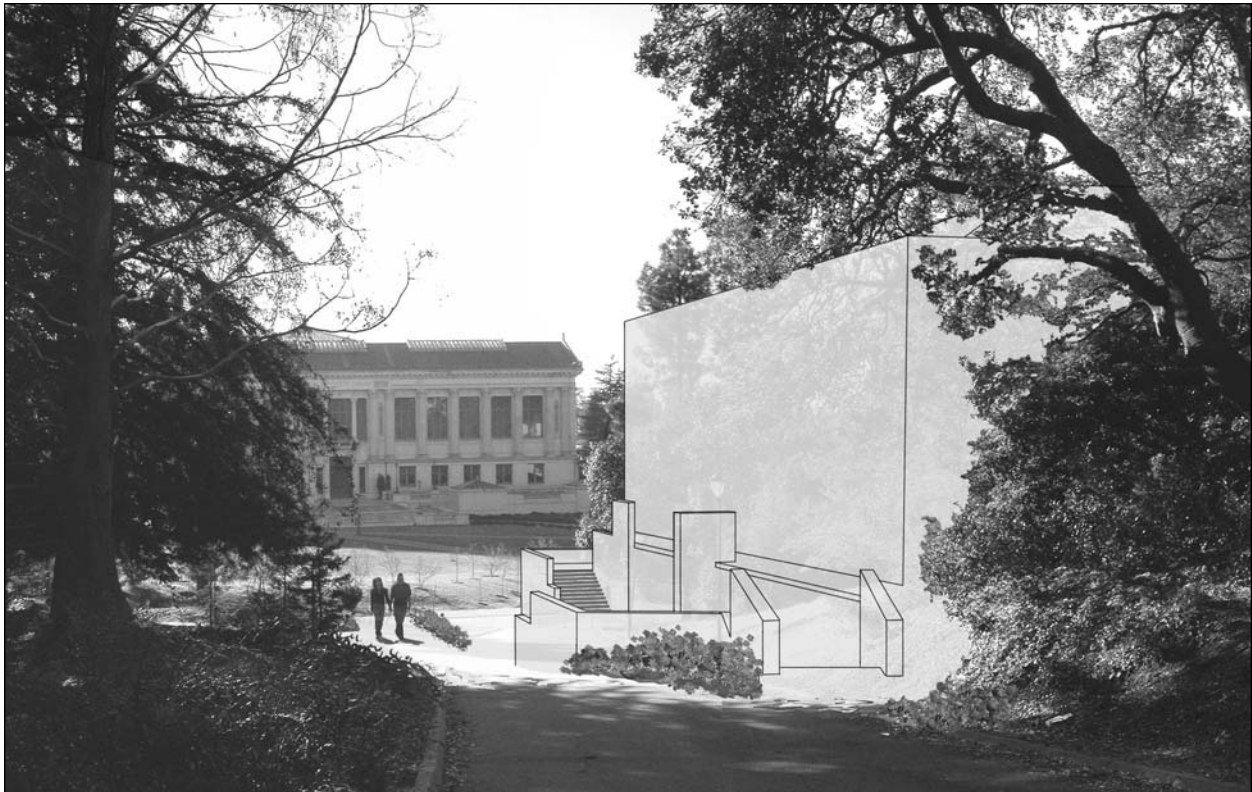


FIGURE 3.2-4 VIEW OF DOE LIBRARY FROM OBSERVATORY HILL : BEFORE (TOP) AND AFTER (BOTTOM)
This figure represents a massing study of the Phase I building at the schematic stage of design. Since the study was completed, the architectural treatment of the Phase I building has become more defined, as shown in the study models depicted in figures 3.2-5 and 3.2-6.



FIGURE 3.2-5 TIEN CENTER ARCHITECTURAL STUDY MODEL: VIEW FROM SOUTH



FIGURE 3.2-6 TIEN CENTER ARCHITECTURAL STUDY MODEL: VIEW FROM SOUTHEAST

4.0 ENVIRONMENTAL EVALUATION

This chapter consists of thirteen individual chapters that describe the existing environmental setting within the 2020 Long Range Development Plan (2020 LRDP) area and evaluate the environmental impacts of the proposed 2020 LRDP and the Chang-Lin Tien Center for East Asian Studies.

4.0.1 SCOPE OF THE ENVIRONMENTAL EVALUATION

In accordance with Appendix G of the CEQA Guidelines, the potential environmental effects of the proposed 2020 LRDP are analyzed for the following environmental issue areas:

- Aesthetics
- Air Quality
- Biological Resources
- Cultural Resources
- Geology, Seismicity and Soils
- Hazardous Materials
- Hydrology and Water Quality
- Land Use
- Noise
- Population and Housing
- Public Services
- Transportation and Traffic
- Utilities and Service System

Based upon the analysis conducted for the Initial Study,¹ which is provided in Appendix A of this EIR, impacts to agricultural resources and mineral resources were determined to be “Effects Not Found to be Significant” according to Section 15128 of the CEQA Guidelines, and are thus not analyzed in this EIR. The Initial Study also determined that the Chang-Lin Tien Center for East Asian Studies project required additional analysis for the environmental issue areas listed above, with the exception of the following:

- Hazardous Materials
- Population and Housing
- Public Services – Schools
- Public Services – Parks and Recreation

4.0.2 FORMAT OF THE ENVIRONMENTAL EVALUATION

Each of the chapters 4.1 through 4.13 begins with an introduction, as well as a summary of scoping comments received during the scoping period for this EIR. Each section follows the same general format, and consists of the following subsections:

- **Analytical Methods.** This section describes the approach used in preparing the EIR section, collecting baseline or setting information, analyzing potential impacts and determining levels of significance.
- **Regulatory Framework.** This section contains an overview of the federal and State laws and regulations applicable to each issue that would apply to development anticipated under the 2020 LRDP.

- **Local Plans and Policies.** Although the university is constitutionally exempt from local regulations when using university property in furtherance of its educational purposes, it is university policy to evaluate proposed projects for consistency with local plans and policies. This section of each chapter contains a brief overview of local plans and policies within Berkeley and Oakland that may be relevant to development under the 2020 LRDP.
- **Existing Setting.** This section describes current conditions relevant to the environmental factor reviewed.
- **Standards of Significance.** This section explains how an impact is judged to be significant in this EIR. The standards are based upon Appendix G of the CEQA Guidelines.
- **Policies and Procedures Guiding Future Project Review.** This section describes existing and proposed UC Berkeley policies and procedures, including those in the 2020 LRDP, that would influence how UC Berkeley would develop and review projects to be approved under the 2020 LRDP.
- **2020 LRDP Impacts.** This section describes potential impacts of 2020 LRDP adoption and implementation, and explains why impacts were found to be significant or less than significant based upon the standards of significance. This section also considers construction and operational impacts, where appropriate.
- **Tien Center Impacts.** This section analyzes the specific impacts of the Tien Center project, including its localized construction impacts.
- **Cumulative Impacts.** This section evaluates whether the 2020 LRDP, in combination with other reasonably foreseeable projects, including development under the City of Berkeley General Plan, UC Berkeley projects previously reviewed in accordance with CEQA, and at Lawrence Berkeley National Laboratory and University Village Albany, would result in significant cumulative impacts. The cumulative analysis methodology is described below in Section 4.0.5.
- **References.**

4.0.3 FORMAT OF IMPACT DISCUSSIONS

As stated above, each of chapters 4.1 to 4.13 contains three impact analysis discussions: 2020 LRDP Impacts, Tien Center Impacts, and Cumulative Impacts. The cumulative impact analysis is described further in Section 4.0.5. The format for the 2020 LRDP impact discussion and Tien Center impact discussion is described below. Each of these discussions has three subsections: *Effects Found Not to be Significant*, *Less Than Significant Impacts*, and *Significant Impacts and Mitigation Measures*.

EFFECTS FOUND NOT TO BE SIGNIFICANT

Based upon the analysis in the Initial Study for the 2020 LRDP and Tien Center project, certain environmental effects were determined to be “Effects Found Not to be Significant.” These effects are summarized in this subsection and the full Initial Study is presented in Appendix A.

LESS THAN SIGNIFICANT IMPACTS

This section includes a discussion of impacts which, based upon the Standards of Significance, were found to be less than significant. Since no mitigation measures are required for less than significant impacts, in most instances none are provided.

The university would continue to comply with and implement its various established programs, procedures and policies, and these are also considered part of the project description. Where relevant, these “Continuing Best Practices” are briefly described in this section and/or in the Significant Impacts and Mitigation Measures section. Ongoing implementation of Continuing Best Practices would be monitored in conjunction with monitoring of 2020 LRDP Mitigation Measures over the lifetime of the 2020 LRDP.

SIGNIFICANT IMPACTS AND MITIGATION MEASURES

This section describes the potential environmental impacts which, based upon the Standards of Significance, were found to be significant. Feasible Mitigation Measures that could reduce the severity of each impact are described. Some impacts are determined to be significant and unavoidable because the impact cannot be eliminated or reduced to a less than significant level through the implementation of Mitigation Measures. These impacts are noted in the impact statement. Some measures can only be implemented at the discretion of other agencies. All identified impacts are summarized in Table 2-1.

In addition to feasible Mitigation Measures and Continuing Best Practices, UC Berkeley would continue to comply with all applicable state and federal laws and regulations, and such compliance is considered part of the project as described.

Each significant impact, Mitigation Measure and Continuing Best Practice called out in the *Significant Impacts and Mitigation Measures* section is separately numbered.

4.0.4 TIEN CENTER PROJECT ANALYSIS

Each section of Chapter 4 includes a project-level analysis for the Chang-Lin Tien Center for East Asian Studies. This analysis is intended to satisfy the requirements of CEQA; to inform the public, the local community, responsible, trustee and federal agencies, and the university of the potentially significant environmental impacts of the Tien Center project, and feasible measures to mitigate those impacts; and to enable The Regents to consider the environmental consequences of the Tien Center when deciding whether to approve the project. This project-specific environmental analysis builds upon the broader programmatic analysis presented above for the 2020 LRDP, and focuses on evaluating and disclosing environmental impacts not previously examined that could result if the Tien Center project is implemented as proposed.

PROTOTYPICAL ENVIRONMENTAL ANALYSIS

The evaluation of the Tien Center in this EIR is a model for future environmental reviews of any project proposed to implement the 2020 LRDP. These future projects would rely on the 2020 LRDP EIR to provide information on general background, setting, and regulatory context; on overall growth-related issues; on potential impacts evaluated in sufficient detail in the 2020 LRDP EIR, where there is no more specific information that requires further analysis, or where no new mitigation measures are required; on cumulative impacts; and on alternatives to implementation of the 2020 LRDP.

In general, environmental reviews of projects implementing the 2020 LRDP would focus on more specific project-level information not available for the 2020 LRDP. Mitigation Measures identified in the LRDP EIR that apply to significant impacts of the project would be implemented as part of the project, and would be identified in the project-specific review. Other project-specific Mitigation Measures, for significant impacts not addressed in sufficient detail in the 2020 LRDP EIR, may also be implemented as part of the project; such measures would be identified in the project-specific review.

4.0.5 CUMULATIVE IMPACT ANALYSIS

Section 15130 of the CEQA Guidelines requires an EIR to discuss cumulative impacts of a project when the project's incremental effect is cumulatively considerable. A cumulative impact consists of an impact created as a result of the combination of the project evaluated in the EIR together with other reasonably foreseeable projects causing related impacts.

- Where the incremental effect of a project is not "cumulatively considerable," a lead agency need not consider that effect significant, but must briefly describe its basis for concluding that the incremental effect is not cumulatively considerable.
- Where the cumulative impact caused by the project's incremental effect and the effects of other projects is not significant, the EIR must briefly indicate why the cumulative impact is not significant.

The cumulative impacts analyses in chapters 4.1 to 4.13 follow the same general formula and include the following subsections:

- **Geographic Context.** This describes the geographic area affected by the cumulative effect, which may differ based on the type of environmental impact under consideration.
- **Standards of Cumulative Significance.** In general these Standards are similar or identical to those used to evaluate the potential impacts of the 2020 LRDP, except as a rule they do not include Standards for which the 2020 LRDP itself has no potential for impact.
- **Cumulative Impacts.** These may be less than significant or significant and, if UC Berkeley's contribution is cumulatively considerable, may be mitigated to less than significant by proposed mitigation measures. Or, they may be significant and unavoidable, in some instances because the required mitigation is outside the jurisdiction of the University.

While the geographic contexts for cumulative environmental impacts may differ by type of impact, the analyses in chapters 4.1 to 4.13 share several basic underlying assumptions:

- Population projections for cities, counties and the Bay Region are based on ABAG *Projections 2003*, except where a jurisdiction has requested us to substitute its own projections, as the city of Berkeley has done.²
- ABAG staff have advised the university that *Projections 2003* does not include the increment of growth in enrollment and employment proposed in the 2020 LRDP. Therefore, this EIR conservatively assumes that the entire 2020 LRDP program, as well as the program proposed for the Lawrence Berkeley National Laboratory 2004

LRDP,³ represents population growth above and beyond the 2020 conditions forecast in *Projections 2003*. This is a particularly conservative assumption because city of Berkeley projections, which are included in ABAG's modeling, include an allowance for growth at UC Berkeley, per the city of Berkeley General Plan EIR.

- The cumulative impact analyses assume private sector development would follow the patterns described in current city and county general plans and other adopted land use plans and policies, as well as the proposed city of Berkeley Southside Plan.
- Within the relevant geographic context each cumulative impacts analysis considers the combination of effects due to the 2020 LRDP, the Lawrence Berkeley National Laboratory 2004 LRDP, proposed UC Berkeley development likely to occur even if the 2020 LRDP is not approved, including build-out of the projects analyzed in the NEQSS EIR and the Underhill Area Projects EIR, proposed UC Berkeley development at University Village Albany, and anticipated growth under the relevant city and/or county general plans and other land use plans and policies in determining the significance of cumulative impact.
- The cumulative impacts analyses also consider the transportation improvements proposed under the AC Transit Major Investment Study, Berkeley/Oakland/San Leandro Corridor.
- The cumulative impacts analyses do not assume any additional development at the UC Berkeley Richmond Field Station. While such development is possible within the timeframe of the 2020 LRDP, at present there are no plans that define the nature or magnitude of such development to a level sufficient to allow environmental analysis. Any such development would be evaluated in a separate, future environmental review.

4.0.6 CONSTRUCTION ACTIVITY

The construction of 2020 LRDP projects is expected to continue throughout the life of the 2020 LRDP, at varying levels of intensity and varying locations. The environmental analyses in Chapter 4 assume no more than one million gross square feet of construction would be underway at any one time within the Campus Park, Adjacent Blocks, Southside and Hill Campus land use zones, which is approximately equal to the maximum level of construction underway at the time the Existing Setting data were collected in 2002 and 2003. Thus, the aggregate effects of the maximum level of construction foreseen under the 2020 LRDP are already reflected in the existing setting.

TABLE 4.0-1
CUMULATIVE ANALYSIS ASSUMPTIONS

Jurisdiction	2000	Population		2000	Households		2000	Jobs	
		Net Change	2020		Net Change	2020		Net Change	2020
Berkeley ^a	106,350	6,750	113,100	44,955	3,655	48,610	77,200	6,630	83,830
El Cerrito	23,171	1,229	24,400	10,208	682	10,890	7,970	800	8,770
Albany	16,444	1,556	18,000	7,011	389	7,400	4,890	2,340	7,230
Oakland ^b	399,484	37,606	437,090	150,790	15,460	166,250	193,950	41,050– 46,050	235,000– 240,000
North Oakland ^b	46,912	1,788	48,700	22,590	980	23,570	16,537	1,493	18,030
Emeryville	6,882	2,618	9,500	3,975	1,555	5,350	18,590	4,410	21,390
Alameda	72,259	10,841	83,100	30,226	3,824	34,050	27,160	15,450	42,610
Richmond	99,216	19,184	118,400	34,625	7,085	41,710	42,340	11,470	53,810
Kensington	4,772	278	5,050	2,123	135	2,258	52	13	65
LBNL ^c	4,300	1,200	5,500	n/a	n/a	n/a	included in population		

^a Phil Kamlarz, city of Berkeley, Letter to UC Berkeley, July 10, 2003, page 5.

^b Hausrath Economics Group, *Summary of Cumulative Growth Scenario for Oakland*, April 2003.

^c LBNL, *Revised Notice of Preparation: Draft EIR*, October 28, 2003, page 8.

Source: ABAG *Projections 2003* except where noted above.

4.0.7 REFERENCES

- ¹ UC Berkeley, *Notice of Preparation: Environmental Impact Report for the 2020 LRDP and Chang-Lin Tien Center for East Asian Studies*, August 29, 2003.
- ² Kamlarz, Phil, City of Berkeley. Written communication, July 10, 2003.
- ³ Lawrence Berkeley National Laboratory (LBNL), *Revised Notice of Preparation: Draft Environmental Impact Report*, October 28, 2003, page 8.

4.1 AESTHETICS

This chapter describes the visual setting of the UC Berkeley campus and evaluates the potential for changes in visual character due to implementation of the 2020 LRDP. This chapter also examines the potential visual impacts from the Tien Center and from cumulative projects.

During the scoping period for this EIR, several comments were received relating to aesthetics. Many comments were in regard to potential development in the Hill Campus and Strawberry Canyon, and resulting potential impacts to Strawberry Creek. There were also concerns about viewsheds within the campus, as well as views from and of the Hill Campus. Commentors also requested this EIR consider more definitive design guidelines for campus buildings. These issues are addressed in this chapter.

The 2020 LRDP is a land use plan to guide the future physical development of the UC Berkeley campus; it does not commit the University to any specific project. Therefore, the visual analysis of the 2020 LRDP presented in this document is programmatic rather than project specific, since the actual sites and designs of future buildings are not yet determined.

4.1.1 ANALYTICAL METHODS

Data used in preparing this chapter were obtained from several sources including previous land use studies and development histories prepared for UC Berkeley, and plans of the cities of Berkeley and Oakland. Applicable regional and local land use plans were reviewed, and policies relevant to the 2020 LRDP and Tien Center are summarized in Section 4.1.3. The existing visual character of the LRDP area, and the views to and from the campus and its environs, were documented during a site visit conducted in December 2002.

This analysis is focused on the aspects of aesthetics defined in the Standards of Significance, including the visual character and quality of the campus and environs, scenic vistas, scenic resources within state scenic highways, and sources of light and glare. Future visual changes which are compatible with existing patterns of development are not considered to constitute significant impacts.

4.1.2 REGULATORY FRAMEWORK

There are no federal or state regulations on this topic relevant to the 2020 LRDP or Tien Center project.

4.1.3 LOCAL PLANS AND POLICIES

Although the University is constitutionally exempt from local regulations when using its property in furtherance of its educational purposes, it is University policy to evaluate proposed projects for consistency with local plans and policies. Therefore, this section outlines the plans and policy goals of the cities of Berkeley and Oakland related to aesthetics.

TABLE 4.1-1

BERKELEY GENERAL PLAN: UC BERKELEY-SPECIFIC URBAN DESIGN POLICIES

UD-10	The University of California. Strongly support actions by the University to maintain and retrofit its historic buildings, and strongly oppose any University projects that would diminish the historic character of the campus or off-campus historic buildings.
OS-4	Working with Other Agencies. Work with the Berkeley Unified School District, the University of California, the East Bay Municipal Utility District, and the East Bay Regional Park District to improve, preserve, maintain, and renovate their open space and recreation facilities.
OS-10	Access Improvements. Improve transit, bicycle, disabled, and pedestrian access to and between open space and recreation facilities, including regional facilities such as the Berkeley Marina, University of California open space, East Bay Regional Park District lands, the Eastshore State Park, and recreational facilities in other cities.

BERKELEY DOWNTOWN PLAN: UC BERKELEY-SPECIFIC URBAN DESIGN POLICIES

DT-15	Adopt development guidelines that promote linkages and better connections between the downtown and the University.
DT-16	Protect adjacent residential neighborhoods with guidelines that scale down development at the periphery of downtown (i.e. a transitional zone).
DT-17	Development along the Oxford edge should incorporate open spaces to provide a transition between the Oxford edge and the more dense areas of the downtown. Maintain visual openness along Oxford Street.
DT-19	Use common elements, such as street trees, paving material and Strawberry Creek, to connect the University and the downtown.

CITY OF BERKELEY

The Campus Park, Adjacent Blocks, and Southside, a portion of the Hill Campus, and most of the LRDP Housing Zone lie within the city of Berkeley city limits. Major city of Berkeley policy documents relevant to the 2020 LRDP include the following:

BERKELEY GENERAL PLAN

In October 2000, the city of Berkeley published a new Draft General Plan. On December 18, 2001 the Berkeley City Council certified the General Plan Update EIR and approved the Housing, Land Use and Transportation Elements of the Draft Plan as amended by the City Council. The City Council gave final approval to the Plan in Spring 2002.

The Berkeley General Plan contains goals and policies which address urban design and visual quality within the city, including areas adjacent to the Campus Park. The plans and policies promote the protection of Berkeley's existing built environment and cultural heritage, and require the design and scale of new construction and renovation to be regulated through use permits, a design review process, and existing design guidelines already in place. Plans and policies also support preserving and maintaining the city's existing open space and recreational resources.

The Berkeley General Plan also contains policies specific to UC Berkeley, listed in Table 4.1-1. General Plan policies and actions support the University's efforts at maintaining and rehabilitating the historical buildings and character of the Campus Park. They also

encourage working with the University to help preserve and maintain the open space and recreational facilities in the area, including actions to help ensure recreational facilities for students who reside in densely developed residential districts.

FINDINGS OF THE BERKELEY GENERAL PLAN EIR

The Berkeley General Plan EIR found adoption of the General Plan would have only one impact of potential significance: Policy OS-3H called for the addition of lights to existing sports fields, which could create significant glare in residential neighborhoods. Since the provisions of policy EM-45, which requires outdoor lighting fixtures to be selected and shielded to avoid glare, may be difficult to implement for sports field lighting, the EIR prescribes the mitigation that each sports field lighting project be subject to site specific environmental review.¹

BERKELEY DOWNTOWN PLAN

The Berkeley Downtown Plan, adopted in 1990, contains objectives and policies with respect to urban design, aesthetics and visual quality within Berkeley's Downtown, including those areas adjacent to the Campus Park. The Plan includes regulations to control the appearance (materials, colors, entrances, and scale) of the exteriors of new and renovated buildings, to ensure that future changes and new development will be compatible with the historic character of the Downtown. The Downtown Plan includes four objectives for Historic Preservation and Urban Design:

- Provide continuity between the old and the new in the built environment, and retain the scale and the unique character of the downtown.
- Strengthen the downtown's identity, image, and sense of place.
- Improve the visual and environmental quality of the downtown, with an emphasis on the pedestrian environment.
- Enhance and improve the physical connection between downtown and the surrounding neighborhoods and institutions, such as the University of California.

The Historic Preservation and Urban Design Element includes a set of policies associated with each objective. Ideas contained in these policies include retaining and rehabilitating older buildings of historic value, creating a compact and cohesive district which retains its early 20th century characteristics, supporting façade and public space improvements to enhance the pedestrian experience, and creating graceful transitions from the downtown core to adjacent residential districts and the University.² The policies specific to UC Berkeley are listed in Table 4.1-1.

CITY OF OAKLAND

Much of the Hill Campus and a portion of the LRDP Housing Zone lie within the city of Oakland city limits. Thus, city of Oakland policies that relate to these areas are relevant to the 2020 LRDP.

OAKLAND GENERAL PLAN

The Oakland General Plan Open Space Conservation and Recreation Element includes objectives and policies relevant to aesthetics and visual quality in the Oakland portion of the LRDP Housing Zone. The broad goal of the element is to have a city-wide open space system accessible to all residents providing recreation and natural resources for the protection of public health and safety and the visual enjoyment of all.³ Policies strive

to meet this goal with high-quality design standards and guidelines. Policies in the element also strive to protect the character of existing scenic views in Oakland by conserving privately-owned areas with important natural resource values through a combination of land acquisition and development controls.⁴

4.1.4 EXISTING SETTING

This section describes the existing visual setting of the UC Berkeley campus and environs. Visual quality is not only a subjective experience, it is also a holistic one: that is, our perception of the visual quality of a place can rarely, if ever, be attributed to a few discrete and identifiable elements. Rather, we experience a place as a composition, as the cumulative experience of all its visual elements and their relationships.

Any description of the visual setting for an area as large and diverse as the campus and its environs, therefore, must necessarily be general. This section concentrates on the aspects of the visual setting most relevant to the Standards of Significance: namely, scenic vistas and visual character, with the latter defined as the general pattern of building scale, form, and style, and the relationship of buildings and landscape.

This section follows the practice of previous campus studies and plans, in presenting the visual character of the Campus Park in the context of its historical evolution. The Campus Park today is the result of nearly a century and a half of continuous development, and its unique visual character is due in large part to the rich mix of historical styles of architecture and landscape.

CAMPUS PARK

The heart of UC Berkeley is often described as a 'University in a park' and it is this parklike character that unifies its disparate buildings and diverse academic functions, and imparts a unique and memorable identity. UC Berkeley was established on an expansive landscape of rolling hills, framed by the north and south forks of Strawberry Creek. Over the years, two complementary design themes have emerged to define the relationship of buildings and landscape in the Campus Park.



Strawberry Creek



Central Glades at West Oval

VISUAL CHARACTER

The first theme, pursued in the Frederick Law Olmsted plan of 1866 and the David Farquharson plan of 1870, emphasized the complex natural order of the site, in its organic landscape forms and informal clusters of buildings. Campanile Way, aligned on axis with the Golden Gate, and Piedmont Avenue are remnants of this theme.

The second theme had its origins in the 1897 Hearst competition to select a new plan for the campus. The winner, Emile Bénard, presented a classical Beaux-Arts scheme which featured formal axes, bilateral symmetry, and monumental buildings with neoclassic facades. The Bénard plan was organized around a strong east-west open space axis, aligned with the city grid, and proposed to terminate at a large Pantheon structure east of the Mining Circle. Although the plan represented a shift from a natural to a formal, urban order, it retained the meanders of Strawberry Creek as an organic counterpoint; the creek remains today as a primary campus formgiver.

In 1902, John Galen Howard, who was by then campus architect, revised the Bénard plan to reflect the topography of the site, and shifted the axis of the Central Glades to realign with the Golden Gate. The 18 buildings completed under Howard's tenure include Doe Library, Hearst Mining Building, Sather Tower, and California, Durant, and Wellman Halls. The symmetry of these buildings, and their typical palette of granite facades, tile roofs, and copper trim, impart a sense of unity and dignity to the heart of campus.

Professor John Gregg, a renowned landscape architect, designed paths and landscapes with picturesque plantings to complement the Howard plan. In contrast to the grand formality of classical buildings set on ascending plateaus, buildings near the creek were sited and designed in a more informal style, set within randomly planted groves.

Under the subsequent tenures of campus architects George Kelham and Arthur Brown, campus construction largely continued the organizational and architectural traditions set by the Howard plan, in such buildings as McLaughlin, Giannini, and Sproul Halls. While more economical materials such as concrete and terra cotta had begun to replace granite, and details had become simpler, these buildings retain the light grey exterior and pitched tile roofs, and orthogonal siting of their precedents.



Neoclassical Doe Library (right) with striped classical Bancroft Library (left)

This ‘stripped classical’ style continued as the campus architectural standard for a few years after the departure of Brown in 1948, as evidenced in the Bancroft Library and in Lewis, Mulford, and Dwinelle Halls. However a modernist aesthetic also began to emerge during the early 1950s, in Cory, Morgan, and Warren Halls.

Over the last half of the 20th Century, the substantial growth of the UC Berkeley campus significantly changed the visual character of the Campus Park, particularly near its perimeter. A variety of building designs, heights, scales, and materials were employed in UC Berkeley building projects, and integrated campus planning gave way to the urgent need for new program space. The integration of landscape and buildings was neglected, as was the larger visual coherence and identity of the campus as a whole.

For example, the construction of Barrows and Evans Halls not only introduced two buildings of a significantly larger scale than previous campus buildings, but also damaged important views. Evans Hall blocks the view of the Golden Gate from the Mining Circle, a key feature of the Howard plan, while Barrows Hall partly blocks the view of Sather Tower from Telegraph Avenue, the traditional primary route to campus from the south.

With the adoption of the 1990-2005 LRDP, the University began to recommit itself to contextual design that would respect the Beaux-Arts and Picturesque origins of the Campus Park, most notably in the reconstruction of Memorial Glade and the design of Haas School of Business, which draws upon the Arts and Crafts tradition of the Faculty Club and numerous historic buildings in the City Environs.

SCENIC VISTAS

Given the campus’ spectacular setting on a gentle west facing slope at the base of the East Bay hills, views have always been a defining element of campus plans. The primary example is the alignment of the campus’ historic core with the Golden Gate, rather than the city grid. The growth of the campus, the resulting increase in building density and the maturing tree canopy, have reduced the number of significant views down to a few key vistas. While the construction of taller buildings has created new views from their upper stories, the analysis in this EIR is limited to public vistas, which are defined as exterior locations accessible by the general public.



Memorial Glade



Haas Business School

This analysis categorizes scenic vistas into 3 types: public views into the Campus Park, public views out from the Campus Park, and public views of significant visual features within the Campus Park.

VIEWS INTO THE CAMPUS from its gateways and the city beyond help define the image and identity of the University and serve as wayfinding landmarks. Because the campus is set within an intensively urbanized environment, significant views into the campus today are either from close range or along arterial streets.

Sproul Plaza is the most heavily used gateway to the Campus Park. The vista from Telegraph Avenue through Sproul Plaza is framed by the neoclassic Sproul Hall on the east and the modern student union complex on the west. Formal rows of plane trees line the route from the current campus edge at Bancroft Way through the plaza to the historic campus entrance at Sather Gate.

College Avenue presents a longer-distance view into the Campus Park. College terminates at the campus at a large, open green, framed by Boalt, Wurster and Kroeber Halls. Although a far less active place than Sproul Plaza, the College entrance presents a peaceful, welcoming and distinctly parklike image of the Campus Park.



View into campus from Telegraph Avenue



View into campus from College Avenue



View into campus from University Avenue



View of Doe Library from Observatory Hill

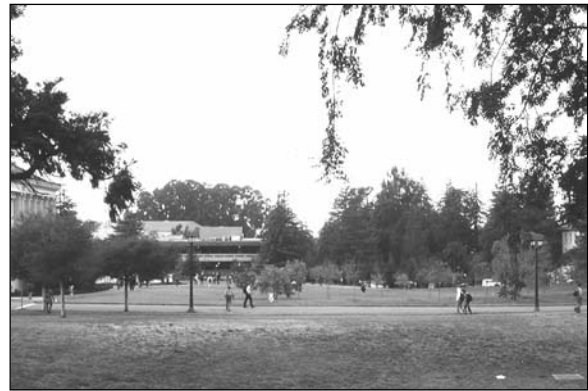
University Avenue is the longest-distance view into the Campus Park. From points beyond a few blocks distant, the Campus Park presents itself largely as a mass of mature trees: the upper portion of Evans Hall is the only clearly visible campus building.

From closer range, however, the view into the Campus Park through the West Crescent presents the strongest image of the picturesque ideal of the ‘University in a park’. This view includes the broad lawn of the Crescent, with its clusters of mature trees, in the foreground, framed by the mature tree canopy of Strawberry Creek, Eucalyptus Grove, and the oaks and pines in front of Warren Hall. The break in the canopy at University Drive presents a glimpse of the Central Glades and the Campus Park interior.

A panoramic view of the Crescent can be experienced from Oxford Street, but narrower views of the Crescent landscape may also be experienced from Center Street, Addison Street, and University Avenue. These secondary views provide a visual link from the downtown to the Campus Park, and a reminder of the historical relationship of campus and city. The view into the Campus Park from North Gate, framed by twin pillars, leads visitors into campus past the rustic landscape of Observatory Hill. However, the far more significant view along this route is the view of Doe Library from the crest of Observatory Hill, described below.



View west from Campanile Way



View west from Central Glades



View east from Campanile Way



View of Sather Tower from Sather Gate

VIEWS FROM THE CAMPUS remind the viewer of the physical and historical place of the University in the Bay Region. The view west from the base of Sather Tower down Campanile Way to the Bay and the Golden Gate dates back to the original concepts of Olmsted and Farquharson. This magnificent vista was one of the primary amenities taken into consideration in the selection of the site by the University in the 1860s.

The view west from the upper portion of the Central Glades also aligns with the Golden Gate, as established in the Howard plan, although this vista has been compromised by the construction of Moffitt Library and the grove of redwoods planted in the middle portion of the Glades. The view of the Golden Gate from the Mining Circle was blocked by the construction of Evans Hall.

VIEWS WITHIN THE CAMPUS reinforce the image and identity of the Campus Park for scholars, workers, and visitors, and also serve as wayfinding devices. The view through the Central Glades includes not only the Bay and Golden Gate in the distance, but also many of the Campus Park's most significant historic buildings and open spaces, such as Memorial and West Oval Glades.

The view along Campanile Way is also significant in both directions. It not only provides a view of the Bay and Golden Gate to the west, but visitors entering the Campus Park from the west experience the striking focal view of Sather Tower at the eastern terminus of Campanile Way. Sather Tower is visible from many points within the Campus Park, but a few vistas merit special mention: the views from Founders' Rock, from Faculty Glade, and from Sproul Plaza.

As mentioned above, the expansive view of Memorial Glade and the north façade of Doe Library from the crest of Observatory Hill present the viewer with a panoramic view of the historic heart of the Campus Park. As the viewer continues along the route into campus, Sather Tower emerges into view to the east.

HILL CAMPUS

The Hill Campus consists of roughly 1,000 acres extending east from Stadium Rimway to Grizzly Peak Boulevard. 200 of these acres are managed under the separate jurisdiction of Lawrence Berkeley National Laboratory, and are not within the scope of the UC Berkeley 2020 LRDP. While the 800 Hill Campus acres managed by UC Berkeley contain several campus public and research facilities concentrated along Centennial Drive, including the Lawrence Hall of Science, the Botanical Garden, the Space Sciences Laboratory and the Mathematical Sciences Research Institute, the primary use of the Hill Campus is natural open space.

VISUAL CHARACTER

From a base elevation of roughly 400 feet at its western edge, the Hill Campus rises to nearly 1800 feet at Chaparral Hill at its eastern edge. Slopes range from moderate to steep, but in general the terrain is rugged: few sites within the Hill Campus are suitable for development without extensive site alterations. The western third of the Hill Campus abuts low-density private residential areas to the north and south, while the eastern two-thirds abuts the largely undeveloped lands of the East Bay Regional Park District and the East Bay Municipal Utility District.

The most dramatic physical feature of the Hill Campus is Strawberry Canyon, a watershed of roughly one square mile drained by the south fork of Strawberry Creek. This water supply helped convince the trustees of the College of California to acquire the ranch lands along the creek in 1868 as the site for their new campus. At the time, the hills above the campus were a mix of grassland, oak savannah and open chaparral. It was not until speculators in the next decade planted eucalyptus in a failed commercial venture that the hills began to acquire their present, largely forested look.

The Hill Campus landscape today is a mosaic of wet and dry north coastal scrub intermixed with stands of trees: oak-bay woodland and clusters of redwoods as well as pine and eucalyptus plantations. The pattern of vegetation has changed significantly from the original mix of grassland and oak savannah, due to the decline of grazing and to human introduction of eucalyptus and conifers as well as invasive perennials such as brooms and euphorbia, and to the fact introduced species often out-compete natives.

SCENIC VISTAS

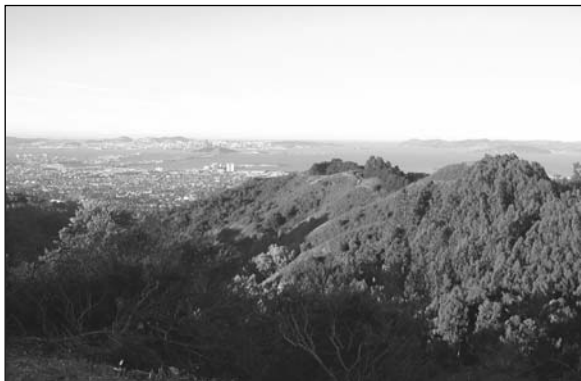
The Hill Campus affords dramatic panoramic views of the Bay Region from the Lawrence Hall of Science, as well as from several points along Grizzly Peak Boulevard.

CITY ENVIRONS

The City Environs – the Adjacent Blocks, the Southside, and the Housing Zone – consist of a grid of city blocks developed with a dense but almost entirely low-rise mix of residential, commercial, and institutional buildings. One- to four-story buildings with street level shops and services and office or residences on upper floors predominate along arterials, while interior blocks tend to be exclusively residential.

VISUAL CHARACTER

Much of the building stock in Berkeley and North Oakland dates from the 1910s, 1920s, and 1930s, and these buildings continue to define the character of the area, particularly in downtown Berkeley and in the older residential districts. The strong influence of the arts and crafts movement on residential design would coincide with a period of expansive development in Berkeley and North Oakland in the decades after the San Francisco earthquake, to produce the many craftsman style homes that have come to symbolize the area for many of its residents.



View west from Grizzly Peak Boulevard above Claremont Canyon



View west from Lawrence Hall of Science

However, like the Campus Park, the City Environs have continued to evolve over the years, and in some areas single-family homes have given way to multifamily buildings. But since this development has occurred project by project, many residential districts have an eclectic mix of older one-and two-family homes and newer, larger apartment buildings.

Nowhere is this mix more pronounced than in the Southside, where the mix is even more varied due to the presence of numerous institutional uses, some owned by the University and others by a variety of religious organizations. The most visually prominent structures within the Southside, due to their scale, are the 3 campus residence hall 'units' each designed as four slab towers organized around a central dining commons. As of July 2003, the dining commons in the two units east of Telegraph had been demolished, and construction was underway on four new midrise residential buildings, two in each unit complex, as shown below.

The University also owns the two most significant open space resources in the otherwise densely developed Southside: People's Park and the future Underhill Field. People's Park, nearly a full block in size, includes a large open lawn, a 'woodland' area, and community gardens. The site of Underhill Field is presently a surface parking lot, the site of a demolished campus parking structure. Under the auspices of the Underhill Area Plan, previously reviewed in accordance with CEQA, the University plans to construct a parking structure with rooftop sports facility on the site.



Clark Kerr Campus



Residence halls with new construction underway fall 2003



Telegraph Avenue south of Dwight typical



Shattuck Avenue north of University typical

The Southside also includes the 50-acre Clark Kerr Campus, also owned and operated by the University, which contains student and faculty housing, a recreation center, conference facility, and child care. The campus was acquired by the University in 1982 from the California Schools for the Deaf and Blind. Its 26 low-rise Mission Revival buildings, dating from the 1920s through the 1950s, are organized around formal landscaped courtyards. The entire Clark Kerr Campus is on the National Register.

In contrast to downtown Berkeley and the older residential districts of Berkeley and North Oakland, the major arterials outside the downtown tend to have no coherent style or identity, due in large part to the proliferation of nondescript apartment and retail buildings from the 1950s, 1960s and 1970s and, more recently, franchise outlets. This is particularly true along University Avenue, Telegraph south of Dwight, and Shattuck south of Dwight and north of University: areas lying within the LRDP Housing Zone.

SCENIC VISTAS

The City Environs are mostly flat and densely urbanized, and since future University projects in the City Environs are expected to be of the same general scale as private projects on similar sites, no significant impacts on scenic vistas are expected.

4.1.5 STANDARDS OF SIGNIFICANCE

The significance of the potential impacts of the 2020 LRDP and Tien Center on aesthetics was determined based on the following standards:

Standard: Would the project substantially damage scenic resources within a state scenic highway?

Standard: Would the project substantially degrade the existing visual character or quality of the site and its surroundings?

Standard: Would the project have a substantial adverse effect on a scenic vista?

Standard: Would the project create new sources of substantial light or glare that would adversely affect day- or night-time views in the area?

4.1.6 POLICIES AND PROCEDURES GUIDING FUTURE PROJECTS

This section describes policies and procedures that would influence aesthetics impacts of projects to be implemented under the 2020 LRDP.

INDEPENDENT DESIGN REVIEW

The University initiated independent design and cost review of building plans in 1985 in response to concerns about quality management of a rapidly growing capital improvement program. University policy requires independent architectural design review and independent cost estimates of projects with a total project cost over \$5 million.⁵ The policy requires design reviews to be performed early in the design process, at suitable intervals during design, and at the time of completion of design.

Selection of the reviewer, or panel of reviewers, and the format for the design review are left to the discretion of the Chancellor, subject to the following:

- The reviewers shall be licensed architects or other design professionals.
- The reviewers shall have no current connection with the firm or firms acting as executive architect or as consultants on the project being reviewed.
- The reviewers shall not be employed by the University, except for qualified faculty.
- The review shall focus on, but need not be limited to, the compatibility of the design with its setting and the suitability of the design to its functional program and project budget.

At UC Berkeley, independent design review of projects is conducted by the UC Berkeley Design Review Committee, with staff support from Facilities Services.

2020 LRDP

Review of individual projects under the 2020 LRDP would affect the visual quality of the campus and its city environs by guiding the location, scale, form and design of new University projects. Three of the LRDP Objectives noted in Chapter 3.1 are particularly relevant to visual quality:

- **Maintain and enhance the image and experience of the campus, and preserve our historic legacy of landscape and architecture.**
- **Plan every new project to respect and enhance the character, livability, and cultural vitality of our City Environs.**
- **Maintain the Hill Campus as a natural resource for research, education and recreation, with focused development on suitable sites.**

The 2020 LRDP includes a number of policies and procedures for individual project review to support these Objectives, as described below.

CAMPUS PARK

While the design of each campus building should reflect its own time and place, it should also reflect the enduring values of elegance and quality, and contribute to a memorable identity for the campus as a whole. Toward this goal, major capital projects under the 2020 LRDP would be reviewed at each stage of design by the UC Berkeley Design Review Committee, in accordance with the aforementioned policy of Independent Design Review.

The Campus Park Framework and Design Guidelines contained in the 2020 LRDP would guide these reviews to ensure they reflect a coherent aesthetic vision and support the campus' academic goals. The Campus Park Design Guidelines prescribe general design principles for the Campus Park as a whole, as well as more prescriptive criteria in selected areas to ensure:

- The major elements of the campus landscape armature, as well as its most significant views and exterior spaces, are preserved from intrusion by buildings,
- Projects within the classical core enhance the architectural integrity of the ensemble, and complement rather than compete with historic buildings,

- Projects at the city interface create a graceful transition from campus to city, and enhance the visual image and pedestrian experience of the campus edge,
- Projects facing places of interaction provide enclosure and security, admit sunlight, and have active ground level uses that observe and activate the place.

Moreover, given the variety of site conditions present in the Campus Park, project-specific design guidelines would be prepared for each major project, based on the Campus Park Guidelines. The project-specific design guidelines would specify the landscape and open space improvements to be incorporated into the project scope and budget.

HILL CAMPUS

The 2020 LRDP includes a policy to maintain the visual primacy of the natural landscape in the Hill Campus. It goes on to establish several design principles to promote this policy in individual projects:

- New building projects should conform to the contours of the land, and grading should be minimized.
- Project landscaping should utilize native plant materials and reflect the rustic style of adjacent natural areas.
- Buildings should be clustered to minimize site disturbance, and should utilize articulated volumes to reduce the perception of building mass.
- Exterior materials and colors should be selected to help buildings blend into, rather than contrast with, the landscape.
- Architecture should strive for a simple elegance of form, details, and materials that respects and complements rather than competes with the natural setting.

Major capital projects under the 2020 LRDP would be reviewed at each stage of design by the UC Berkeley Design Review Committee, and project specific guidelines would be prepared for each major project. The above principles would inform the guidelines and design review for all future Hill Campus projects.

CITY ENVIRONS

UC Berkeley serves the entire state of California, and has a mission that can not always be met entirely within the parameters of municipal policy. In the City Environs, however, the design objectives of UC Berkeley should be informed by the design policies of neighboring cities, in order to respect and enhance their character and livability with new University investment.

Major capital projects would be reviewed at each stage of design by the UC Berkeley Design Review Committee, based on project specific design guidelines informed by the provisions of city general plans and other relevant city plans and policies. The University would make informational presentations on all major projects in the City Environs to the city planning commission and, if relevant, the city landmarks commission for comment prior to schematic design review by the UC Berkeley Design Review Committee.

Projects on the Adjacent Blocks that lie within the area of the Southside Plan should as a general rule use the Southside Plan, described below, as a guide.

SOUTHSIDE. In 1997 the city of Berkeley and UC Berkeley signed a Memorandum of Understanding, which states ‘the city and the University will jointly participate in the preparation of a Southside Plan...the campus will acknowledge the Plan as the guide for campus developments in the Southside area.’

The city and University have since collaborated on a draft Southside Plan, which as of July 2003 was being finalized for formal city adoption (see City Agreements in section 4.8.6 of this EIR). Assuming no further substantive changes are made by the city prior to adoption, the University would as a general rule use the design guidelines and standards prescribed in the Southside Plan as its guide for the location and design of projects implemented under the 2020 LRDP within the geographic area of the Southside Plan.

Major capital projects would be reviewed at each stage of design by the UC Berkeley Design Review Committee. The University would make informational presentations on all major projects within the Southside Plan area to the city of Berkeley Planning Commission and, if relevant, the city of Berkeley Landmarks Commission for comment prior to schematic design review by the UC Berkeley Design Review Committee.

LRDP HOUSING ZONE. The housing objectives for the 2020 LRDP require that all new lower division student housing must be within a one mile radius of the center of campus, defined as Doe Library, while other new student housing must be within this one mile radius or within a 20 minute transit trip of Doe Library. In the 2020 LRDP, this zone is defined to exclude those areas with residential designations of under 40 units per acre in a municipal general plan as of July 2003.

While future University housing projects must have adequate density to support reasonable rents, they must also be designed to respect and enhance the character and livability of the areas in which they are located. To the extent feasible, University housing projects in the 2020 LRDP Housing Zone should not have a greater number of stories nor have lesser setback dimensions than could be permitted for a project under the relevant city zoning ordinance as of July 2003.

Major capital projects would be reviewed at each stage of design by the UC Berkeley Design Review Committee, based on project specific design guidelines informed by the provisions of city general plans and other relevant city plans and policies. The University would make informational presentations on all major projects in the Housing Zone to the city planning commission and, if relevant, the city landmarks commission for comment prior to schematic design review by the UC Berkeley Design Review Committee.

4.1.7 2020 LRDP IMPACTS

This section describes the potential aesthetic impacts of the 2020 LRDP, based on the Standards of Significance, whether they are significant or less than significant, and whether any significant impacts can be mitigated to less than significant levels.

EFFECTS FOUND NOT TO BE SIGNIFICANT

The Initial Study found that the 2020 LRDP would have no significant impacts in regard to the following threshold:

Would the project substantially damage scenic resources within a state scenic highway?

Regional access to UC Berkeley is provided by Interstate Highways 80 and 580, and State Routes 24 and 13. None is a designated or presently eligible scenic route⁶. Therefore, no further analysis of impacts against this Standard is required.

LESS THAN SIGNIFICANT IMPACTS

LRDP Impact AES-1: Projects under the 2020 LRDP would result in visual changes, through new construction on presently undeveloped sites, through replacement of existing structures with new structures, and through exterior renovations of existing structures. The design provisions of the 2020 LRDP would ensure those changes would not degrade the existing visual quality and character of their environs.

CAMPUS PARK

Major capital projects under the 2020 LRDP would be reviewed at each stage of design by the UC Berkeley Design Review Committee; the Campus Park Framework and Guidelines contained in the 2020 LRDP would guide these reviews to ensure they preserve and enhance the visual image and character of the Campus Park.

Continuing Best Practice AES-1-a: New projects in the Campus Park would as a general rule conform to the Campus Park Guidelines. While the Guidelines would not preclude alternate design concepts when such concepts present the best solution for a particular site, UC Berkeley would not depart from the Guidelines except for solutions of extraordinary quality.

Continuing Best Practice AES-1-b: Major new campus projects would continue to be reviewed at each stage of design by the UC Berkeley Design Review Committee. The provisions of the 2020 LRDP, as well as project specific design guidelines prepared for each such project, would guide these reviews.

HILL CAMPUS

The 2020 LRDP preserves the overwhelming majority of the Hill Campus as natural open space, in the Ecological Study Area, or as the Botanical Gardens, which the 2020 LRDP proposes to expand. The amount of development proposed for the Hill Campus is modest, only 100,000 gsf and up to 100 housing units, and would occur on sites proximate to previously developed Hill Campus facilities.

Projects under the 2020 LRDP would be subject to the same design review procedures described in CBP AES-1-b. However, the unique naturalistic character of the Hill Campus, and the potential visibility of its many west-facing slopes from points west in the Bay Region, require a more specific approach to siting, building, and landscape design in new projects.

Continuing Best Practice AES-1-c: New Hill Campus projects would as a general rule conform to the design principles established in the Hill Campus Framework. While these principles would not preclude alternate design

design concepts when such concepts present the best solution for a particular site, the University would not depart from these principles except for solutions of extraordinary quality.

The University also maintains an ongoing program of fuel management to reduce fire risk. This program has the potential over the long term to enhance the visual and ecological quality of the Hill Campus by restoring native patterns of vegetation.

Continuing Best Practice AES-1-d: To the extent feasible, future fuel management practices would include the selective replacement of high-hazard introduced plant species with native species: for example, the restoration of native grassland and oak-bay woodland through the eradication of invasive exotics, and replacement of aged pines and second-growth eucalyptus. Such conversions would be planned with care, however, to avoid significant disruption of faunal habitats.

CITY ENVIRONS

The Adjacent Blocks, Southside, and LRDP Housing Zone present a highly variegated visual character, with architectural styles dating from every decade of the 20th century and a few examples from the 19th. However, they have in common an orthogonal urban grid which is relatively dense but, except for portions of the Adjacent Blocks and Downtown Berkeley, overwhelmingly low-rise in character.

The cities of Berkeley and Oakland have extensive portfolios of policies and guidelines that reflect community aesthetic values with respect to the scale, form, and style of architecture and landscape, and address the great variety of existing conditions within the City Environs. While the University has a statewide mission that can not always be met entirely within the parameters of municipal policies and guidelines, they serve as a guide for project location and design, and help ensure future projects under the 2020 LRDP would not significantly degrade existing visual character.

Projects under the 2020 LRDP would be subject to the same design review procedures described in Practice AES-1-b. For projects in the City Environs, UC Berkeley already consults with the city of Berkeley and would do the same with the city of Oakland.

Continuing Best Practice AES-1-e: UC Berkeley would make informational presentations of all major projects in the City Environs in Berkeley to the Berkeley Planning Commission and, if relevant, the Berkeley Landmarks Commission for comment prior to schematic design review by the UC Berkeley Design Review Committee. Major projects in the City Environs in Oakland would similarly be presented to the Oakland Planning Commission and, if relevant, to the Oakland Landmarks Preservation Advisory Board.

Continuing Best Practice AES-1-f: Each individual project built in the City Environs under the 2020 LRDP would be assessed to determine whether it could pose potential significant aesthetic impacts not anticipated in the 2020 LRDP, and if so, the project would be subject to further evaluation under CEQA.

Continuing Best Practice AES-1-g: To the extent feasible, University housing projects in the 2020 LRDP Housing Zone would not have a greater number of stories nor have setback dimensions less than could be permitted for a project under the relevant city zoning ordinance as of July 2003.

Continuing Best Practice AES-1-h: Assuming no further substantive changes are made by the city prior to adoption, the University would as a general rule use the design guidelines and standards prescribed in the Southside Plan as its guide for the location and design of University projects implemented under the 2020 LRDP within the area of the Southside Plan.

The design provisions of the 2020 LRDP and the above Continuing Best Practices would ensure LRDP Impact AES-1 is *less than significant*.

LRDP Impact AES-2: The Campus Park and Hill Campus have a number of scenic vistas into, within, and from campus lands. While projects under the 2020 LRDP would result in visual changes, the design provisions of the 2020 LRDP would ensure those changes would not have adverse effects on those scenic vistas.

CAMPUS PARK

The Campus Park Framework and Guidelines contained in the 2020 LRDP identify preservation areas, into which new buildings should not intrude. These preservation areas include the scenic vistas described in Section 4.1.4, above. On-going implementation of CBPs AES-1-a and AES-1-b, above, would continue to protect scenic vistas through implementation of the 2020 LRDP.

HILL CAMPUS

The Hill Campus affords dramatic panoramic views of the Bay Region from the Lawrence Hall of Science, as well as from several points along Grizzly Peak Boulevard at the east boundary of the campus lands. Since the areas to the west of these vista points are designated in the 2020 LRDP Hill Campus Framework as Claremont Canyon Reserve, Ecological Study Area, and open space buffer, no development is expected within the Hill Campus that could block or otherwise compromise these scenic vistas.

CITY ENVIRONS

The City Environs are mostly flat and densely urbanized, and since future University projects in the City Environs are expected to be of the same general scale as private projects on similar sites, no significant impacts on scenic vistas are expected. However, any such impacts would be disclosed through the process of consultation described in CBP AES-1-e, and would be evaluated as necessary in project specific CEQA review.

The design provisions of the 2020 LRDP and the above Continuing Best Practices would ensure LRDP Impact AES-2 is *less than significant*.

SIGNIFICANT IMPACTS AND MITIGATION MEASURES

LRDP Impact AES-3: Projects under the 2020 LRDP have the potential to create new sources of substantial light or glare that could have adverse impacts on day- or night-time views, but the mitigation measures described below would reduce this impact to *less than significant*.

New development under the 2020 LRDP, which could include locations near the perimeter of the Campus Park, as well as areas that are currently undeveloped, could create new sources of light from exterior building illumination, lighted recreation/athletic facilities, and parking lots or structures, as well as glare from reflective building surfaces or headlights of vehicular traffic.

LRDP Mitigation Measure AES-3-a: Lighting for new development projects would be designed to include shields and cut-offs that minimize light spillage onto unintended surfaces and minimize atmospheric light pollution. The only exception to this principle would be in those areas where such features would be incompatible with the visual and/or historic character of the area.

LRDP Mitigation Measure AES-3-b: As part of the design review procedures described in the above Continuing Best Practices, light and glare would be given specific consideration, and measures incorporated into the project design to minimize both. In general, exterior surfaces would not be reflective: architectural screens and shading devices are preferable to reflective glass.

Implementation of the Mitigation Measures described above would reduce Impact LRDP AES-3 to a *less than significant* level.

4.1.8 TIEN CENTER IMPACTS

This section describes the potential aesthetic impacts of the Tien Center, based on the Standards of Significance, whether they are significant or less than significant, and whether any significant impacts can be mitigated to less than significant levels.

EFFECTS FOUND NOT TO BE SIGNIFICANT

The Initial Study found that the Tien Center would have no significant impacts in regard to the following thresholds:

Would the project substantially damage scenic resources within a state scenic highway?

Regional access to UC Berkeley is provided by Interstate Highways 80 and 580, and State Routes 24 and 13. None is a designated or presently eligible scenic route.⁶ Therefore, no further analysis of this Standard is required.

LESS THAN SIGNIFICANT IMPACTS

Tien Center Impact AES-1: The Tien Center has the potential to degrade the visual quality and character of its environs, but the project design avoids such impacts by conforming to the Campus Park Guidelines in the 2020 LRDP.

The Tien Center is envisioned as a composition of two rectangular buildings. The Phase 1 building would be located at the south base of Observatory Hill on the site of the existing parking lot, facing Memorial Glade and Doe Library, and aligned with the central axis of the Glade.

The Phase 1 building would occupy one of the most visible sites from within the Campus Park, and would also be located within its historic ensemble of neoclassic buildings. The design of the Phase 1 building is based on the principles for the classical core prescribed in the Campus Park Framework and Design Guidelines, which include:

- The project should preserve the view of Doe Library from the crest of Observatory Hill.
- The project should be composed of elements orthogonal in plan, and sited to respect the axial relationships of the classical core buildings and the Central Glades.
- The project should have a hip or gable roof, with a pitch similar to existing historic buildings in the classical core.
- The project should be fenestrated with individual punched windows that respect the building structural grid.
- The project should utilize the following materials palette: roofs of unglazed red tile, walls of light grey granite or sand finish architectural concrete, windows of clear or lightly tinted glass, and metalwork of copper or bronze.

The preliminary design for Phase 1, shown in Figures 3.2-5 and 3.2-6, conforms to all these principles except the fourth: in lieu of individual punched windows that respect the structural grid, the building would have large expanses of windows and bronze spandrel panels on the north, east and west facades, which span multiple bays and are set behind a bronze screen. However, while this architectural feature is unprecedented at this large scale in the classical core, some of its buildings have smaller versions of such screens, notably Valley Life Sciences Building which, although not strictly a classical building, has a similarly prominent position facing the Central Glades.

At roughly 75 feet in height, the Phase 1 building would be taller but compatible in scale with other classical core buildings, and its rectangular form and orthogonal relationship to those buildings and the central glades is consistent with classical core traditions. For these reasons, Tien Center Impact AES-1 is *less than significant* for Phase 1.

The Phase 2 building would be sited at the west base of Observatory Hill, oriented at right angles to Phase 1, and adjacent to Haviland Hall, a neoclassic National Register building. Apart from its general location and orientation, however, the Phase 2 building is not yet designed to a point where aesthetic determinations can be made. Its impacts on visual quality and character would be assessed at the time of project-specific review.

Tien Center Impact AES-2: The Tien Center has the potential to cause adverse impacts on scenic vistas, but the project design avoids such impacts by conforming to the Campus Park Guidelines in the 2020 LRDP.

The Phase 1 building of the Tien Center could affect two significant Campus Park vistas: the view west from the east end of Memorial Glade, and the view of Doe Library from the crest of Observatory Hill. With respect to the view west from Memorial Glade, a new building could affect this vista either by partly or entirely blocking the view, like Moffitt Library has done, or by altering the visual character of the view, as might occur if the building were designed in an architectural style incompatible with the historic buildings of the classical core.

As proposed, Phase 1 of the Tien Center would respect the preservation zones established in the Campus Park Framework and Guidelines: the façade would not protrude further into the Central Glades than the façade of McLaughlin Hall, thus preserving and reinforcing the formal definition of the Glades by the buildings facing it. The building would be oriented with its long dimension aligned with the east-west axis of the Glades, and its architectural style, as described above, would be compatible with the historic buildings of the classical core.

With respect to the view of Doe Library from the crest of Observatory Hill, as shown in Figure 3.2-4, the Phase 1 building would respect the preservation zones established in the Campus Park Framework and Guidelines: the building would not protrude into the view cone established by the Guidelines to protect this view. For these reasons, Tien Center Impact AES-2 is *less than significant* for Phase 1. While the Phase 2 building is not yet designed, its proposed location does not threaten any significant scenic vistas.

Tien Center Impact AES-3: As a project implementing the 2020 LRDP, the Tien Center would not create new sources of light or glare that could have adverse impacts on day or night-time views.

Incorporation of the Mitigation Measures described under LRDP Impact AES-3 would ensure Tien Center Impact AES-3 is *less than significant*.

4.1.9 CUMULATIVE IMPACTS

This section evaluates whether the 2020 LRDP, in combination with other University and non-University projects which are reasonably foreseeable, would result in significant cumulative aesthetic impacts.

This analysis considers cumulative growth as represented by the implementation of municipal general plans, implementation of the proposed Lawrence Berkeley National Laboratory 2004 LRDP, the proposed redevelopment of University Village Albany, the draft Southside Plan, the AC Transit Major Investment Study, and implementation of the 2020 LRDP, as described in 4.0.5. The analysis also includes growth anticipated by previously certified UC Berkeley EIRs, including the Northeast Quadrant Science and Safety Projects (SCH 2001022038), Seismic Replacement Building 1 (SCH 99122065), and the Underhill Area Projects (SCH 99042051).

The geographic context for the analysis of cumulative aesthetic impacts includes the city of Berkeley and the areas of the city of Oakland within the scope of the 2020 LRDP, plus the areas of the Bay Region from which the UC Berkeley Hill Campus and Lawrence Berkeley National Laboratory are visible from public exterior viewpoints.

The significance of the potential cumulative aesthetic impacts was determined based on the following standards, which are identical to those presented in section 4.1.5, except for those found to have no potential for environmental impact in the 2020 LRDP Initial Study, and therefore no potential for a cumulatively considerable impact.

Standard: *Would the project substantially degrade the existing visual character or quality of the site and its surroundings?*

Standard: *Would the project have a substantial adverse effect on a scenic vista?*

Standard: *Would the project create new sources of substantial light or glare that would adversely affect day- or night-time views in the area?*

Section 4.1.7 found these impacts would, with the prescribed mitigation measures, be *less than significant* for the 2020 LRDP. The question posed in this section is twofold:

- Is the potential *cumulative* impact of the 2020 LRDP *and* other reasonably foreseeable projects under these standards significant?
- Is the contribution of the 2020 LRDP to these impacts cumulatively considerable?

Cumulative Impact AES-1: The 2020 LRDP, in combination with other reasonably foreseeable projects, would result in visual changes. While such changes would have the potential to degrade the visual quality and character of the sites and their environs, the design provisions of the 2020 LRDP would ensure the contribution of projects under the 2020 LRDP would not be cumulatively considerable.

Cumulative Impact AES-2: The 2020 LRDP, in combination with other reasonably foreseeable projects, would result in visual changes. While such changes would have the potential to adversely affect scenic vistas, the design provisions of the 2020 LRDP would ensure the contribution of projects under the 2020 LRDP would not be cumulatively considerable.

This analysis considers cumulative growth within the geographic context, as represented by the implementation of each city's general plan, the implementation of the proposed 2004 LRDP for Lawrence Berkeley National Laboratory, and the proposed redevelopment of University Village in Albany, as well as implementation of the 2020 LRDP, as described in chapter 4.0.

The geographic context includes flat, urbanized areas as well as areas on the western slopes of the East Bay Hills, but the nature of potential aesthetic impacts differs in these two environments, as described below.

FLATLANDS. The urban flatlands, which include the Campus Park and City Environs in the 2020 LRDP, as well as University Village Albany, are already mostly built out: very few large vacant sites remain. Thus, while the cumulative number of projects built in the urban flatlands from now through 2020 may be substantial, they would be built in conformance with the 2020 LRDP or with city general plans and ordinances, would not change the already urbanized character of the area, and thus are not expected to result in significant adverse impacts to visual quality, character or scenic vistas.

With respect to the proposed redevelopment of University Village Albany, the Initial Study found the project would have no potential for significant impact in any of the four standards of significance for aesthetics used in the analysis, which are the same as those used in the analysis of the 2020 LRDP. With respect to visual quality and character, the Initial Study found "... The [UVA] master plan, as amended, would be consistent with the visual quality and character of the site and other uses in the vicinity, and would not degrade the visual quality or character of the site. Step 2 would replace the existing housing with housing types similar to the existing housing and within the guidelines of the approved master plan. The step 3 project would generally conform to Albany General Plan designations and Albany's San Pablo Avenue Urban Design Guidelines ..."⁷

HILLS. The UC Berkeley Hill Campus and the entire Lawrence Berkeley National Laboratory site are located on the west-facing slopes of the East Bay Hills, and are thus visible from many public viewpoints to the west. The 'greenbelt' along the crest of the hills that extends from Richmond to Hayward is a unique and significant scenic resource for the entire Bay Region. The analysis in section 4.1.7 concludes projects implemented under the design provisions of the UC Berkeley 2020 LRDP would not have a significant adverse impact on visual quality or character or on scenic vistas.

Within the hills portion of the geographic context, development at Lawrence Berkeley National Laboratory would constitute the great majority of development anticipated to occur during the time horizon of the 2020 LRDP. The Revised NOP for its 2004 LRDP indicates building space on the LBNL site would increase by up to 800,000 gsf,⁸ compared to up to 100,000 gsf plus up to 100 housing units in the UC Berkeley Hill Campus. Most of the land around these two areas consists of permanently dedicated open space, with some clusters of low-density single-family residences.

The specific design provisions of the proposed Lawrence Berkeley National Laboratory 2004 LRDP are not yet available, but the Revised NOP indicates this document "...would be expected to include LBNL aesthetic design guidelines to be incorporated into any future project."⁹ It is not yet possible to determine whether those LBNL guidelines would entirely eliminate the potential for significant adverse impacts to scenic vistas. However, the design provisions of the 2020 LRDP would ensure the contribution of UC Berkeley projects to any such adverse impact would not be cumulatively considerable.

Cumulative Impact AES-3: The 2020 LRDP, in combination with other reasonably foreseeable projects, would have the potential to create new sources of substantial light or glare that could have adverse impacts on day- or night-time views, but the mitigation measures prescribed above would ensure the contribution of the 2020 LRDP to any such adverse impact would not be cumulatively considerable.

The same general conclusions apply to Cumulative Impact AES-3 as to AES-1 and AES-2. It is not yet possible to determine whether the aesthetic design guidelines proposed to be prescribed in the Lawrence Berkeley National Laboratory 2004 LRDP would eliminate the potential to create new sources of substantial light or glare, but the mitigation measures prescribed in the 2020 LRDP would ensure the contribution of UC Berkeley projects to any such adverse impact would not be cumulatively considerable.

4.1.10 REFERENCES

- ¹ *City of Berkeley Draft General Plan EIR*, February 2001, pages 164-165
- ² City of Berkeley, *Downtown Plan Goals, Objectives, Policies*,
www.ci.berkeley.ca.us/planning/landuse/plans/dtgoals.htm, retrieved February 2, 2004
- ³ City of Oakland, *Open Space Conservation and Recreation Element*, June 1996, page 2-9.
- ⁴ City of Oakland, *Open Space Conservation and Recreation Element*, June 1996, page 2-65.
- ⁵ University of California, *Facilities Manual*, Vol 3, Part 1, Chapter 5, Section 5.1.
<http://www.ucop.edu/facil/fmc/facilman/volume3/part1/ch5.html>, retrieved February 19, 2004.
- ⁶ The portion of Route 24 east of the Caldecott Tunnel is a designated scenic highway, but the portion west of the Tunnel is not. Source: Department of Transportation,
<http://www.dot.ca.gov/hq/LandArch/scenic/schwy2.html>, retrieved February 19, 2002. The campus lands are not visible from the portion of Route 24 east of the Tunnel.
- ⁷ UC Berkeley, *Notice of Preparation and Initial Study Checklist, University Village and Albany/Northwest Berkeley Properties Master Plan Amendments*, May 20 2003, Checklist page 20.
- ⁸ Lawrence Berkeley National Laboratory (LBNL), *Revised Notice of Preparation, Draft Environmental Impact Report*, October 28 2003.
- ⁹ Lawrence Berkeley National Laboratory (LBNL), *Revised Notice of Preparation, Draft Environmental Impact Report*, October 28 2003, Checklist page 1.

4.2 AIR QUALITY

This chapter describes existing air quality conditions in the region and the 2020 LRDP land use zones and evaluates the potential for development under the 2020 LRDP to affect regional and local air quality. Additionally, this chapter examines the potential air quality impacts from the Chang-Lin Tien Center for East Asian Studies and potential cumulative air quality impacts. This chapter also provides a summary of the regulatory framework applicable to air quality.

As described in the Initial Study and Notice of Preparation for the 2020 LRDP and Tien Center project,¹ the Tien Center would house office, classroom and library space, and would not be a significant point source for air pollutants; would not be a source for toxic air contaminant emissions; and would not be a source for odiferous emissions. Further, the increase in campus population associated with the Tien Center would be limited to approximately five new staff members. No air quality impacts are anticipated from operation of the Tien Center. Contributions of the Tien Center to potential air quality impacts would thus be from construction-related emissions as part of the program of development implementing the 2020 LRDP.

During the scoping period for this EIR, commentors requested that the EIR analyze air quality impacts from construction, hazardous emissions, and increased traffic and parking under the 2020 LRDP. These issues are addressed in this chapter.

Commentors also sought information about environmental impacts of nanotechnology research. Nanotechnology is an emerging area of research aimed at the development of structures and devices at the atomic, molecular or macromolecular levels to produce materials with novel properties and perform functions at the molecular level. The U.S. Environmental Protection Agency (EPA) has listed nanotechnology as an area for future study under their “Futures Analysis” program, and only recently has the EPA begun funding research in this area. December 11, 2003 was the deadline for applications for grants under the EPA National Center for Environmental Research (NCER) for the “Impacts of Manufactured Nanomaterials on Human Health and the Environment”. Thus, nanotechnology is an emerging area of study at the EPA in terms of potential environmental impacts. No regulatory standards have been developed. The topic is therefore not addressed further in this document.

4.2.1 ANALYTICAL METHODS

2020 LRDP

BACKGROUND AIR QUALITY

Ambient air quality data for criteria air pollutants from monitoring stations in the project vicinity, operated by the California Air Resources Board (CARB) and the Bay Area Air Quality Management District (BAAQMD), were obtained from the CARB internet site (www.arb.ca.gov), which contains summaries of state-wide monitored data. Background ambient data for toxic air contaminants were obtained from a BAAQMD compilation contained in their annual air toxic report.² The assessment of potential impacts generally follows recommendations in the BAAQMD CEQA Guidelines: *Assessing the Air Quality Impacts of Projects and Plans*,³ and Appendix G of the CEQA Guidelines.

STATIONARY SOURCE EMISSIONS

Estimates of existing campus stationary sources of air emissions were obtained from BAAQMD air permit information, as well as information regarding campus operations obtained from the UC Berkeley Office of Environment, Health & Safety (EH&S) regarding laboratory chemical use and other fuel and material use data. Increased turbine and boiler emissions were estimated from the estimated increased campus steam demand under the 2020 LRDP. Emissions from the routine testing of new emergency generators were calculated based on the assessed power output of the new generators assuming that future engines would meet current certification requirements of the CARB (i.e. 0.15 pounds of diesel particulate matter per horsepower-hour). This is further explained in two technical studies that support the 2020 LRDP EIR.⁴

AREA SOURCE EMISSIONS

Existing campus area sources include academic, administrative, and housing buildings. Emissions associated with these land uses include:

- diesel-powered landscaping equipment emissions.
- natural gas combustion emissions from space and water heating. Since this is many point sources (venting at housing and buildings) it was treated as an area source.
- reactive organic gas (ROG) emissions from consumer product use, such as automotive products, household cleaners, and personal care products.
- ROG emissions from increased laboratory space.

Note that there is no specific regulatory framework for these types of sources, since they are a result of various activities by individuals rather than pollutants emitted by businesses or industry. The URBEMIS 2002 model was used to estimate emissions from landscaping equipment, space and water heating, and consumer product use. These calculations were based on the estimated gross square feet (GSF) for current academic and support facility space; emissions of 2020 LRDP development were determined based on the area of expected building (in GSF) for academic and support facilities at full development under the 2020 LRDP, which in this analysis is 2.2 million GSF. URBEMIS is a CARB-approved model that estimates emissions from land use development projects. URBEMIS estimates air pollutant emissions from the area sources mentioned above, as well as construction sources. The model was developed under the cooperation of several California air districts and the California Air Pollution Control Officers Association (CAPCOA).

In addition to the criteria pollutants from future housing and academic and support space, ROG emissions not quantified by URBEMIS would be generated by increased laboratory space. Increased emissions of individual organic chemicals projected in future new laboratory space were quantified as described in the Toxic Air Contaminant Emissions discussion below.

VEHICULAR EMISSIONS

Criteria pollutants emitted in vehicle exhaust from student, faculty, and staff vehicle trips to UC Berkeley were assessed applying state-approved emission factors to the transportation analysis. Emissions from vehicle trips associated with the 2020 LRDP were estimated with the EMFAC2002 model. This is the latest in a series of models by the CARB for calculation of emissions from all classes of on-road vehicles. Traffic data

for LRDP conditions were obtained from the traffic analysis conducted by Fehr and Peers Associates. Daily vehicle trips generated by the project and average miles traveled were used with the EMFAC2002 gram-per-mile factors to calculate daily emissions of ROG, carbon monoxide (CO), nitrogen oxides (NO_x), sulfur dioxide (SO₂), and particulate matter (PM₁₀).

LOCAL CARBON MONOXIDE EMISSIONS

CO emissions impacts from vehicles associated with the full development under the 2020 LRDP were evaluated at intersections in the project vicinity exhibiting the highest peak hour volumes and most congestion due to the proposed project and where the difference between project and no-project volumes was greater than 5 percent. The method of evaluation followed that described in the *Transportation Project-Level Carbon Monoxide Protocol* (UC Davis 1997) referred to as the “CO Protocol.” The analysis approach in the CO Protocol involves a screening process where dispersion modeling (e.g. with CALINE4) is not required if the air basin is in attainment of the CO standard and there exists a similar intersection in the air basin that has equal or higher traffic volumes or congestion, or receptors that are as close or closer to the roadway as the intersection(s) under consideration for impacts from the proposed project.

CONSTRUCTION EMISSIONS

The URBEMIS 2002 model was used to estimate the type and number of construction equipment involved in the construction of up to one million gross square feet of space that could be under construction at any time under the 2020 LRDP. Based on the area of construction, this model assumes certain numbers of typical construction equipment and duration of construction. Emissions from all phases of construction are calculated.

TOXIC AIR CONTAMINANT EMISSIONS

Evaluation of impacts from toxic air contaminants (TACs) is based upon a health risk assessment (HRA). An HRA consists of four basic steps to assess potential public health risk. First, the TACs to be evaluated are identified and emissions quantified. This was accomplished by a review of activities and materials that are part of the existing campus operations. Second, ground-level impacts resulting from the transport and dilution of these emissions through the atmosphere were assessed by air dispersion modeling. The Industrial Source Complex Short Term 3 (ISCST3) dispersion model, approved by the United States Environmental Protection Agency (EPA), was used for this assessment.

Third, potential public exposure to these compounds resulting from atmospheric transport was calculated. For this step, methods from current California Office of Environmental Health Hazard Assessment (OEHHA) guidance for exposure assessments from inhalation and non-inhalation exposure pathways were employed. Finally, potential cancer and non-cancer health risks resulting from the calculated exposures were estimated using dose-response relationships developed from toxicological data,

ISCST3 is the most widely used dispersion model for these types of analysis. ISCST3 predicts resulting total airborne concentrations from many point, area, volume, and open pit sources simultaneously at numerous specified locations of interest (“receptors”). The ISCST3 model is capable of predicting impacts in simple terrain (receptors at or below stack height), intermediate terrain (receptors between stack height and final plume rise), and complex terrain (receptors above final plume rise), all of which exists in

the area surrounding UC Berkeley. Of these terrain types, ISCST3 is best suited for simple terrain, which is the terrain immediately surrounding UC Berkeley where the maximum health risks described later in this section were modeled.

Exposure pathways evaluated included direct inhalation, soil ingestion, dermal absorption, mother's milk, and consumption of locally grown produce. Toxicological data published by OEHHA were used when available for any modeled TAC; otherwise, other data published by the California Air Pollution Control Officers Association (CAPCOA), the EPA, or occupational exposure standards adjusted for application to the general public were used.

Hundreds of chemicals are used or produced by campus operations, but only a portion of these chemicals contribute substantially to human health risks. A total of 56 chemicals were selected for modeling in the 2020 LRDP HRA based on a detailed assessment of their use, production, volatility, and toxicity. These chemicals are listed in Table 4.2-1.

The *Central Campus Human Health Risk Assessment*⁵ as augmented by a 2003 update to incorporate current emergency generators⁶ provided an assessment of potential health risks from current campus operations. Emission sources included the cogeneration turbine, central plant boilers, hazardous waste bulking, campus maintenance activities, and laboratory emissions. During development of the 2000 HRA, campus laboratories were categorized into three different Lab Types based on chemical usage patterns:

- Lab Type I = Chemistry and Chemical Engineering
- Lab Type II = General Biological Sciences
- Lab Type III = Physical Sciences/Other (Engineering, Geology, Physics, etc.)

Based on an extensive analysis of actual chemical usage per laboratory described in the 2000 HRA, average emissions (in grams per second) per laboratory space square foot (or g/s per ft²) were calculated for each chemical in each Lab Type. These emission factors can be found in the 2003 HRA update.⁷

Projected health risks after development under the 2020 LRDP were assessed in the future LRDP scenario by including additional laboratory space, increased operation of the central plant boilers, and additional new emergency generators. The future LRDP scenario included these projected emission increases along with the existing campus emissions and emissions from UC Berkeley projects analyzed in previously certified EIRs.

TABLE 4.2-1

TOXIC AIR CONTAMINANTS INCLUDED IN CAMPUS PARK HUMAN HEALTH RISK ASSESSMENT

Laboratory Chemicals*	Combustion Chemicals
Acetonitrile	Acetadehyde**
Benzene*	Acrolein**
Bromine and compounds*	1,3-Butadiene**
t-Butyl alcohol	Dichlorobenzene
Carbon tetrachloride	Ethylbenzene
Chloroform	Naphthalene
Dimethylformamide	PAHs (BaP equivalents)
1,4-Dioxane	PAHs (Pyrene equivalents)
Epichlorohydrin	Propylene Oxide**
Ethanol	
Ethyl acetate	Arsenic
Ethyl ether	Beryllium
Formaldehyde*	Cadmium
Glutaraldehyde	Chromium
n-Hexane*	Cobalt
Hydrazine	Copper
Hydrochloric acid	Lead
Hydrogen fluoride	Manganese
Hydrogen-3**	Mercury
Iodine-125**	Nickel
Isopropanol	Selenium
Methyl alcohol	Vanadium
Methyl bromide	Zinc
Methylene chloride	Diesel exhaust particulate matter (PM)**
Phosgene	
Pyridine	
Tetrachloroethylene	
Tetrahydrofuran	
Toluene*	
1,1,1-Trichloroethane*	
Trichloroethylene	
Triethylamine	
Xylenes*	

* Chemicals noted with asterisks are also combustion chemicals.

** The 2000 *Central Campus Health Risk Assessment* modeled 52 chemicals. Since then, two radionuclides were added as laboratory chemicals, and diesel exhaust PM was added as a combustion chemical. Also, due to updated emission factors, OCDD, antimony, and phosphorus were dropped as combustion chemicals, and four chemicals (acetadehyde, acrolein, 1,3-butadiene, and propylene oxide) were added.

Laboratory emissions assumptions in the year 2020 were based on an estimated net increase of 147,035 square feet of wet laboratory space associated with the approved Northeast Quadrant Science and Safety (NEQSS) Projects⁸ and an estimate of 191,810 assignable square feet of additional new wet laboratory space under the 2020 LRDP. The lab space increases under NEQSS were modeled from emission points characteristic of the new buildings now being constructed pursuant to that approval under the 1990 LRDP amendment. The 2020 LRDP estimate of additional future laboratory space was dispersed through seven hypothetical release points placed in the centroids of seven campus zones where current laboratories exist within the Campus Park.

The net new laboratory space projected under the LRDP was divided into each of these areas in proportion to the current level of laboratory activity in each area. Since new laboratories under the 2020 LRDP could be of any Lab Type, the maximum emission factor per chemical for any Lab Type was used to assess the 2020 LRDP laboratories, as detailed in the 2003 HRA update.⁹ This results in overly conservative analysis of potential emissions. Increased TAC emissions from new emergency generators and increased operation of the central plant boilers were estimated from the above-described future operation assumptions.

TIEN CENTER

The only air pollutant emissions associated with the Tien Center would be during construction. The Tien Center is part of the 2020 LRDP; as such its construction emissions are accounted for by the 1,000,000 square feet per year maximum estimate discussed above under Construction. This project would add a maximum of five new employees; most employees that would work at this center are currently working elsewhere on campus.

4.2.2 REGULATORY FRAMEWORK

The project area is subject to major air quality planning programs required by the federal Clean Air Act, which was last amended in 1990, and the California Clean Air Act of 1988. Both the federal and state statutes provide for ambient air quality standards to protect public health, and development of plans to guide the air quality improvement efforts of state and local agencies. The federal plan, known as the State Implementation Plan (SIP), requires control strategies that demonstrate attainment with national ambient air quality standards by deadlines established in the federal Clean Air Act.

The state plan is called the Clean Air Plan (CAP). The CAP requires satisfactory progress in attaining state ambient air quality standards. This includes a five percent per year reduction in emissions or a demonstration that all feasible measures have been proposed for implementation. Deadlines are not fixed for attaining state standards. The SIP and CAP overlap and contain many of the same emissions control measures. Both the SIP and the CAP rely on the combined emission control programs of the EPA, CARB and BAAQMD.

NATIONAL AND STATE AMBIENT AIR QUALITY STANDARDS

National and state ambient air quality standards for criteria air pollutants have been established for CO, O₃, NO₂, SO₂, and particulate matter less than 10 micrometers and 2.5 micrometers in aerodynamic diameter (PM₁₀ and PM_{2.5}, respectively.) Other pollutants, such as lead, also have federal and state ambient air quality standards, but they are not discussed in this document because emissions of these pollutants related to implementation of the 2020 LRDP are expected to be minimal. In the case of lead, this is primarily due to the phase out of lead in gasoline.

Ambient air quality standards specify the concentration of pollutants that the public can be exposed to without adverse health effects. Individuals vary widely in their sensitivity to air pollutants, so standards are designed to protect more sensitive populations such as children and the elderly. National and state standards are reviewed and updated periodically based on new health effects studies. Except for the eight-hour CO standard, California ambient air quality standards are more stringent than the national standards. National and state ambient air quality standards are listed in Table 4.2-2.

For planning purposes, regions such as the San Francisco Bay Area are given an air quality status label by the federal and state regulatory agencies. Areas with monitored pollutant concentrations that are lower than ambient air quality standards are designated as “attainment areas” on a pollutant-by-pollutant basis. When monitored concentrations exceed ambient standards, areas are designated as “nonattainment areas.” An area that recently exceeded ambient standards but is now in attainment is an attainment area that is referred to as a “maintenance area.”

Nonattainment areas are further classified based on the severity and persistence of the air quality problem as “moderate,” “severe” or “serious.” Classifications determine the applicability and minimum stringency of pollution control requirements. In general, the more serious the air quality classification, the more stringent the control requirements are that must be contained in the regional air quality plans. The EPA has classified the Bay Area as a moderate nonattainment area for ozone, and a “maintenance” attainment area for carbon monoxide until at least 2008 (40 CFR 81.305). The CARB has given the area state-level nonattainment status for O₃ and PM₁₀.

Supplemental information on Bay Area air quality planning and ambient air quality standards is contained in Appendix C.1 of this report.

TABLE 4.2-2
STATE AND FEDERAL AMBIENT AIR QUALITY STANDARDS

Pollutant	Averaging Time	Calif Standards ^a	National Standards ^b		Bay Area State Status/ Classification	Bay Area National Status/ Classification
		Concentrations ^c	Primary ^d	Secondary ^e		
Photochemical Oxidants ^f	8-hour	--	0.08 ppm	Same as Primary	Nonattainment/Serious	Nonattainment/ Moderate ^h
	1-hour ^g	0.09 ppm	0.12 ppm			
Carbon Monoxide	8-hour	9.0 ppm	9 ppm	Same as Primary	Attainment/ None	Attainment/ Maintenance
	1-hour	20.0 ppm	35 ppm			
Nitrogen Dioxide	Annual Mean	--	0.053 ppm	Same as Primary	Attainment/ None	Attainment/None
	1-hour	0.25 ppm	--			
Sulfur Dioxide	Annual Mean	--	0.03 ppm	--	Attainment/ None	Attainment/None
	24-hour	0.04 ppm	0.14 ppm	--		
	3-hour	--	--	0.5 ppm		
	1-hour	0.25 ppm	--	--		
Particulate Matter (PM ₁₀)	Annual Mean	20 µg/m ³	50 µg/m ³	Same as Primary	Nonattainment/None	Attainment/None
	24-hour	50 µg/m ³	150 µg/m ³	Same as Primary		
Fine Particulate Matter (PM _{2.5})	Annual Mean	12 µg/m ³	15 µg/m ³	Same as Primary	Not Designated/ None	Not Designated/None
	24-hour	--	65 µg/m ³			

Notes: ppm = parts per million, µg/m³ = micrograms per cubic meter

^a California standards, other than carbon monoxide, sulfur dioxide (1-hour), and fine particulate matter, are values that are not to be equaled or violated. The carbon monoxide, sulfur dioxide 1-hour), and fine particulate matter standards are not to be violated.

^b National standards, other than ozone, the 24-hour PM_{2.5}, PM₁₀, and those standards based on annual averages, are not to be exceeded more than once a year. The 1-hour ozone standard is attained when the expected number of days per calendar year with maximum hourly average concentrations above the standard is equal to or less than one. The 8-hour ozone standard is attained when the 3-year average of the annual fourth highest daily maximum concentration is less than 0.08 ppm. The 24-hour PM₁₀ standard is attained when the 99th percentile of 24-hour PM₁₀ concentrations in a year, averaged over 3 years, at the population-oriented monitoring site with the highest measured values in the area, is below 150 µg/m³. The 24-hour PM_{2.5} standard is attained when the 98th percentile of 24-hour PM_{2.5} concentrations in a year, averaged over 3 years, at the population-oriented monitoring site with the highest measured values in the area, is below 65 µg/m³. The annual average PM_{2.5} standard is attained when the 3-year average of the annual arithmetic mean PM_{2.5} concentrations, from single or multiple community-oriented monitors, is less than or equal to 15 µg/m³.

^c All measurements of air quality are to be corrected to a reference temperature of 25 degrees Centigrade and a reference pressure of 760 mm of mercury (Hg) (1013.2 millibar); ppm in this table refers to ppm by volume, or micromoles of pollutant per mole of gas.

^d *National Primary Standards*: The levels of air quality deemed necessary by the federal government, with an adequate margin of safety, to protect the public health.

^e *National Secondary Standards*: The levels of air quality deemed necessary by the federal government to protect the public welfare from any known or anticipated adverse effects of a pollutant.

^f Measured as ozone.

^g The 1-hour ozone standard will be replaced by the 8-hour standard on an area-by-area basis when the area has achieved 3 consecutive years of air quality data meeting the 1-hour standard.

^h The Bay Area attained the national ozone standard 5 consecutive years in the early 1990s and was redesignated to Attainment/Maintenance status. However, in 1995 and 1996 the ozone standard was exceeded, and the EPA began to reconsider its decision. Although the standard was once again attained in 1997, the EPA announced in June 1998 its decision to redesignate the Bay Area to nonattainment.

TOXIC AIR CONTAMINANTS

Air toxics have been regulated at the federal level since the Clean Air Act Amendments of 1977. Following the passage of the 1977 law, regulations for seven hazardous air pollutants (HAPs) were promulgated as National Emission Standards for Hazardous Air Pollutants (NESHAP) over a 13-year period. The federal Clean Air Act Amendments of 1990 revamped the NESHAP program to offer a technology-based approach for reducing the emissions of a greater number of air toxic compounds. Under the 1990 Clean Air Act Amendments, a group of 189 substances were identified as HAPs and slated for regulation. The program requires certain facilities to control air toxic emissions by the installation of Maximum Achievable Control Technology (MACT), which is implemented and enforced in the San Francisco Bay Area by the BAAQMD.

There are currently no federal NESHAP or MACT standards applicable to UC Berkeley campus emission sources.

California's air toxics control program began in 1983 with the passage of the Toxic Air Contaminant Identification and Control Act, better known as the Tanner Bill or AB 1807. The Tanner Bill established a regulatory process for the scientific and public review of individual toxic air contaminants (TACs). By 1992, 18 of the 189 federal HAPs had been listed by the CARB as state TACs. Later legislative amendments (AB 2728, Tanner 1992) required the CARB to incorporate all 189 federal HAPs into the state list of TACs.

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 air compounds, including all of the Tanner-designated TACs. Under AB 2588, specified facilities must quantify emissions of regulated air toxics and report them to the local air pollution control districts. If an air pollution control district determines that a given facility poses a potentially significant public health risk, the facility is required to perform a health risk assessment and notify the public in the affected area if the calculated risks exceed specified criteria.

On August 27, 1998, the CARB amended the state TAC list by formally identifying particulate matter emissions from diesel-fueled engines as a TAC. Since the vast majority of diesel exhaust particles are very small by weight, (approximately 94 percent of their combined mass consists of particles less than 2.5 micrometers in diameter), both the particles and their coating of TACs can be inhaled into the lungs. The CARB action will lead to additional control of diesel engine emissions by CARB in the coming years. The EPA also conducted an extensive evaluation of the cancer and noncancer health effects of diesel exhaust and issued final rules on January 18, 2001, to tighten emission standards for diesel heavy-duty truck engines. The new EPA standards will take full effect in 2007.

In compliance with federal law, the BAAQMD's regulations and permitting programs implement federal NESHAP and MACT requirements. In compliance with state law, BAAQMD has also developed various regulations pursuant to the Tanner process for existing and future TAC emission sources, and is administering the AB 2588 program.

The BAAQMD's air permitting program also includes a requirement to perform an air toxics screening analysis on all permit applications for new or modified sources. If BAAQMD staff concludes that projected emissions of specified air toxic compounds from a proposed new or modified source suggest a potential public health risk, then the applicant is subject to a health risk assessment. The project must demonstrate acceptable risk levels or the permit may be denied.

CONSTRUCTION EMISSIONS

Demolition and renovation activities are regulated for potential emissions of asbestos through BAAQMD Regulation 11, Rule 2. This rule requires wetting, collecting, proper waste handling, and record-keeping for any demolition, renovation, and removal of asbestos-containing material. Hazardous materials management and hazardous waste management laws and regulations govern handling other building materials (e.g. lead particles) that could become airborne during demolition or renovation activities. Other dust from construction and demolition activities would be addressed by BAAQMD Regulation 1, Section 301, which states that sources cannot emit air contaminants that cause nuisances to "any considerable number of persons or the public," and by adherence to construction emission mitigation measures incorporated into construction contracts.

ODORS

The BAAQMD has several regulations that apply to emissions of odor-causing substances. Regulation 1, Section 301 is the aforementioned nuisance provision that states sources cannot emit air contaminants that cause nuisances to "any considerable number of persons or the public." Most confirmed odor incidents are treated as nuisances. Regulation 7 specifies general limitations on odorous substances and specific emission limitations on certain compounds such as mercaptan and phenolic compounds. Regulation 7 applies to a facility when and if the BAAQMD receives confirmed complaints from more than 9 different complainants in a 90-day period. Finally, Regulation 9, Rule 2 specifically limits emissions of hydrogen sulfide, a compound with a characteristic "rotten egg" smell. No state or federal regulations apply specifically to control of odors.

4.2.3 LOCAL PLANS AND POLICIES

Although the University is constitutionally exempt from local land use regulations when using University property in furtherance of its educational purposes, it is University policy to evaluate proposed projects for consistency with local plans and policies. Therefore, this section outlines the plans and policy goals of the cities of Berkeley and Oakland related to air quality.

CITY OF BERKELEY

BERKELEY GENERAL PLAN

The City of Berkeley General Plan EIR notes the following goals of the General Plan pertain to air quality: to improve downtown and neighborhood commercial areas for pedestrian orientation (LU-18; LU-28; H-15); to promote and enhance public transportation (T-13, T-11, T-9, T-5; T-3, T-2; LU-26); to improve access by increasing proximity of residents to employment, services and goods (T-16); to reduce detrimental

effects of parking and traffic on residential areas (T-21); to make improvements to the physical infrastructure that facilitate mobility and the flow of traffic on major and collector streets and reduce the air quality impacts of congestion (T-30); to encourage bicycle usage (T-41 through T-45); to reduce and disclose the use of hazardous materials (EM-5, EM-8, EM-10, EM-11, EM-12, EM-13, EM-14, EM-16); to reduce local air emissions by 15 percent by the year 2010 (EM-18), and to support the use of alternate fuels (EM-20, EM-21, EM-22).

FINDINGS OF THE BERKELEY GENERAL PLAN EIR

Over conditions current at the time of the General Plan (approximately year 2000), the City of Berkeley General Plan EIR assumed a net increase in Berkeley households of 3,176 (approximately 3,340 housing units); an increase in population of 6,955 people;¹⁰ an increase of 10,895 jobs;¹¹ and a city-wide increase in automobile trips generated of approximately 5.1 percent.¹² The City of Berkeley General Plan EIR assumed an increase of 3,284 new jobs in the period 2000 to 2020 for the immediate area of the Berkeley Campus Park and LBNL¹³ and an increase of 2351 additional jobs in the larger area bounded by Hearst/Shattuck/Dwight/eastern city limits (3284 plus 2351 equals 5,635 in the larger area). UC Berkeley accounted for much of this projected growth.¹⁴

The General Plan EIR made the following conclusions with regard to air quality:

- The Draft General Plan is not consistent with BAAQMD significance criteria with respect to odors and toxic air contaminants, since it does not address the use of buffer zones to avoid odor and/or toxic air contaminant impacts. Although most of Berkeley is built out and vacant land is scarce, the potential for new live-work units or the conversion of industrial uses to commercial or residential uses could result in a significant impact if the policy is not amended. As a mitigation measure, the City of Berkeley is to adopt policies (such as those in the West Berkeley Plan) to ensure that any new development in the city would be protected from odors and toxic air pollutants through environmental review.
- Traffic changes were found to modify levels of carbon monoxide along streets and intersections in Berkeley. Future concentrations of carbon monoxide were predicted to be lower than existing concentrations because of anticipated improvements in vehicle emission standards. Project-related emissions were expected to be incrementally higher. However, the project-related concentrations were expected to be well below the state and federal ambient air quality standards.
- The Draft General Plan would allow employment and population growth that would generate additional air emissions that would not be consistent with the population and vehicle miles traveled assumptions in the regional Clean Air Plan. The Draft General Plan predicts a year 2020 population that is 5 percent greater than current 2020 projections from the Association of Bay Area Governments (ABAG). However, the draft General Plan's population increase is based on meeting the required Regional Housing Needs Determination as mandated by ABAG. For this reason only, the population projections embodied in the draft General Plan are not consistent with the latest ABAG projections for Berkeley which were the source of information on households and employment used in the 1997 Bay Area Clean Air Plan. As such, this is considered a significant impact. However, this significant impact would be short-term, since future ABAG projections would be revised to incorporate the higher population figures projected in the Draft General Plan.

- The EIR determined there would be no significant cumulative effect upon air quality, because development under the General Plan would be transit-oriented, centered around major local and regional transit nodes. Transit-oriented development was found to ultimately help achieve regional air quality goals, resulting in a cumulative air quality benefit.

CITY OF OAKLAND

The City of Oakland's General Plan contains a number of policies related to protection of air resources. These policies are contained in the Open Space, Conservation and Preservation Element and address the following: the promotion of land use patterns and densities that help improve regional air quality conditions; the maintenance of a coordinated alternative transportation system; the expansion of existing transportation systems management and transportation demand management strategies to reduce congestion, vehicle idling, and single passenger auto travel; the design of development to minimize air quality impacts; the use of the best available air pollution control technology by new industry; the control of dust emissions from construction, demolition and grading; and the coordination of local and regional air quality planning.¹⁵

4.2.4 EXISTING SETTING

REGIONAL CLIMATOLOGY

The climate of the San Francisco Bay Area is classified as Mediterranean, with mild, wet winters and warm, dry summers. The regional climate is controlled primarily by the Pacific high-pressure system over the eastern Pacific Ocean. Local climate is strongly influenced by topography and proximity to the Pacific Ocean and San Francisco Bay. Cool, onshore winds blowing from the Pacific have a moderating effect, especially west of the Diablo Mountain Range, where UC Berkeley is located. These mountains act as a barrier to onshore winds, resulting in the channeling of airflow along canyons, valleys, and through straits in the Bay, as well as strong west-to-east temperature differences. The resulting overall airflow patterns are complex, exhibiting much local variation. Large-scale winds, which are the wind patterns influenced by general geographical and topographical features of the San Francisco Bay Area on a roughly 50-mile scale, are predominantly from the northwest.

In the immediate UC Berkeley area, the flow of marine air traveling across San Francisco and through the Golden Gate is the dominant weather factor. Prevailing winds in the project area are from the west in mid-spring through mid-fall. In the winter, winds flowing from the east and southeast increase due in part to winter storms and the absence of a strong thermal trough caused by a southward shift of the Pacific high-pressure system. Air pollution potential in Berkeley is low compared to the sheltered valleys throughout the region, due largely to good ventilation from often-brisk marine airflow through the Golden Gate.

Temperatures in the project area are moderated by the proximity to San Francisco Bay. During the summer months, average maximum temperatures are in the mid 60s to mid 70s. Average maximum winter temperatures are in the high 50s to low 60s. Average minimum temperatures are in the low to mid 40s in winter and mid 50s in the summer.

EXISTING AMBIENT AIR QUALITY

This section describes existing air quality for both criteria air pollutants and toxic air contaminants.

CRITERIA AIR POLLUTANTS

The Bay Area Air Quality Management District (BAAQMD) operates a regional air quality monitoring network for criteria pollutants, including ozone (O₃), CO, NO₂, SO₂, and PM₁₀. “Criteria pollutants” are pollutants that have established air quality standards. Another class of air pollutants associated with criteria pollutants are reactive organic gases (ROG). ROG are hydrocarbons that do not have a specific air quality standard, but undergo atmospheric reactions with NO₂ and other nitrogen oxides (NO_x) in the presence of sunlight to form photochemical oxidants, which are measured as the criteria pollutant O₃. Thus, ROG and NO_x are O₃ “precursor” pollutants.

The closest criteria pollutant monitoring stations to the project area are located in Oakland on Alice Street near Jack London Square and at the Alameda County Hospital in San Leandro. O₃ and CO are measured at the Alice Street station, and O₃ is measured at the San Leandro station. There is no station representative of the project area that monitors PM₁₀, NO₂ or SO₂. The closest monitoring stations with ambient NO₂ and SO₂ data are located in San Pablo and Richmond, respectively. PM₁₀ is monitored in Concord but not reported here because it is so far from the project area. Nevertheless, the project area is classified as non-attainment of the state PM₁₀ standard because of monitored exceedances of that standard elsewhere in the air basin. If one station within an entire air basin monitors concentrations above a standard, then the whole air basin is considered to be non-attainment for that pollutant.

A three-year summary of ambient air quality measured at the above stations is presented in Table 4.2-3 for the three most recent years with available data. Monitoring data from the BAAQMD network are used by the U.S. Environmental Protection Agency (EPA) and California Air Resources Board (CARB) to designate the status of pollutants relative to air quality standards (or “attainment” status) and to classify the severity of non-attainment problems.

TOXIC AIR CONTAMINANTS

In addition to criteria pollutants, both the BAAQMD and the CARB operate monitoring networks in the San Francisco Bay Area to measure ambient levels of toxic air contaminants (TACs). TACs are air pollutants for which there are no air quality standards but which have known human health effects. The TACs selected for monitoring are those that have traditionally been found in the highest concentrations in ambient air and therefore tend to produce the most potential health risk. The BAAQMD operates an ambient TAC monitoring station at Davie Stadium at 198 Oak Road in Oakland, about four miles south of UC Berkeley.

The BAAQMD reports a calculated lifetime cancer risk from measured concentrations of TACs in 2001 (the most recent year with available data) to be about 173 in one million averaged over all Bay Area locations.¹⁶ Using the same calculation methods with the ambient TAC data reported from the Davie Stadium monitoring station¹⁷ (about 4 miles south of UC Berkeley), an average annual cancer risk of 163 in one million is estimated at that location. This calculation is presented in Appendix C.

TABLE 4.2-3
SUMMARY OF CRITERIA AIR POLLUTANT MONITORING

Station	Air Quality Indicator	2000	2001	2002
Ozone				
Alice Street (Oakland)	Peak 1-hour concentration (ppm)	0.072	0.069	0.053
	Days above federal standard	0	0	0
	Days above state standard	1	0	1
Carbon Monoxide				
Alice Street (Oakland)	Peak 1-hour concentration (ppm)	5.4	5.0	4.4
	Days above federal standard	0	0	0
	Days above state standard	0	0	0
	Peak 8-hour concentration (ppm)	3.6	4.0	3.3
	Days above federal standard	0	0	0
	Days above state standard	0	0	0
Nitrogen Dioxide				
San Pablo	Peak 1-hour concentration ($\mu\text{g}/\text{m}^3$)	0.066	--	--
	Days above federal standard	--	--	--
	Days above state standard	0	0	0
	Annual arithmetic mean ($\mu\text{g}/\text{m}^3$)	0.014	--	--
	Exceedance of federal standard	no	no	no
	Exceedance of state standard	--	--	--
Sulfur Dioxide				
7th Street (Richmond)	Peak 24-hour concentration ($\mu\text{g}/\text{m}^3$)	0.008	--	--
	Days above federal or state standard	0	0	0
	Annual arithmetic mean ($\mu\text{g}/\text{m}^3$)	0.008	--	--
	Exceedance of federal standard	no	no	no
	Exceedance of state standard	--	--	--

Note: There is not a representative monitoring station for PM₁₀ in the project area. Monitoring at the San Leandro station was discontinued after 1998.

Source: CARB 2001, 2002, and 2003, Internet Air Quality Data Summaries.

Because diesel particulate matter (DPM) can not be directly monitored in the ambient air, the BAAQMD uses CARB estimates of the population-weighted average ambient DPM concentration for the Bay Area to estimate an average cancer risk from DPM exposure at about 440 in one million (which adds to the estimated cancer risks from the other TACs).

These calculated average cancer risk values from ambient air exposure in the Bay Area can be compared against the lifetime probability of being diagnosed with cancer in the United States from all causes, which is about 40 percent, or 400,000 in one million.¹⁸ Thus the risk of being diagnosed with cancer from ambient TACs in the Bay Area is quite small when compared against the overall background cancer risk.

EXISTING UC BERKELEY AIR EMISSION SOURCES

UC BERKELEY STATIONARY SOURCES

Stationary sources of criteria pollutants and TACs at UC Berkeley include the cogeneration plant, individual boilers for campus heating and energy operations, printing presses, and wet laboratories. Other minor sources include painting and solvent-cleaning operations, hazardous materials handling, and emergency generators.

Existing criteria pollutant emissions from the cogeneration plant, boilers, printing presses, and routine testing and maintenance of emergency generators are summarized in Table 4.2-4. Painting/solvent cleaning and hazardous materials handling have minor ROG emission quantities compared with the quantities shown in Table 4.2-4, and hence are not included in the table. Based on 1998 usage data provided by the UC Berkeley Office of Environment, Health and Safety (EH&S), considered typical and representative of current operations,¹⁹ total ROG emissions from painting/solvent cleaning and hazardous materials handling are less than one pound per day and therefore are insignificant. These emissions, however, are included in the health risk assessment discussed below.

In addition to criteria pollutant emissions, the stationary sources on campus also emit TAC emissions. Hundreds of chemicals are used or produced by campus facilities, but only a portion of these chemicals contribute substantially to human health risks. Thus, a total of 52 chemicals were selected for modeling in the *Central Campus Human Health Risk Assessment*²⁰ based on a detailed assessment of their use, volatility, and toxicity. The *Central Campus Health Risk Assessment* used a baseline year of 2000, considered to be representative of current campus operations.

Since the 2000 HRA was performed, emissions from existing emergency generators were added to the existing campus health risk assessment (HRA) calculations and diesel particulate matter (DPM) was added to the list of TACs. In addition to DPM, two laboratory chemicals were added to the HRA analysis, and due to updated combustion emission factors, three chemicals were dropped and four other chemicals were added. The updated analysis, therefore, modeled a total of 56 chemicals. This analysis is presented in an updated HRA report.²¹ The list of 56 chemicals included in the updated HRA is shown in Table 4.2-1.

The maximum lifetime cancer risk from existing stationary campus sources at a residential maximally exposed individual (MEI) location was estimated to be 4.3 in one million along Spruce Street, north of Hearst Street. The diesel generators contribute 89 percent of the risk at this location. The laboratories contribute 10 percent and the boilers, cogeneration turbine and other sources (painting, printing and hazardous materials handling) contribute less than 1 percent each at this location. The residential MEI calculation assumed continuous exposure over a 70-year period and an average adult body weight of 70 kilograms (154 pounds). The calculated cancer risks at this location include inhalation, soil ingestion, dermal absorption, home garden, and mother's milk exposure pathways.

TABLE 4.2-4

UC BERKELEY CAMPUS EXISTING STATIONARY SOURCE EMISSIONS (LBS/DAY)

Source	NO _x	ROG	PM ₁₀	CO
Gas Turbine& Duct Burner ¹ (Plant #11326)	102	17	7	60
Boilers and Printing Presses ¹ (Plant #59)	9	108	1	10
Emergency Generators ²	23.0	5.0	2.2	9.2
Total	134.0	130.0	10.2	79.2
2001 Bay Area Emissions Inventory	1,250,125	1,072,370	373,395	5,619,540

Notes: All existing emissions comply with requirements specified in applicable BAAQMD air permits. The largest emission totals are ROG from boilers and printing presses and NO_x from the gas turbine and duct burner, which represent 0.01 percent and 0.008 percent of the 2001 Bay Area ROG and NO_x emissions, respectively.

¹ BAAQMD Plant Inventory Report, 2001.

²Based on information received from EH&S, 2003.

Non-cancer health risk from TACs was also assessed in the HRA. Potential non-cancer health risk is assessed by the “hazard index,” which is the sum of the ratios of each chemical’s actual exposures to acceptable exposures. Hazard indices are calculated for both long-term (chronic) and short-term (acute) health effects. Hazard indices less than 1.0 indicate an acceptable non-cancer health risk. The highest calculated hazard indices for existing Central Campus operations were 0.075 for chronic exposures and 0.15 for acute exposures.

The HRA also looked at risks from TACs for sensitive receptors. Sensitive receptors are defined as groups of individuals that may be more susceptible, due to their age or condition, to health risks from chemical exposure. Locations of sensitive receptors include schools, hospitals, day care centers, and senior care facilities. A listing of sensitive receptors examined is included in Appendix C.

The maximum cancer risk calculated for any sensitive receptor was 0.61 in one million for an employee at the on-campus day care center at Girton Hall, near Gayley Road. An incremental cancer risk of 0.47 in one million was calculated for a child at the Girton Hall on-campus day care center, assuming an average child’s body weight of 15 kilograms (33 pounds) and inhalation rate of 10 cubic meters of air per day, which is approximately half that of an adult’s inhalation rate. Child exposure results for all other schools and day care centers in the surrounding area were lower.

AREA SOURCES

Area sources include all academic, administrative, housing buildings, and campus laboratories. Pollutants are emitted from natural gas combustion for space and water heating, landscaping equipment, paints, solvents, and personal care products. These emissions are typically minimal. Existing campus emissions from area sources are summarized in Table 4.2-5.

VEHICULAR SOURCES

Criteria pollutants (NO_x, ROG, CO, PM₁₀, and SO₂) are emitted in vehicle exhaust from student, faculty, and staff and visitor/vendor vehicle trips to the university. The transportation analysis performed by Fehr and Peers in 2003 estimated the distribution of distances traveled by students and employees to UC Berkeley. Table 4.2-6 shows the total number of current student and employee vehicle trips. Emission factors were obtained from the EMFAC2002.

**TABLE 4.2-5
EXISTING CAMPUS AREA SOURCE EMISSIONS (LBS/DAY)**

	NO _x	ROG	PM ₁₀	CO
Natural gas combustion	138.8	10.2	0.3	56.2
Landscaping equipment	0.01	0.2	0	1.2
Consumer product use	0	172.9	0	0
Campus Laboratories ^A	0	61	0	0
Total	138.8	244.3	0.3	57.4

Note: SO₂ emissions are negligible.

^A URS Central Campus Human Health Risk Assessment. June 2000. Laboratory emissions conservatively estimated; actual emissions likely to be lower.

**TABLE 4.2-6
EXISTING STUDENT AND EMPLOYEE VEHICLE EMISSIONS (2000/2001)**

	NO _x	ROG	PM ₁₀	CO
Student Emissions (lb/day)	29.0	22.0	7.8	440.2
Employee Emissions (lb/day)	36.8	29.0	9.8	563.4
Total (lb/day)	65.8	51.0	17.6	1003.6

Notes: Numbers are based on year 2000 Student Housing and Transportation survey and the year 2001 Faculty/Staff Housing, Transportation, and Parking Survey (Fehr and Peers 2003).

SO₂ emissions are negligible.

LOCAL CARBON MONOXIDE EMISSIONS

Under existing conditions, traffic at intersections around UC Berkeley does not create substantial CO emissions that would lead to a violation of the CO standards. Current monitoring data show that ambient levels of CO are below state and federal standards.

CONSTRUCTION SOURCES

Construction activities are a source of dust emissions that can have temporary impacts on local air quality by possibly exceeding state air quality standards. These emissions are generated from land clearing, ground excavation, cut and fill operations, demolition and the construction of the project facilities. Dust emissions vary from day to day depending on the level of activity, the specific operations and the prevailing weather.

In addition to particulate emissions from earth moving, combustion exhaust emissions from construction equipment create a temporary impact on local air quality, for both toxic air contaminants and criteria air pollutants. Such equipment is typically diesel fueled. The BAAQMD considers implementation of construction-related mitigation measures sufficient to reduce impacts from construction. The BAAQMD CEQA Guidelines²² focus on implementation of mitigation of construction-related impacts rather than on quantification of construction emission levels. Construction projects at UC Berkeley have followed these mitigation guidelines and impacts have not been considered significant.

ODORS

With limited exceptions, odors are not a problem at UC Berkeley or as a result of campus operations. In late 1998 and early 1999, occasional incomplete combustion of natural gas in the cogeneration plant's gas turbine led to numerous odor complaints associated with the mercaptans added to pipeline natural gas for leak detection purposes. These mechanical problems were corrected in the summer of 1999 and no outdoor odor complaints have been received since that time.

Other than the above, no significant outdoor odor complaints associated with UC Berkeley were filed with the EH&S or BAAQMD between January 1998 and December 2001.^{23 24} A number of indoor air quality complaints have been filed by occupants of campus buildings, primarily due to on-campus construction/renovation activities and laboratory chemical-type odors.

4.2.5 STANDARDS OF SIGNIFICANCE

The significance of the potential impacts of the 2020 LRDP and Tien Center on air quality was determined based on the following standards:

Standard: Would the project conflict with or obstruct implementation of the applicable air quality plan?

Standard: Would the project violate any air quality standard or contribute substantially to an existing or projected air quality violation?

Standard: Would the project expose sensitive receptors to substantial air pollutant concentrations?

Standard: Would the project cause objectionable odors affecting a substantial number of people?

Standard: Would the project expose people to substantial levels of toxic air contaminants (TACs), such that the exposure could cause an incremental human cancer risk greater than 10 in one million or exceed a hazard index of one for the maximally exposed individual?

Standard: Would the project 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?

BAAQMD CEQA Guidelines distinguish between projects and plans and recommend that the evaluation of air quality impacts resulting from land use plans (General Plans, specific plans, etc) not focus on quantification of emissions but on an analysis of the plan's consistency with the Clean Air Plan (CAP). The 2020 LRDP is a land use plan for the development of the campus over the next 15 years. Therefore in the impact analysis that follows, impacts from the development under the 2020 LRDP are evaluated in terms of the 2020 LRDP's consistency with the CAP. Although estimated emissions are reported, they are reported only for informational purposes and are not compared to any numerical thresholds such as the pounds per day/tons per day thresholds established by the BAAQMD for individual projects. As and when individual development projects are proposed on the campus under the 2020 LRDP, a project-level evaluation of operational emissions would be conducted and the estimated emissions of the project would be compared to BAAQMD thresholds (80 pounds per day of NO_x, ROG, and PM₁₀ and 550 pounds per day of CO).

4.2.6 POLICIES AND PROCEDURES GUIDING FUTURE PROJECTS

This section describes existing policies and procedures that would help to minimize air quality impacts of development under the 2020 LRDP. It discusses both the policies in the 2020 LRDP itself and other University agreements affecting air quality.

Construction of a new building would involve grading, earthmoving, and building of the structure. Fugitive dust (PM₁₀) would be emitted during grading and earthmoving and combustion pollutants would be emitted from equipment used in grading and building construction. For individual projects, the BAAQMD CEQA Guidelines do not require quantification of construction-related emissions. A specific set of mitigation measures is required to reduce the emissions, and the impact is generally considered less than significant.

An increase in vehicle trips is generally associated with new building and campus growth. Each individual project that would increase vehicle trips would increase vehicular pollutants. At the project-level, impacts of any project for which vehicle emissions are below thresholds established by the BAAQMD and in effect at the time of project approval, would be less than significant.

New buildings for academic or housing purposes would have emissions from natural gas combustion for space and water heating, and possibly diesel combustion for emergency generators. Emergency generators would require permitting, and would comply with air district regulations to reduce emissions. Natural gas combustion at the program level analyzed herein was found not to exceed permissible levels; thus, no one project implementing the 2020 LRDP would result in exceedances.

2020 LRDP

The 2020 LRDP would influence air quality by guiding the location, scale, form and design of new University projects. While several Objectives bear directly or indirectly on air quality, two are particularly relevant:

- **Provide the housing, access, and services we require to support a vital intellectual community and promote full engagement in campus life.**
- **Plan every new project as a model of resource conservation and environmental stewardship.**

The 2020 LRDP includes a number of policies and procedures for individual project review to support these Objectives, as described below. With respect to access, the 2020 LRDP anticipates increasing the supply of parking to accommodate unmet demand and future growth; reducing demand for parking through incentives for alternate travel modes; and collaborating with local cities and transit providers to improve service to the campus. The housing program is designed to support these policies by ensuring all new student housing is located within a one mile radius or within a block of a transit line providing trips to Doe Library in under 20 minutes, thus reducing the need to drive.

Policies under the second objective include incorporating sustainable design principles into capital investment decisions; developing a campus standard for sustainable design specific to the UCB site, climate, and facility inventory; designing new campus buildings

to a standard equivalent to LEED 2.1; and designing new campus laboratory buildings to a standard equivalent to LEED 2.1 and LABS 21 environmental performance criteria.

4.2.7 2020 LRDP IMPACTS

This section describes the potential air quality impacts of the 2020 LRDP based on the Standards of Significance, whether they are significant or less than significant, and whether any significant impacts can be mitigated to less than significant levels.

LESS THAN SIGNIFICANT IMPACTS

LRDP Impact AIR-1: Implementation of the 2020 LRDP would not violate the carbon monoxide standard or expose sensitive receptors to substantial CO concentrations.

Implementation of the 2020 LRDP would not contribute substantially to a violation of CO standards or expose receptors to substantial CO concentrations associated with vehicular traffic. Development under the 2020 LRDP would result in increases in traffic that would produce additional CO emissions, compared to existing conditions. Ambient ground-level concentrations of CO could increase if a large number of sources of CO are present in a given area, such as motor vehicles at congested intersections. Impacts from CO emissions from vehicles associated with the 2020 LRDP were evaluated at intersections in the project vicinity that would be most affected by the 2020 LRDP development. The analysis evaluated intersections where the change in traffic volumes between conditions without and with the 2020 LRDP is greater than five percent.

The intersection found to exhibit the highest volumes due to LRDP development is the University Avenue and San Pablo Avenue intersection. Volumes at this intersection under the 2020 LRDP conditions were compared to volumes at the “worst case” intersection of Mission Boulevard and Jackson Street/Foothill Boulevard in Hayward (Table 4.2-7).

Intersections in Berkeley that are closer to the Campus Park and City Environs do not exhibit higher volumes (under existing conditions) than the University and San Pablo Avenues intersection under project conditions. Therefore, no Berkeley intersection is suitable as a “worst-case” comparison intersection. However, the Mission Boulevard and Jackson Street/Foothill Boulevard intersection in Hayward is suitable as a “worst case” intersection for this analysis because it is within the same air basin as the project area – an air basin that attains the CO standards; the meteorology in the vicinity of this intersection is similar to that of the project area; and the background CO concentrations are similar to those of the project area. In addition, this intersection exhibits very high peak-hour volumes, yet the ambient CO concentrations monitored in the area are still below the state standards.

The volumes at Mission Boulevard and Jackson Street/Foothill Boulevard are higher than those at University Avenue and San Pablo Avenue. The results of this analysis show that traffic under LRDP conditions at University Avenue and San Pablo Avenue would not cause a violation of the CO standards because the “worst case” intersection of Mission Boulevard and Jackson Street/Foothill Boulevard, with higher traffic volumes, does not cause a violation of the CO standard.

TABLE 4.2-7

COMPARISON OF PROJECT WITH WORST-CASE INTERSECTION

	University Avenue and San Pablo Avenue (Project condition)	Mission Boulevard and Jackson Street/Foothill Boulevard in Hayward
Peak-Hour Traffic Volume	5,594	7,400

Note: peak hour volumes for the Mission Blvd. and Jackson St./Foothill Blvd. intersection were obtained from the traffic operations page on the Caltrans internet site (<http://www.dot.ca.gov>).

Additionally, campus programs further reduce risk of CO concentrations. The campus New Directions Program, which includes incentives to use car pools, transit, and other modes, is continuously updated to leverage alternative transit resources to their most effective use.

Continuing Best Practice AIR-1: UC Berkeley shall continue to implement the same or equivalent alternative transit programs, striving to improve the campus mode split and reduce the use of single occupant vehicles among students, staff, faculty and visitors to campus.

LRDP Impact AIR-2: Implementation of the 2020 LRDP would not create objectionable odors affecting a substantial number of people.

Construction activities occurring under the 2020 LRDP would generate airborne odors associated with the operation of construction vehicles (i.e. diesel exhaust) and the application of architectural coatings. These emissions would occur during daytime hours only and would be isolated to the immediate vicinity of the construction site and activity. As such, they would not affect a substantial number of people.

Potential operational airborne odors could result from cooking activities associated with individual projects under the LRDP. These odors would be similar to existing housing and food services uses on and around the campus and would be confined to the immediate vicinity of the new buildings. Consequently, implementation of the 2020 LRDP would not create objectionable odors affecting a substantial number of people and potential impacts would be less than significant. No mitigation is required.

LRDP Impact AIR-3: Implementation of the 2020 LRDP would not expose people to substantial levels of toxic air contaminants (TACs) from stationary and area sources.

Estimated health risks associated with current (baseline) campus operations were summarized in Section 4.2.4, Existing Setting. The health risk estimates provided below characterize future campus operations (including baseline conditions, the NEQSS Projects approved under the 1990 LRDP amendment, and implementation of the 2020 LRDP).

New stationary and area sources associated with implementation of the 2020 LRDP would not expose campus occupants and other populations in the vicinity of the university to substantial air toxics concentrations, such that the exposure could increase human cancer risk above 10 in one million or exceed a hazard index of one for the maximally exposed individual (MEI). UC Berkeley conducted a health risk assessment

(HRA) to identify potential health risks associated with development anticipated to occur under the 2020 LRDP.²⁵ An HRA characterizes human health risks as a result of exposure to toxic substances. In order to assess potential health risks associated with the full development under the 2020 LRDP, total health risks for the academic year 2020 were evaluated for existing campus operations and future development combined.

The HRA for the 2020 LRDP analyzed toxic air contaminant (TAC) emissions associated with laboratory operations, hazardous materials bulking operations, natural gas and diesel fired stationary combustion sources (including routine firing of back-up emergency generators), campus painting/maintenance activities, and campus printing press operations. The list of chemicals included in the HRA is shown in Table 4.2-1.

The MEI exposure at a residential location was estimated to be along Hearst Avenue, east of Arch Street, where cancer risk from combined campus development (baseline conditions, NEQSS projects, plus 2020 LRDP development) was estimated at 5.4 in one million. Emergency generators contribute approximately 69 percent to the total health risk at this location. The laboratories contribute approximately 29 percent. All other sources contribute less than 1 percent each to the cancer risk at this location. The residential MEI location for the 2020 LRDP is close to the existing campus residential MEI, about 0.1 mile to the northeast along Hearst Avenue. The relative source contributions described above for the 2020 LRDP are different than those for the existing campus. This is primarily due to an increase in laboratory emissions under the 2020 LRDP along the eastern side of the campus causing a shift in the location of overall maximum risk further from existing emergency generators. The residential MEI calculation assumed continuous exposure over a 70-year period and an average adult body weight of 70 kilograms (154 pounds). The calculated cancer risks at this location include inhalation, soil ingestion, dermal absorption, home garden, and mother's milk exposure pathways.

Non-cancer health risk from TACs was also assessed in the HRA. Potential non-cancer health risk is assessed by the "hazard index," which is the sum of the ratios of each chemical's actual exposures to acceptable exposures. Hazard indices are calculated for both long-term (chronic) and short-term (acute) health effects. Hazard indices less than 1.0 indicate an acceptable non-cancer health risk. The highest calculated hazard indices for existing Campus Park operations were 0.13 for chronic exposures and 0.29 for acute exposures.

The HRA also looked at risks from TACs for sensitive receptors. A listing of sensitive receptors examined is included in Appendix C. Sensitive receptors are defined as groups of individuals that may be more susceptible, due to their age or condition, to health risks from chemical exposure. Locations of sensitive receptors include schools, hospitals, day care centers, and senior care facilities.

The maximum cancer risk calculated for any sensitive receptor was 0.75 in one million for an employee at the on-campus day care center at Girton Hall, near Gayley Road. An incremental cancer risk of 0.58 in one million was calculated for a child at the Girton Hall on-campus day care center, assuming an average child's body weight of 15 kilograms (33 pounds) and inhalation rate of 10 cubic meters of air per day, which is approximately half that of an adult's inhalation rate. Child exposure results for all other schools and day care centers in the surrounding area were lower.

LRDP Impact AIR-4: Emissions from construction activities associated with the 2020 LRDP would be controlled and would not lead to a violation of air quality standards.

Construction-related activities would generate fugitive dust, which is measured in terms of PM₁₀, from earthmoving, excavation, grading, and travel over unpaved haul roads. The term “fugitive dust” refers to particulate matter emitted from an open area (i.e., not through a stack or an exhaust vent) due to human activities or by the forces of wind acting on exposed material such as dirt roads or soil storage piles. Particulate emissions from fugitive dust tend to vary with the level and type of activity, silt content, and moisture of the soil and prevailing weather.

In addition, exhaust pollutants are emitted from construction equipment use. This equipment is typically diesel-fueled. Recently, the CARB recognized the particulate matter emissions in diesel exhaust as a carcinogen, so there is an additional concern about this pollutant.

With respect to impacts from emissions associated with construction activities, the BAAQMD recommends that lead agencies focus on avoidance of significant impacts through implementation of control measures for PM₁₀, which the BAAQMD considers to be the pollutant of greatest concern from construction activities. Accordingly, if applicable control measures are included as part of the project, the impact is considered less than significant. The BAAQMD-recommended mitigation measures are listed below:

Basic Control Measures (for all construction sites)

- Water all active construction areas at least twice daily.
- Cover all trucks hauling soil, sand, and other loose materials or require all trucks to maintain at least two feet of freeboard.
- Pave, apply water three times daily, or apply (non-toxic) soil stabilizers on all unpaved access roads, parking areas and staging areas at construction sites.
- Sweep daily (with water sweepers) all paved access roads, parking areas, and staging areas at construction sites.
- Sweep streets daily (with water sweepers) if visible soil material is carried onto adjacent public streets.

Enhanced Control Measures (for sites greater than four acres in area)

- All “Basic” control measures listed above.
- Hydroseed or apply (non-toxic) soil stabilizers to inactive construction areas (previously graded areas inactive for ten days or more).
- Enclose, cover, water twice daily or apply (non-toxic) soil binders to exposed stockpiles (dirt, sand, etc.)
- Limit traffic speeds on unpaved roads to 15 mph.
- Install sandbags or other erosion control measures to prevent silt runoff to public roadways.
- Replant vegetation in disturbed areas as quickly as possible.

TABLE 4.2-8

ESTIMATED CONSTRUCTION EMISSIONS FROM MAXIMUM ASSUMED CONSTRUCTION SCENARIO UNDER THE 2020 LRDP (LBS/DAY)

Pollutant	Daily Emissions from Site Grading	Daily Emissions from Building Construction	Totals
NOx	570	553	1,123
ROG	16	1,549	1,565
PM10	11	1	12
CO	124	143	267

Notes: Site grading emissions would not occur on the same day as construction emissions.
 SO₂ emissions are negligible.

Optional Control Measures (for large areas near sensitive receptors)

- Install wheel washers for all exiting trucks, or wash off the tires or tracks of all trucks and equipment leaving the site.
- Install wind breaks, or plant trees/vegetative wind breaks at windward side(s) of construction areas.
- Suspend excavation and grading activity when winds (instantaneous gusts) exceed 25 mph.
- Limit the area subject to excavation, grading, and other construction activity at any one time.

Several of the above control measures are best practices currently in use during construction projects on the campus to minimize emissions. These were described in the 1990 LRDP EIR and are summarized below. In addition, UC Berkeley will implement LRDP Mitigation Measure AIR-4-a and AIR-4-b to further minimize emissions from construction projects proposed under the 2020 LRDP.

Continuing Best Practice AIR-4-a: UC Berkeley shall continue to include in all construction contracts the measures specified below to reduce fugitive dust impacts:

- All disturbed areas, including quarry product piles, which are not being actively utilized for construction purposes, shall be effectively stabilized of dust emissions using tarps, water, (non-toxic) chemical stabilizer/suppressant, or vegetative ground cover.
- All on-site unpaved roads and off-site unpaved access roads shall be effectively stabilized of dust emissions using water or (non-toxic) chemical stabilizer/suppressant.
- When quarry product or trash materials are transported off-site, all material shall be covered, or at least two feet of freeboard space from the top of the container shall be maintained.

LRDP Mitigation Measure AIR-4-a: In addition, UC Berkeley shall include in all construction contracts the measures specified below to reduce fugitive dust impacts, including but not limited to the following:

- All land clearing, grubbing, scraping, excavation, land leveling, grading, cut and fill, and demolition activities shall be effectively controlled of fugitive dust emissions utilizing application of water or by presoaking.
- When demolishing buildings, water shall be applied to all exterior surfaces of the building for dust suppression.

- All operations shall limit or expeditiously remove the accumulation of mud or dirt from paved areas of construction sites and from adjacent public streets as necessary. See also CBP HYD 1-b.
- Following the addition of materials to, or the removal of materials from, the surface of outdoor storage piles, said piles shall be effectively stabilized of fugitive dust emissions by utilizing sufficient water or by covering.
- Limit traffic speeds on unpaved roads to 15 mph.
- Water blasting shall be used in lieu of dry sand blasting wherever feasible.
- Install sandbags or other erosion control measures to prevent silt runoff to public roadways from sites with slopes over one percent.
- To the extent feasible, limit area subject to excavation, grading, and other construction activity at any one time.
- Replant vegetation in disturbed areas as quickly as possible.

Continuing Best Practice AIR-4-b: UC Berkeley shall continue to implement the following control measure to reduce emissions of diesel particulate matter and ozone precursors from construction equipment exhaust:

- Minimize idling time when construction equipment is not in use.

LRDP Mitigation Measure AIR-4-b: UC Berkeley shall implement the following control measures to reduce emissions of diesel particulate matter and ozone precursors from construction equipment exhaust:

- To the extent that equipment is available and cost effective, UC Berkeley shall require contractors to use alternatives to diesel fuel, retrofit existing engines in construction equipment, and employ diesel particulate matter exhaust filtration devices.
- To the extent practicable, manage operation of heavy-duty equipment to reduce emissions, including the use of particulate traps.

As noted earlier, BAAQMD CEQA Guidelines do not require lead agencies to estimate emissions from construction, nor do the guidelines provide any numerical thresholds that can be used to evaluate the significance of emissions, should those be quantified. Furthermore, the 2020 LRDP is a land use plan and not a specific development project. The scale and location of construction activities on the campus under the LRDP will vary with time and cannot be accurately characterized at this time. For informational purposes only, construction emissions were estimated using the URBEMIS model. A maximum assumed construction area of 1,000,000 GSF was used as a worst-case condition to characterize emissions from construction. The results of the emissions quantification, in terms of pounds per day are presented in Table 4.2-8.

The emissions reported include controls incorporated in the URBEMIS model, which include watering of exposed surfaces three times daily and use of cooled exhaust gas recirculation.

SIGNIFICANT IMPACTS AND MITIGATION MEASURES

LRDP Impact AIR-5: Operational emissions from implementation of the 2020 LRDP may hinder the attainment of the Clean Air Plan. This would be a *significant and unavoidable* impact.

As discussed earlier, BAAQMD CEQA Guidelines distinguish between projects and plans and recommend that the evaluation of air quality impacts from land use plans (“plans” include general plan amendments, redevelopment plans, specific area plans, annexations of lands and services, and similar planning activities) not focus on quantification of emissions but on an analysis of the plan’s consistency with the Clean Air Plan (CAP). The 2020 LRDP is a land use plan for the development of the campus over the next 15 years. Therefore, impacts from the development under the 2020 LRDP were evaluated in terms of the LRDP’s consistency with the CAP.

The BAAQMD CEQA Guidelines state that if population and VMT growth rates of plans are less than or equal to those in the most recent Clean Air Plan, then impacts are considered to be less than significant. Growth and VMT rates considered to be consistent with the CAP would not interfere with attainment because this growth is included in the projections utilized in the formulation of the plan. In addition, a local plan must contain the transportation control measures (TCMs) listed in the Clean Air Plan to be consistent with it. Because the Bay Area does not attain the state ozone standard, growth in population and VMT rates not consistent with the Plan could potentially hinder attainment efforts.

Since the campus is located within the City of Berkeley, the City of Berkeley takes the population and VMT from the campus into account in its planning. As described in Chapter 4.10, however, for purposes of this EIR, 2020 LRDP growth is conservatively estimated to be in addition to City of Berkeley growth as estimated by ABAG. As a result, the ABAG projections that were taken from the City of Berkeley and used in the most recent Clean Air Plan (2000) are, for purposes of this EIR, assumed not to include the 2020 LRDP-related campus growth. Campus growth may not be consistent with the most recent Clean Air Plan and may result in a significant impact. Relatedly, because it is possible that the air district will not attain air quality standards with the inclusion of this project in the plan, the impact is considered significant and unavoidable.

This assumption is very conservative. Some projects, such as the Tien Center analyzed below, would not result in operational emissions that could influence attainment efforts. Full build-out under the 2020 LRDP is not anticipated prior to 2020; ABAG projections have typically, with occasional exceptions, included an envelope of growth sufficient to reflect UC Berkeley; the Clean Air Plan undergoes updates every three years and ABAG updates its population and VMT projections every two years. Future clean air planning, based on ABAG growth projections which would accurately reflect the City of Berkeley and include the UC Berkeley campus, would be incorporated in future air quality planning, and the residual impact would be less than significant.

In addition, as discussed in Section 4.2.3, the City of Berkeley’s General Plan policies incorporate the TCMs listed in Table 5 of the BAAQMD CEQA Guidelines; thus the local general plan is consistent with the Clean Air Plan’s TCMs. UC Berkeley also has a

solid record of promoting transportation control measures, including promoting trip reduction programs, improving bicycle amenities and promoting bicycle commuting, conducting demonstration projects for reduced emission vehicles, emphasizing pedestrian-friendly design. See also Chapter 4.12.

Although the BAAQMD CEQA Guidelines do not require the quantification of emissions associated with a plan, daily emissions associated with the 2020 LRDP were estimated and are reported below in Table 4.2-9 for informational purposes. Implementation of the 2020 LRDP would increase the amount of building space, the number of people living on campus, and the number of students, faculty and staff traveling to and from UC Berkeley on a daily basis. Other campus operations could also increase in response to the increased on-campus population.

STATIONARY SOURCE EMISSIONS

Implementation of the 2020 LRDP would require additional emergency generators. These generators would emit criteria pollutants in the exhaust from diesel fuel combustion. The anticipated emissions are summarized in Table 4.2-9. In addition, the increase in steam needs would cause an increase in boiler emissions at the central plant.

AREA SOURCE EMISSIONS

Emissions of NO_x, ROG, CO, PM₁₀, and SO₂ from area sources (water and space heating, landscaping equipment, and consumer product use) are summarized in Table 4.2-9.

OPERATIONAL VEHICULAR EMISSIONS

The increased number of passenger vehicles from students, faculty, and staff using the campus would contribute to regional emissions of NO_x, ROG, CO, SO₂, and PM₁₀. These emissions were estimated for UC Berkeley using the EMFAC2002 on-road vehicle emissions model. It is estimated that 3,500 new daily trips would be generated by the proposed project. Daily vehicle emissions associated with the 2020 LRDP at build-out are summarized in Table 4.2-9.

In addition to passenger vehicles, buses and delivery trucks serving the campus would also emit exhaust pollutants. These vehicles are typically diesel-fueled, and diesel particulate matter emissions were recently recognized by the CARB as carcinogenic (see LRDP Impact AIR-3, above and Cumulative Impact AIR-3 and AIR-4, below). However, increasing numbers of parcel delivery trucks are using alternative fuels such as compressed natural gas. In addition, newer diesel engines for trucks and buses are required to meet increasingly stringent emission levels by the CARB and the U.S. EPA.²⁶ Thus, as fleets are updated, it is expected that diesel particulate emissions from these types of vehicles will continue to decrease in the future.

TOTAL EMISSIONS

Total operational emissions of criteria pollutants are the sum of stationary source emissions, area source emissions (housing and other building space), and regional emissions from vehicular sources. Total emissions of NO_x, ROG, CO, PM₁₀ and SO₂ from development under the 2020 LRDP are summarized in Table 4.2-9.

As this table shows, with respect to NO_x, PM₁₀ and CO incremental emissions due to the 2020 LRDP would be fairly low when compared to BAAQMD thresholds that are

TABLE 4.2-9

**TOTAL OPERATIONAL EMISSIONS FOR GROWTH ANTICIPATED UNDER THE 2020 LRDP:
 INCREMENT ABOVE EXISTING EMISSIONS (LBS/DAY)**

Source	Existing Campus				LRDP Increment			
	NO _x	ROG	PM ₁₀	CO	NO _x	ROG	PM ₁₀	CO
Vehicles	66	51	18	1004	13	10	4	197
Academic and Support Buildings	139	183	0.3	57	21	2	0.04	9
Housing ¹	Note	Note	Note	Note	11	69	0.02	5
Laboratories ²	0	61	0	0	--	26	--	--
Stationary (Turbine) ³	102	17	7	60	0	0	0	0
Stationary (Plant Boilers) ³	9	108	1	10	1	9	0.1	1
Stationary (Generators)	23	5	2	9	9	2	0.1	4
Total	339	425	28	1140	55	118	4	207

Notes:

¹ Existing housing emissions were included in the total for Academic and Support Buildings. The Oakland housing zone was included in the URBEMIS estimates for emissions from housing.

² Appendix C of this report. Laboratory emissions conservatively estimated; actual emissions likely to be lower.

³ The cogeneration turbine is expected to operate at current levels. The projected 8% increase in peak campus steam demand is assumed to be obtained from the campus boilers. SO₂ emissions are negligible.

applied to individual development projects. This is because the projected increase in the number of daily vehicle trips associated with the LRDP is not large, and other sources on the campus would not generate substantial emissions. The one pollutant for which the estimated emissions are high is ROG, with more than ½ the emissions associated with new housing that would be built under the 2020 LRDP. The majority of these emissions associated with housing result from use of household products by individuals and cannot be easily controlled by the campus. The campus will therefore implement measures that reduce emissions from other sources associated with the 2020 LRDP, so as to reduce the total new emissions to the maximum extent possible.

Continuing Best Practice AIR-5: UC Berkeley will continue to implement transportation control measures such as supporting voluntary trip-reduction programs, ridesharing, and implementing improvements to bicycle facilities.

LRDP Mitigation Measure AIR-5: UC Berkeley will work with the City of Berkeley, ABAG and BAAQMD to ensure that emissions directly and indirectly associated with the campus are adequately accounted for and mitigated in applicable air quality planning efforts.

Pursuant to LRDP Mitigation Measure AIR-5, projected growth under the 2020 LRDP will be provided to the ABAG for inclusion in the growth projections for the Bay Area, which would then be incorporated into the next CAP. With the implementation of the 2020 LRDP mitigation measures and coordinated planning efforts with the BAAQMD, the impact from operational emissions would be fully addressed, and future projects

implementing the 2020 LRDP would likely be in compliance with air quality plans; the impact is therefore anticipated to be short-term and temporary.

4.2.8 TIEN CENTER IMPACTS

This section describes the air quality impacts of the Chang-Lin Tien Center for East Asian Studies based on the Standards of Significance, whether they are significant or less than significant, and whether any significant impacts can be mitigated to less than significant levels.

EFFECTS NOT FOUND TO BE SIGNIFICANT

The Initial Study found that the Chang-Lin Tien Center for East Asian Studies would have no significant impacts in regard to the following thresholds:

Would the project violate any air quality standard or contribute substantially to an existing or projected air quality violation?

Would the project expose sensitive receptors to substantial air pollutant concentrations?

Would the project cause objectionable odors affecting a substantial number of people?

Would the project expose people to substantial levels of toxic air contaminants (TACs), such that the exposure could cause an incremental human cancer risk greater than 10 in one million or exceed a hazard index of one for the maximally exposed individual?

The Initial Study noted that the Tien Center would house office, classroom and library space, and thus operation and occupancy of the Tien Center would not be a significant source of air pollutants, air emissions, toxic air contaminant emissions, nor odiferous emissions. Construction impacts associated with the Tien Center are accounted for by the analysis above related to construction emissions; regional air plan consistency impacts of implementing the 2020 LRDP, including the Tien Center, are also analyzed above. See in particular the discussion for LRDP Impact AIR-4 and AIR-5, above. There would not be unique or additional air quality impacts from this project.

4.2.9 CUMULATIVE IMPACTS

This section evaluates whether development under the 2020 LRDP, in combination with non-UC Berkeley projects that are reasonably foreseeable, would result in significant cumulative air quality impacts. Such impacts could occur if air quality impacts associated with development under the 2020 LRDP could combine with air quality impacts from other projects to create impacts that would be cumulatively considerable.

This analysis considers cumulative growth as represented by the implementation of municipal general plans in the nine county San Francisco Bay Area air basin, implementation of the proposed Lawrence Berkeley National Laboratory 2004 LRDP, the proposed redevelopment of University Village Albany, the draft Southside Plan, the AC

Transit Major Investment Study, and implementation of the 2020 LRDP, as described in 4.0.5. The analysis also includes growth anticipated by the City of Berkeley General Plan EIR and by previously certified UC Berkeley EIRs, including the Northeast Quadrant Science and Safety Projects (SCH 2001022038), Seismic Replacement Building 1 (SCH 99122065), and the Underhill Area Projects (SCH 99042051)

The geographic context for the analysis of cumulative air quality impacts varies with the pollutant. Ozone precursors (NO_x and ROG) when emitted by a source disperse in the air and therefore cumulate with emissions from other sources on a regional level. The geographic context of the analysis of cumulative impacts from the emission of ozone precursors therefore is the Bay Area air basin.

Some pollutants on the other hand (namely, PM₁₀, CO and toxic air contaminants) tend to remain near ground level and therefore produce localized impacts. The geographic context for cumulative impacts from these pollutants is intersections affected by project traffic in the case of CO and the campus and surrounding areas within the City of Berkeley for toxic air contaminants.

Construction sites tend to be the primary source of PM₁₀ emissions. Therefore the geographic context for cumulative PM₁₀ impacts would be construction sites of previously analyzed UC Berkeley projects, LBNL projects, or other projects in the nearby vicinity that are in close proximity to construction sites for projects implementing the 2020 LRDP.

The significance of the potential cumulative impacts was determined based on the following standards:

Standard: *Would the project conflict with or obstruct implementation of the applicable air quality plan?*

Standard: *Would the project violate any air quality standard or contribute substantially to an existing or projected air quality violation?*

Standard: *Would the project expose sensitive receptors to substantial air pollutant concentrations?*

Standard: *Would the project cause objectionable odors affecting a substantial number of people?*

Standard: *Would the project expose people to substantial levels of toxic air contaminants (TACs), such that the exposure could cause an incremental human cancer risk greater than 10 in one million or exceed a hazard index of one for the maximally exposed individual?*

Standard: *Would the project 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?*

The question posed in this section is twofold:

- Is the potential *cumulative* impact of the 2020 LRDP *and* other reasonably foreseeable projects below these standards of significance?
- Is the contribution of the 2020 LRDP to these impacts cumulatively considerable?

Five cumulative air quality impacts to which the project would contribute are discussed below. These impacts focus on (1) the cumulative impact associated with emissions of non-attainment criteria pollutants; (2) the cumulative impact associated with CO; (3) implications of regional growth for toxic air contaminant levels; (4) the cumulative impact associated with toxic air contaminant emissions from stationary and area sources; and (5) air impacts of combined reasonably foreseeable construction activities. The proposed project does not include any major source of objectionable odors and would therefore not contribute to a cumulative impact associated with odors.

Cumulative Impact AIR-1: The 2020 LRDP, in combination with other reasonably foreseeable projects, could result in a cumulatively considerable increase of non-attainment pollutants and thereby conflict with the most recent Clean Air Plan. The cumulative impact would be *significant*.

Stationary, mobile and area sources associated with the development of the campus, together with similar sources associated with regional growth throughout the Bay Area air basin, would contribute to emissions of criteria pollutants for which the region is in non-attainment status and could hinder attainment efforts. As discussed under LRDP Impact AIR-5, although the BAAQMD has accounted for a certain amount of regional growth in its most recent Clean Air Plan (2000), this plan may not include the campus growth anticipated under the 2020 LRDP. Furthermore, the air basin remains an area of nonattainment for some of the criteria pollutants. Therefore, the cumulative emissions from regional growth, including those associated with the 2020 LRDP, could result in a significant impact on air quality, and the proposed project's contribution to this cumulative impact would be cumulatively considerable.

It should be noted that the Clean Air Plan undergoes updates every three years and incorporates updated ABAG population and vehicle mileage growth projections. When the BAAQMD Clean Air Plan is updated, it will include the ABAG updated population and vehicle mileage projections that would include campus growth under the 2020 LRDP as well as other growth projected for the region. Once the emissions inventory for the revised level of growth is developed, the BAAQMD will refine existing control programs as well as add new control programs to minimize emissions at the regional level so that the region progresses towards attainment. UC Berkeley would continue to comply with recommendations and mitigation measures of the regional air district, supporting compliance with the Clean Air Plan.

The campus will implement Continuing Best Practice AIR-5 and LRDP Mitigation Measure AIR-5 to reduce its contribution to the cumulative air quality impact to the maximum extent feasible.

Cumulative Impact AIR-2: Traffic associated with the development under the 2020 LRDP, in combination with other reasonably foreseeable projects, would not contribute to a cumulatively considerable increase in or expose receptors to substantial CO concentrations. The cumulative impact would be *less than significant*.

Development under the 2020 LRDP would result in increases in traffic that would produce additional CO emissions compared to existing conditions. Other growth in the campus vicinity would also add traffic to the intersections affected by the proposed project. LRDP Impact AIR-1 evaluated CO impacts from cumulative plus project conditions. The peak hour vehicle volumes for University and San Pablo Avenues reported in Table 4.2-7 included cumulative growth for the project region. Since this peak hour volume would not cause a violation of the CO standard, the cumulative impact would be less than significant.

Cumulative Impact AIR-3: With technological improvements to meet more stringent standards, regional growth would not result in an increase in toxic air contaminants.

As discussed under LRDP Impact AIR-3, above, the total estimated cancer risk from UC Berkeley campus stationary and area sources is predicted to be below 10 in one million for both the off-campus and on-campus MEI assuming a 70-year exposure period.

As described in Section 4.2.4, the approximate average lifetime cancer risk from exposure to ambient TACs is 613 in one million, with 440 in a million of this risk attributable to diesel particulate matter (DPM) emissions. Thus, diesel particulate matter emissions represent about 72 percent of the current background TAC lifetime cancer risk in the Bay Area. Since 1990, air toxics control programs have reduced the overall level of TACs in the Bay Area. In 1990, the ambient TAC lifetime cancer risk was estimated at 1,153 in one million, with 750 in one million coming from diesel particulate matter. In 1995, the ambient TAC lifetime cancer risk was 884 in one million, with 570 in one million coming from diesel particulate matter.²⁷ Diesel particulate matter emissions from implementation of the 2020 LRDP represent about 69 percent of the estimated off-campus MEI lifetime cancer risk, similar to the percentage of background ambient cancer risk attributable to background diesel particulate matter emissions.

Current UC Berkeley operations were assessed assuming no retrofit controls, and emissions from future equipment were based on current new equipment performance standards. Through CARB's implementation of its adopted Risk Reduction Plan to Reduce Particulate Matter Emissions from Diesel-Fueled Engines and Vehicles ("Risk Reduction Plan")²⁸ as well as future potential U.S. EPA emission standards, diesel emission sources at UC Berkeley will likely undergo further emission reductions not accounted for in the HRA. The CARB Risk Reduction Plan called for retrofit standards for existing engines and more stringent emission standards for new engines, standards adopted by the CARB at their February 26, 2004 Board Meeting.²⁹ CARB estimates that full implementation of the Risk Reduction Plan for all covered emissions units will reduce diesel emissions in the year 2010 by 75 percent over year 2000 levels. In addition, the U.S. EPA has recently issued final rulemaking notices establishing more stringent federal emission standards for light-duty vehicles, heavy-duty vehicles, non-

road engines, and agricultural equipment.³⁰ These rulemakings will phase in requirements to use cleaner burning EPA-certified diesel engines between 2004 and 2008.

As described above, despite the growth of UC Berkeley operations between 1990 and 2004, the average TAC background cancer risk has declined due to control measures that have included UC Berkeley operations. In addition, UC Berkeley has reduced diesel emissions where feasible in switching to cleaner-operating fleet vehicles. UC Berkeley will continue to implement diesel emission reduction efforts and will also be subject to required control measures in the future. UC Berkeley emission reductions in future years should continue to reflect the anticipated overall regional reductions in TAC levels.

In conclusion, TAC emissions from the 2020 LRDP in combination with existing campus operations are anticipated to decline due to implementation of new technologies to reduce air toxics, particularly from diesel engines. Furthermore, future operation of current campus activities, new campus projects, and other air toxics sources in the region will be subject to future TAC emission control programs, and as such, regional TAC levels including those resulting from future UC Berkeley operations are expected to continue to decline. Additionally, air toxics impacts generally are localized around emission sources, so impacts do not generally cumulate at a substantial distance.

In light of the priority being given to air toxics regulation by CARB and EPA, the significant programs presently under development, and the availability of technologies to achieve substantial additional TAC reductions, CARB's projections of continuing regional TAC reductions are well supported, resulting in a *less than significant* cumulative impact.

Cumulative Impact AIR-4: The 2020 LRDP, in combination with other reasonably foreseeable projects, would contribute to a cumulatively considerable increase in toxic air contaminants from stationary and area sources. The impact would be *significant and unavoidable*.

As described in Cumulative Impact AIR-3, above, the ambient risk for toxic air contaminants in the Bay Area (based on 2001 data) is 613 in a million; 72 percent of this risk is due to diesel particulate matter emissions. The standard applied by BAAQMD for analysis of the contribution of individual development projects to this risk is ten in one million. That is the standard used in this Draft EIR to analyze the significance of the 2020 LRDP's impacts in LRDP Impact AIR-3 and to evaluate the significance of cumulative TAC impacts from stationary and area sources.

With inclusion of 2020 LRDP development, including diesel particulate matter emissions from anticipated emergency generators, the maximum lifetime cancer risk from campus projects (baseline levels, plus NEQSS and 2020 LRDP development) was calculated to be 5.4 in one million along Hearst Avenue, east of Arch Street. The calculated lifetime cancer risks drop off with distance to less than 1 in one million about 2 kilometers from the Campus Park and South Campus areas. The only other project within this distance that could potentially add cumulatively to these estimated lifetime cancer risks is the LBNL 2004 LRDP.

LBNL has preliminarily assessed potential cancer risks associated with their existing and proposed stationary and area sources. These risks have been overlaid with the UCB 2020 LRDP HRA results to obtain a cumulative risk analysis. In a small area of maximum overlap, roughly north of Ridge Road, east of La Loma Avenue and south of Buena Vista Way in Berkeley, estimates show that the existing cumulative cancer risks from both facilities currently exceeds ten in one million lifetime cancer risk, up to a maximum of approximately 17 in a million at limited locations. Future emissions from the facilities under their respective LRDPs would potentially extend the area exceeding ten in one million lifetime cancer risk slightly to roughly north of Hearst Avenue, east of LeRoy Avenue and south of Codornices Park up to a maximum of approximately 22 in one million at limited sites.³¹ Therefore, the cumulative risk due to toxic air contaminant emissions from stationary and area sources under the UCB 2020 LRDP and the LBNL 2004 LRDP would be *significant*.

The primary source of this risk is diesel particulate matter, and the assumptions used in this calculation are conservative. Implementation of the 2020 LRDP and LBNL 2004 LRDP may partially serve to reduce this risk, as projects to replace and renovate existing facilities include replacement of existing diesel emitters. As indicated under Cumulative Impact AIR-3, above, with implementation of newer technologies that meet higher regulatory standards, DPM emissions are reduced.

Cumulative Impact AIR-5: Construction activities associated with the 2020 LRDP, in combination with other reasonably foreseeable projects, would be controlled by best management practices in accordance with air district guidance. The cumulative impact would be *less than significant*.

Increased construction activities under the 2020 LRDP and other reasonably foreseeable projects in the area could lead to increased emissions of PM₁₀ and PM_{2.5} and other pollutants. As noted earlier, BAAQMD CEQA Guidelines do not require lead agencies to estimate emissions from construction, nor do the guidelines provide any numerical thresholds that can be used to evaluate the significance of emissions, should those be quantified. Appropriate controls, however, must be implemented. UC Berkeley has committed to implementing the best practices recommended by the BAAQMD and it is assumed that other construction projects will also implement the BAAQMD measures. This will result in a *less than significant* impact. As and when individual development projects are proposed on the campus under the 2020 LRDP, a project-level evaluation of operational emissions would be conducted and the estimated emissions of the project would be compared to BAAQMD thresholds (80 pounds per day of NO_x, ROG, and PM₁₀ and 550 pounds per day of CO).

4.2.10 REFERENCES

¹ UC Berkeley, *Notice of Preparation: Environmental Impact Report for the 2020 LRDP and Chang-Lin Tien Center for East Asian Studies*, August 29, 2003, pages 19-21.

² Bay Area Air Quality Management District (BAAQMD), *Toxic Air Contaminant Control Program Annual Report: 2001*, July 2003.

³ Bay Area Air Quality Management District (BAAQMD), *BAAQMD CEQA Guidelines: Assessing the Air Quality Impacts of Projects and Plans*, April 1996, revised December 1999.

- ⁴ URS Corporation, *Air Quality and Hazardous Materials Existing Conditions Report*, University of California, Berkeley, October 2002; URS Corporation, *Central Campus Human Health Risk Assessment*, Prepared for UC Berkeley Physical and Environmental Planning, June 28, 2000.
- ⁵ URS Corporation, *Central Campus Human Health Risk Assessment*, Prepared for UC Berkeley Physical and Environmental Planning, June 28, 2000.
- ⁶ See Appendix C.3 of this report.
- ⁷ See Appendix C.3 of this report, Table C.3-1, page C-8.
- ⁸ UC Berkeley, *Northeast Quadrant Science and Safety Projects and 1990 Long Range Development Plan Amendment, Draft Environmental Impact Report*, June, 2001, page 3.7-16. The NEQSS EIR provided an approximate net increase in wet laboratory space of 146,300 square feet. Upon commencement of project construction, the net wet laboratory space increase for NEQSS was refined to 147,035 square feet.
- ⁹ See Appendix C.3 of this report, pages C-13 through C-16.
- ¹⁰ *City of Berkeley Draft General Plan EIR*, February 2001, page 34.
- ¹¹ *City of Berkeley Final General Plan EIR*, June 2001, page 35.
- ¹² *City of Berkeley Draft General Plan EIR*, February 2001, page 128.
- ¹³ *City of Berkeley Final General Plan EIR*, June 2001, page 48.
- ¹⁴ *City of Berkeley Final General Plan EIR*, June 2001, pages 48 to 49.
- ¹⁵ City of Oakland, *Open Space Conservation and Recreation: An Element of the Oakland General Plan*, June 1996, pages 3-52 to 3-56.
- ¹⁶ Bay Area Air Quality Management District (BAAQMD), *Toxic Air Contaminant Control Program Annual Report: 2001*, July 2003, page 10.
- ¹⁷ Bay Area Air Quality Management District (BAAQMD), *Toxic Air Contaminant Control Program Annual Report: 2001*, July 2003, Appendix C-1, page C-1-3.
- ¹⁸ National Cancer Institute, *Surveillance, Epidemiology, and End Results (SEER) Cancer Statistics Review, 1975–2000*, National Institutes of Health, Bethesda, MD, 2003, Table I-15, http://www.seer.cancer.gov/crs/1975_2000/sections.html.
- ¹⁹ URS Corporation, *Central Campus Human Health Risk Assessment*, Prepared for UC Berkeley Physical and Environmental Planning, June 28, 2000, pages 3-7 through 3-9.
- ²⁰ URS Corporation, *Central Campus Human Health Risk Assessment*, Prepared for UC Berkeley Physical and Environmental Planning, June 28, 2000, page ES-1.
- ²¹ See Appendix C.3 of this report.
- ²² Bay Area Air Quality Management District (BAAQMD), *BAAQMD CEQA Guidelines: Assessing the Air Quality Impacts of Projects and Plans*, April 1996, revised December 1999, page 13.
- ²³ Haet, Greg, Associate Director, UCB Office of Environment, Health and Safety. Personal communication with John Koehler, URS Corporation, December 2001.
- ²⁴ Walker, Rochelle, Bay Area Air Quality Management District. Written communication to Cheri Velzy, URS Corporation, September 4, 2001.
- ²⁵ See Appendix C.3 of this report.
- ²⁶ U.S. Environmental Protection Agency (EPA) press release “Engine Manufacturers on Target to Meet More Stringent 2007 Clean-Diesel Regulations”, <http://yosemite.epa.gov/opa/admpress.nsf>; California Air Resources Board, “Reduced Emission Standards for 2007 and Subsequent Model Year Heavy-Duty Diesel Engines”, <http://www.arb.ca.gov/msprog/onroadhd/reducstd.htm>, retrieved March 25, 2004.
- ²⁷ California Air Resources Board (CARB), *The 2003 California Almanac of Emissions and Air Quality*, Chapter 5 – TAC Emissions, Air Quality and Health Risk, pages 261 to 263, <http://www.arb.ca.gov/almanac/almanac03/pdf/chap503.pdf>.

- ²⁸ California Air Resources Board (CARB), *Risk Reduction Plan to Reduce Particulate Matter Emissions from Diesel-Fueled Engines and Vehicles*, Stationary Source Division and Mobile Source Division, October 2000.
- ²⁹ California Air Resources Board (CARB), *Staff Report: Initial Statement of Reasons for Proposed Rulemaking, Airborne Toxic Control Measure for Stationary Compression-Ignition Engines*, Stationary Source Division, Emissions Assessment Branch, September 2003, <http://www.arb.ca.gov/regact/statde/isor.pdf>.
- ³⁰ U.S. Environmental Protection Agency (EPA), Federal Register 65 FR 6698, February 10, 2000, *Final Rule: Control of Air Pollution from New Motor Vehicles: Tier 2 Motor Vehicle Emissions Standards and Gasoline Sulfur Control Requirements* (clarified and amended in direct final rule published in Federal Register 67 FR 72821, December 6, 2002); U.S. Environmental Protection Agency (EPA), Federal Register 65 FR 59895, October 6, 2000, *Final Rule: Emissions Control, Air Pollution From 2004 and Later Model Year Heavy-Duty Highway Engines and Vehicles*; U.S. Environmental Protection Agency (EPA), Federal Register, 67 FR 68242, November 8, 2002, *Final Rule: Control of Emissions From Nonroad Large Spark-Ignition Engines, and Recreational Engines (Marine and Land-Based)*; U.S. Environmental Protection Agency (EPA), Federal Register, 68 FR 17741, April 11, 2003, *Direct Final Rule: Control of Emissions from Nonroad Diesel Engines: Amendments to the Nonroad Engine Definition*.
- ³¹ Dr. Patterson, Brian, Secor International Inc., personal communication with Ms. Vicki Hoffman of URS Corporation, March 26 and 31, 2004.

4.3 BIOLOGICAL RESOURCES

This section assesses the potential impacts of implementation of the proposed 2020 LRDP and the Tien Center for East Asian Studies on the biological resources of UC Berkeley and the 2020 LRDP area. Biological resources include all flora, fauna and associated habitats (including wetlands) that would be affected by project implementation.

During the scoping period for this EIR, several comments were received related to biological resources. Most comments were in regard to potential future development in the Hill Campus and potential impacts to endangered species, creek habitat, and other plants and wildlife. Requests were also made that this EIR examine biological impacts resulting from the proposed placement of the Tien Center project. These issues are addressed in this chapter.

4.3.1 ANALYTICAL METHOD

Biological resources in the study area were determined through a review of available information, including the 1990 LRDP EIR,¹ environmental documents on specific developments on the Campus Park and surrounding areas, and assessments conducted for the Hill Campus. Field reconnaissance surveys were conducted on February 4 and April 22, 2003 for the Campus Park and the two potential development areas in the Hill Campus. The potential impacts of implementation of the 2020 LRDP were then evaluated against this baseline in light of the adequacy of existing programs and proposed LRDP policies intended to protect and enhance sensitive biological resources.

4.3.2 REGULATORY FRAMEWORK

In addition to the environmental protection provided by CEQA, other state and federal regulations have been enacted to provide for the protection and management of sensitive biological and wetland resources. The U.S. Fish and Wildlife Service (USFWS) is responsible for implementing the federal Endangered Species Act and the Migratory Bird Treaty Act, while the U.S. Army Corps of Engineers (Corps) has primary responsibility for protecting wetlands under Section 404 of the Clean Water Act.

At the state level, the California Department of Fish and Game (CDFG) is responsible for administration of the California Endangered Species Act, and for protection of streams, water bodies, and riparian corridors through the Streambed Alteration Agreement process under Section 1601-1606 of the California Fish and Game Code. Certification from the California Regional Water Quality Control Board (RWQCB) is also required when a proposed activity may result in discharge into navigable waters, pursuant to Section 401 of the Clean Water Act and EPA 404(b)(1) Guidelines.

The federal Endangered Species Act (ESA, 16 U.S.C. 1531 §4(f)) requires the USFWS to develop Recovery Plans (RPs) to facilitate re-establishment and delisting of listed species. The USFWS has based recent RPs on natural communities and species assemblages rather than on any single listed species. USFWS published the Draft Recovery Plan for Chaparral and Scrub Community Species East of San Francisco Bay, California on April 7, 2003. The Final Recovery Plan is yet to be published.

SPECIAL-STATUS SPECIES AND SENSITIVE NATURAL COMMUNITIES

Special-status species² are plants and animals that are legally protected under the state and/or federal Endangered Species Acts³ or other regulations, as well as other species that are considered rare enough by the scientific community and trustee agencies to warrant special consideration, particularly with regard to protection of isolated populations, nesting or denning locations, communal roosts, and other essential habitat. Species with legal protection under the Endangered Species Acts often represent major constraints to development, particularly when the species are wide ranging or highly sensitive to habitat disturbance and where proposed development would result in a “take”⁴ of these species.

The primary information source on the distribution of special-status species in California is the California Natural Diversity Database (CNDDDB) inventory, which is maintained by the Natural Heritage Division of the CDFG. Occurrence data are obtained from a variety of scientific, academic, and professional organizations, private consulting firms, and knowledgeable individuals, and entered into the inventory as expeditiously as practicable. The presence of a population of a species of concern in a particular region is an indication that additional populations may occur at other locations within the region, if habitat conditions are suitable. However, the absence of an occurrence in a particular location does not necessarily mean that special-status species are absent from the area in question, only that no data have been entered into the CNDDDB inventory. Where suitable habitat is present, detailed field surveys are generally required to provide a conclusive determination on presence or absence of sensitive resources at a particular location.

In addition to species-oriented management, protecting habitat on an ecosystem-level is increasingly recognized as vital to the protection of natural diversity in the state. The CDFG maintains occurrence information in the CNDDDB inventory of those natural communities which are considered particularly rare or threatened. Although these natural communities have no legal protective status under the state or federal Endangered Species Acts, they are provided some level of protection under the CEQA Guidelines. Further loss of a sensitive natural community could be interpreted as substantially diminishing habitat, depending on the relative abundance, quality and degree of past disturbance, and the anticipated impacts to a known occurrence of a specific community type with a high inventory priority. Sensitive natural communities recognized by the CNDDDB include riparian scrub and woodland, native grasslands, valley oak woodlands and other types of deciduous oak woodlands, and coastal salt marsh, among others.

WETLANDS

Although definitions vary to some degree, wetlands are generally considered to be areas that are periodically or permanently inundated by surface or ground water, and support vegetation adapted to life in saturated soil. Wetlands are recognized as important features on a regional and national level due to their high inherent value to fish and wildlife, use as storage areas for storm and flood waters, and water recharge, filtration, and purification functions. Technical standards have been developed as a method of defining wetlands through consideration of three criteria: hydrology, soils, and vegetation.

The Corps, CDFG, and RWQCB have jurisdiction over modifications to stream channels, river banks, lakes, and other wetland features. Jurisdiction of the Corps is established through the provisions of Section 404 of the Clean Water Act, which prohibits

the discharge of dredged or fill material into “waters” of the United States without a permit, including certain wetlands and unvegetated “other waters of the U.S.” Jurisdictional authority of the CDFG is established under Sections 1601-1606 of the Fish and Game Code, which pertains to activities that would disrupt the natural flow or alter the channel, bed, or bank of any lake, river, or stream.

The Fish and Game Code stipulates that it is “unlawful to substantially divert or obstruct the natural flow or substantially change the bed, channel or bank of any river, stream or lake” without notifying the CDFG, incorporating necessary mitigation, and obtaining a Streambed Alteration agreement. The Wetlands Resources Policy of the CDFG states that the Fish and Game Commission will “strongly discourage development in or conversion of wetlands... unless, at a minimum, project mitigation assures there will be no net loss of either wetland habitat values or acreage.” Jurisdictional authority of the RWQCB is established pursuant to Section 401 of the Clean Water Act, which typically requires a water quality certification when an individual or nationwide permit is issued by the Corps. The RWQCB also has jurisdiction over “waters of the state” under the Porter-Cologne Water Quality Control Act.

4.3.3 LOCAL PLANS AND POLICIES

Although the University is constitutionally exempt from local regulations when using its property in furtherance of its educational purposes, it is University policy to evaluate proposed projects for consistency with local plans and policies. Therefore, this section outlines the plans and policy goals of the cities of Berkeley and Oakland related to biological resources. The cities of Berkeley and Oakland also have creek protection and tree preservation ordinances.

CITY OF BERKELEY

BERKELEY GENERAL PLAN

The City of Berkeley General Plan contains general references to the protection of sensitive biological resources. One policy in the Environmental Management Element calls for the protection and restoration of valuable, significant, or unique natural habitat areas (EM-28). Actions called for in the policy include balancing the increased use of open space and public lands with enhancement of natural habitat, and the importance of preserving and enhancing riparian areas and water flows necessary to support natural habitat and wildlife.

Policy EM-32 calls for inter-jurisdictional coordination to restore historic coastal grasslands and native trees in the hill area. Policy EM-27 on creeks and watershed management seeks daylighting whenever feasible, promotes restrictions on development adjacent to creeks, and encourages creek and wetland restoration projects. Policy EM-29 promotes the preservation of street and park trees, including preservation of heritage trees, such as native oaks and other significant trees on public and private property.

FINDINGS OF THE BERKELEY GENERAL PLAN EIR

The City of Berkeley General Plan EIR found that potential impacts to local habitat may result from the restoration of historic coastal grasslands in the Berkeley Hills. The EIR identified several potential impacts due to the removal of existing scrub and woodland cover to create grasslands. Impacts may include conversion of existing wildlife habitat

and possible negative effects upon special-status species. A mitigation measure required consultation with natural resource agencies to ensure habitat conversion would not result in take of any special-status species or loss of essential breeding and foraging habitat.

The potential degradation of sensitive riparian habitat was identified as an impact of development and maintenance of a citywide pedestrian and bicycle network. A mitigation measure was recommended requiring that any new paths undergo complete environmental review, including consideration of potential effects on riparian zones. The EIR further concluded that, because no undeveloped, natural land is proposed to be developed as part of the general plan, the plan would not contribute to a regional cumulative loss of habitat or natural resources.

CITY OF BERKELEY ORDINANCES

The City of Berkeley's Coast Live Oak Tree Removal Ordinance (No. 6462-N.S.) prohibits the removal of any coast live oak tree with a circumference of 18 inches or more, and any multi-stemmed coast live oak with an aggregate circumference of 26 inches or more, without a permit. Removal of any protected live oak is strongly discouraged by the city, and requires mitigation when removal is permitted.

The Preservation and Restoration of Natural Watercourses Ordinance (No. 5961) of the City of Berkeley regulates any future culverting of, or construction in, open creeks, encourages the rehabilitation and restoration of natural waterways, and promotes responsible management of watersheds. The ordinance includes provisions which prohibit obstructing or interfering with watercourses, require setbacks for new construction, and describe the process for obtaining permits for construction of walls, drains, and bulkheads.

CITY OF OAKLAND

OAKLAND GENERAL PLAN

The City of Oakland's General Plan contains a number of policies related to protection of biological resources. These policies from the Open Space, Conservation and Preservation Element include: protection of native plant communities, especially oak woodlands, redwood forests, native perennial grasslands, and riparian woodlands; protection of habitat for rare, endangered and threatened species; and protection of wildlife from the hazards of urbanization, loss of habitat, and predation by domestic animals.

CITY OF OAKLAND ORDINANCES

The City of Oakland also has both a tree protection and a creek protection ordinance. The Protected Tree Ordinance (Title 12, Chapter 12.36) defines protected trees and requires a permit for their removal. According to the ordinance, a tree removal permit must be obtained to remove the following trees: coast live oaks measuring 4 inches in diameter at breast height (dbh) or greater; any other tree measuring 9 inches dbh or greater, except eucalyptus and Monterey pine trees; and more than five Monterey pine trees measuring at least 9 inches dbh, per acre. The removal of five or fewer Monterey pines per acre is not regulated by the Oakland tree protection ordinance.

The City of Oakland's Creek Protection, Storm Water Management, and Discharge Control Ordinance (Title 13, Chapter 13.16) serves to regulate proposed modification in or within 100 feet of a creek. The category of the permit is dependent on proximity to

the creek channel and nature of the exterior work. A creek protection plan is generally required in addition to an approved permit.

4.3.4 EXISTING SETTING

UC Berkeley is located on the western slopes of the Berkeley Hills, occupying the upper watersheds of Strawberry and Claremont Canyons. It contains two distinct areas, one the largely developed Campus Park, and the other the largely undeveloped Hill Campus. The City Environs, the lands to the south, north and west of the Campus Park, are extensively developed with urban uses, including residential, commercial, and institutional uses. Sensitive vegetation and wildlife resources are generally absent in the urbanized area surrounding the Campus Park due to its intensively developed character.

The eastern edge of the Southside area, along the upper slopes of the Clark Kerr Campus and Smyth-Fernwald housing area, contain areas of undeveloped habitat. These areas include native woodlands and grasslands, and remnants of riparian habitat along the remaining segments of open creek channels. Figure 4.3-1 shows the relationship of the Campus Park and lower Hill Campus to the surrounding urban developed lands.

The LRDP Housing Zone includes areas either within a mile radius of Doe Library or within a block of a transit line providing trips to Doe Library in under 20 minutes. As such, sensitive vegetation and wildlife resources are largely absent in these mostly intensively urbanized areas.

CAMPUS PARK

The Campus Park is an urbanized and landscaped area that contains the majority of UC Berkeley's academic and administrative space. The North and South Forks of Strawberry Creek and three designated Natural Areas bordering them are the most biologically important features on the Campus Park. Mature ornamental trees, shrubs and large areas of turf contribute to the landscaped character of the Campus Park.

VEGETATION

The Campus Park is dominated by ornamental and native (such as coast live oak, coast redwood, toyon, California buckeye, and California bay) landscape plantings, which surround the existing buildings, plazas, and open areas of lawns and groundcovers. The riparian areas associated with Strawberry Creek are the most biologically productive and sensitive vegetated areas on the Campus Park.

Remnants of native oak woodlands, dominated by large native coast live oaks, occur on the slopes around Observatory Hill between Haviland and McCone Halls in the vicinity of the proposed Tien center site. The remainder of the Campus Park supports a variety of primarily non-native ornamental plantings, including mature eucalyptus, pines, palms, cedars, ginko, maples, and oaks. Tree and shrub species from around the world have been planted throughout the Campus Park for aesthetic, teaching and research purposes.

In the late 1880's, a botanical garden was established north of Doe Library between the Hearst Mining Circle and Haviland Hall, and a few of the original specimen trees from the original botanical garden remain. Another distinct vegetation resource on the Cam-

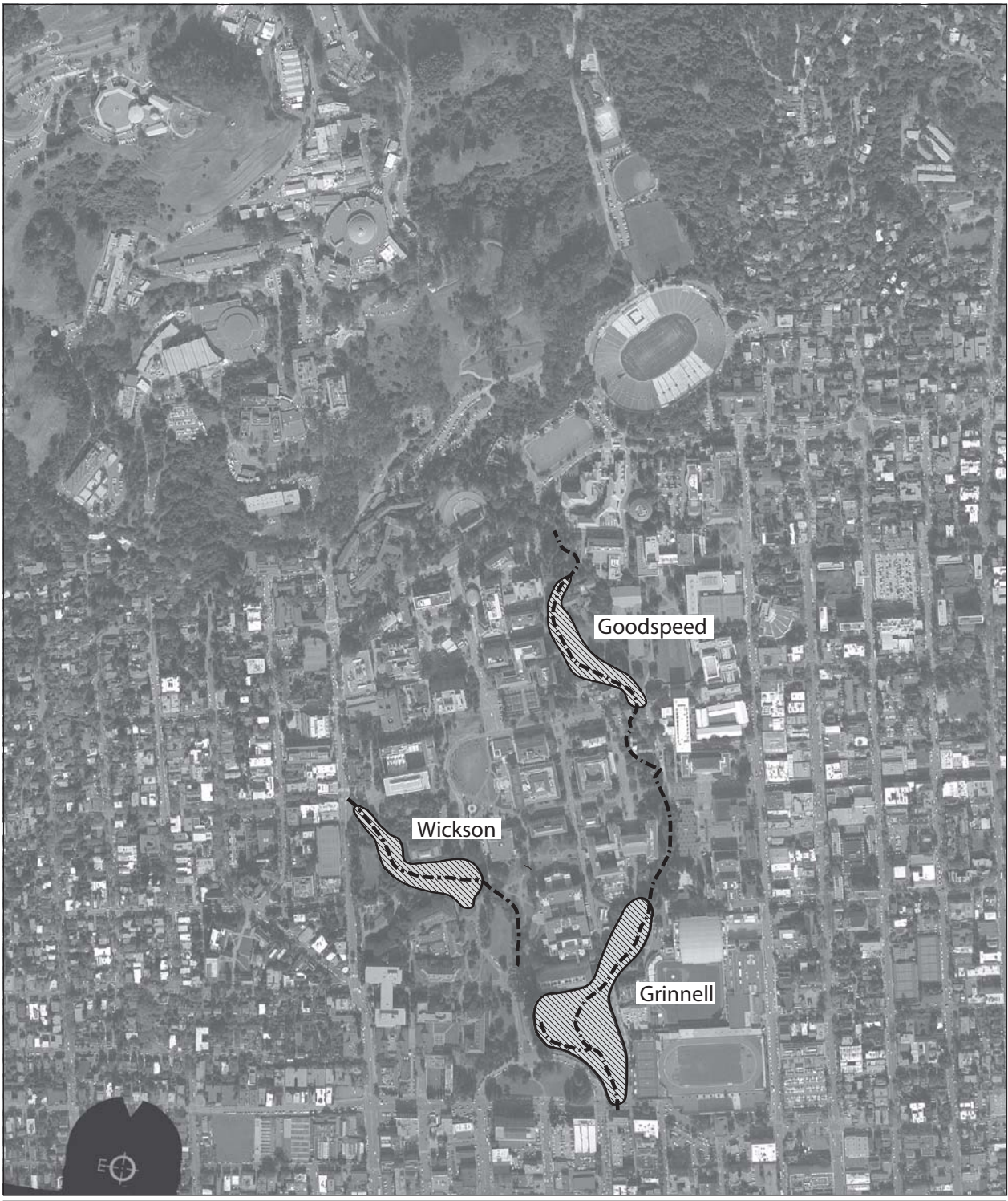
pus Park is the grove of large blue gum eucalyptus to the west of the Life Sciences Addition, reportedly planted in 1877 to protect a former running track from westerly winds.

Vegetation in the vicinity of Observatory Hill consists of a combination of mature and sapling coast live oaks, most of which appear to occur naturally on the hillside, together with native California buckeye, various coniferous species, toyon, California hazel, poison oak, and some native and non-native grasses. Many of the coast live oak trees are of a substantial size, with trunk diameters exceeding 24 inches in dbh, which contributes to the natural character of Observatory Hill. A young valley oak occurs at the south edge of the parking lot immediately southeast of Haviland Hall, and given the general local absence of this species, was presumed planted at the site. Other species on the hillside include planted manzanita, cedars, pines, dawn redwoods, coast redwoods, German ivy, periwinkle, wisteria, and St. John's wort.

As Figure 4.3-1 shows, the riparian corridors along Strawberry Creek are the focus of the remaining natural open space in the Campus Park, although only portions of these corridors are within the currently designated Natural Areas. The South Fork is an open channel from just northeast of the Women's Faculty Club to Oxford Street. The North Fork enters an open channel west of the North Gate, flows through a culvert under the West Circle and continues as an open channel through the Eucalyptus Grove west of the Life Sciences Addition, where it then meets the South Fork. Remnants of natural vegetation as well as planted native and ornamental species grow along both forks across the Campus Park.

Native species along the Strawberry Creek corridors include buckeye, live oak, bay, big-leaf maple, snowberry, hazel, and sword fern. Non-native trees and shrubs include blue gum, red gum, American elm, weeping elm, bald cypress, pittosporum, giant sequoia, azaleas, rhododendrons, purple-leaved flowering plum, and others. Several highly invasive non-native groundcovers, including periwinkle, German ivy, and wandering jew, grow in and along the banks of the creek and surrounding landscaped areas. Redwoods form the dominant tree cover along several segments of the creek. This species is native to coastal California and parts of the Oakland Hills, but is not indigenous to the Campus Park and the Strawberry Creek watershed.

The three currently designated Natural Areas, established by the University in 1969, occur along the two forks of Strawberry Creek on the Campus Park. The Wickson, Grinnell, and Goodspeed Natural Areas were designated for a combination of biological, educational, and aesthetic values which set them apart from the remainder of the Campus Park. The remnant natural vegetation and mature planted species associated with the Natural Areas contribute to higher vegetation and wildlife habitat values than the remainder of the more intensively developed Campus Park.





-  Designated Natural Areas
-  Open Channel of Strawberry Creek

FIGURE 4.3-1
DESIGNATED NATURAL AREAS
IN THE CAMPUS PARK

WICKSON NATURAL AREA. This Natural Area occurs along the North Fork of Strawberry Creek from the North Gate to the bridges over University Drive. Dominant tree species along this segment of the creek include redwood, buckeye, live oak, maple, and bay. Shrub and groundcover species include scouring rush, nettle, bracken fern, wandering jew and German ivy. This Natural Area is bordered by the fenced, managed grounds east of University House, the remnant oak woodlands on the northwestern slope of Observatory Hill, the lawns which border Giannini Hall, and by Haviland Hall and Moffitt Library. Several large palms and other older ornamental trees associated with the original botanical gardens extend into the southeastern edge of the Wickson Natural Area. Named landmark trees occur within the Wickson Natural Area, including the Sproul Centennial Redwood and Willey Redwood.

GRINNELL NATURAL AREA. This Natural Area borders the lower end of the North Fork of Strawberry Creek and the South Fork of Strawberry Creek from the Dana Street Bridge to the Oxford Street storm drain. Dominant tree species include a large grove of blue gum just west of the Life Sciences Addition, redwoods along the South Fork, scattered live oak along the fringe of the creek corridor, and mature Monterey pines between Frank Schlessinger Way and the creek which are nearing senescence. With the exception of the pines, these are being replaced. Trees in the eucalyptus grove were recently evaluated and a number removed because of the hazard posed by potential toppling due to trunk and root decay. Understory growth beneath the eucalyptus is sparse due to the dense duff produced by the trees and the natural allelopathology of eucalyptus: oils in eucalyptus sap, leaves, and bark duff are toxic to many other species' seedlings. Other tree and shrub species found in the remainder of the Natural Area include toyon, nine-bark, thimbleberry, hazel, blue elderberry, maple, bay, and buckeye. A small area of non-native grassland occurs in the understory of the mature pines and scattered oaks, south of the South Fork and north of Frank Schlessinger Way, dominated by wild oats, plantain, and filaree.

GOODSPEED NATURAL AREA. This Natural Area occurs on the South Fork from the Faculty Club, across the north edge of Faculty Glade, to Barrows Hall. Trees along the creek include bay, buckeye, live oak, and planted redwoods and pines. Mature live oak and a specimen buckeye are significant edge features which surround the broad turf area of the glade. Native shrubs and groundcovers along this segment of the creek include hazel, toyon, California blackberry, and thimbleberry, together with introduced German ivy and wandering jew. A number of wetland species occur in and along the creek channel, including sedge, horsetail, and water parsley.

WILDLIFE

The Campus Park and surrounding urban lands of Berkeley have only limited value to wildlife due to the extent of existing development and intensity of human activity. Impervious surfaces and structures provide little opportunity for use by wildlife, and species found in the vicinity are typical in urbanized areas. In addition to its aesthetic value, mature landscaping, particularly larger trees and shrubs, can provide nesting and foraging opportunities for both resident and migratory bird species.

The diversity of animal life on the Campus Park has consistently diminished with the increased urbanization of the city and UC Berkeley over the years. Birds are most abundant, both in numbers and diversity of species. Segments of the creek corridors and

Natural Areas with shrub and tree canopy support both resident and migratory birds, including Steller and scrub jays, dark-eyed junco, brown towhee, red-breasted nuthatch, black phoebes, black-capped chickadee, brown creeper, and sparrows. Bird species common in urban and suburban habitats utilize the structures, lawns, and landscaped areas on the Campus Park, and include American robin, house finch, house sparrow, mourning dove, northern mocking bird, and European starling, among others.

Intensively managed turf and landscaped areas tend to have little biological value, other than occasional foraging opportunities to some bird species and habitat for Botta's pocket gopher. Introduced fox squirrel, house mouse, and Norway rat are abundant along the creek corridors, areas with protective cover, and sometimes within structures. Nocturnal scavengers such as raccoon and opossum also frequent the creek corridors and area where waste is available for foraging. Great horned owl have been known to roost in the eucalyptus grove in the Grinnell Natural Area, and this and other raptor species such as red-tailed hawk could establish nests in the larger trees in the Natural Areas on the Campus Park. A pair of Cooper's hawks has recently nested in the Wickson Natural Area.

The aquatic habitat value of Strawberry Creek through the Campus Park is limited by the extensive historical physical alterations to the creek channels, the lack of pool habitat, increased water velocities, and water quality degradation. The number and diversity of invertebrate and macroinvertebrate species in both forks of the creek on the Campus Park are lower than in the upper watershed, indicative of stressed conditions and pollutants. Common species include aquatic earthworms, stonefly, narrow-winged damselfly, and water strider. Implementation of the Strawberry Creek Management Plan beginning in 1987 led to improved conditions on the South Fork with habitat conditions improving from very poor to fair.

North Fork habitat conditions have also improved but remain poor, probably due to domestic water spills (which contain chloramines that harm fisheries) and continued water pollution from the more urbanized North Fork watershed. Steelhead were once reported by the CDFG from Strawberry Creek in the 1930's, but the native fisheries were eliminated from the creek segments across the Campus Park as a result of the changing conditions in creek hydraulics and water quality, culverting, and construction of barriers to fish migration. Native minnow species, California roach and hitch, Sacramento Suckers and three spined sticklebacks were stocked in the creek beginning in 1988 and continue to thrive.

SPECIAL-STATUS SPECIES

Due to the extent of past development, the Campus Park does not provide suitable habitat for special-status plant or animal species, with the exception of possible nesting by raptors. Cooper's hawk has recently nested in the dense woodlands of the Wickson Natural Area. There is a possibility that mature trees on the Campus Park, such as those in the eucalyptus grove in the Grinnell Natural Area and trees in the other Natural Areas, could be used for nesting by great horned owl or other raptor species in the future. Any established raptor or migratory bird nest in active use would be protected from destruction by the Migratory Bird Treaty Act and Section 3503.5 of the CDFG Code. Detailed surveys are not considered necessary to confirm absence of any special-status plant species on the Campus Park, or most special-status animal species with the possi-

ble exception of nesting raptors. Preconstruction raptor nesting surveys would be necessary to confirm absence of any raptor nests if construction were to involve disturbance near mature trees in the Natural Areas.

There is also a remote possibility that one or more species of special-status bat could utilize attics and other locations in buildings on the Campus Park that are largely inaccessible to humans and remain relatively undisturbed. The intensity of human activity on the Campus Park limits the likelihood that roosts of any special-status bat species are present, and none have been reported by the CNDDB in the vicinity. Table 4.3-1 provides information on each of these species of bat and their status as a federal Species of Concern.

WETLANDS

Jurisdictional wetlands and unvegetated other waters on the Campus Park are limited to the North and South Forks of Strawberry Creek. Most of these creek segments lack emergent wetland vegetation, although some wetland indicator species occur in the channel bottom through the Goodspeed Natural Area. Modifications at or below the ordinary high water level along the creeks is regulated by the Corps, and any alternation to the bed or banks of the channels requires authorization from the CDFG. No seeps, springs, or seasonal wetlands occur within the remainder of the Campus Park.

HILL CAMPUS

The Hill Campus consists of approximately 800 acres east of the Campus Park, largely referred to as Strawberry Canyon, bordered by Lawrence Berkeley National Laboratory, East Bay Regional Park District (EBRPD) Tilden Regional Park, East Bay Municipal Utility District (EBMUD) watershed lands, and low-density residential development. The western side of the Hill Campus includes the Lawrence Hall of Science, the UC Botanical Garden, the Strawberry Recreation Area, and Charter (“Tightwad”) Hill above Memorial Stadium.

GENERAL VEGETATION AND WILDLIFE

As shown in Figure 4.3-2, the Hill Campus consists of the largely undeveloped upper watersheds of Strawberry and Claremont Canyons, supporting a diverse mixture of cover types and associated wildlife species. Ornamental landscaping, which includes a wide variety of native and non-native trees, shrubs, groundcovers, and turf, occurs within the fenced areas at the UC Botanical Garden and around the Lawrence Hall of Science and Strawberry Canyon Recreation Area facilities. Large tracts of the Hill Campus were planted with eucalyptus and conifer, which now form a dominant part of the visual landscape. Stands of blue gum have spread throughout much of the two watersheds, and have contributed to relatively high fire fuel loads.

Native cover in the Hill Campus includes areas of oak-bay woodland, north coastal scrub, remnants of oak savanna and native grasslands, and the important riparian scrub and woodland associated with the main channel and tributaries of Strawberry and Claremont Creeks. The 1987 Strawberry Creek Management Plan⁵ describes a program for improvements to Strawberry Creek, some of which have been implemented. The plan is now being updated.

The Hill Campus contains a University-designated Ecological Study Area (ESA), shown in Figure 3.1-10, comprising approximately 600 acres. The ESA generally wraps around the eastern ends of the Strawberry Canyon Recreation Area and around the southern, eastern, and northeastern boundary of the Botanical Garden and Lawrence Berkeley National Laboratory. The 1990-2005 LRDP designated a Faunal Refuge within the ESA on the hillside east of the Botanical Garden. The ESA provides valuable teaching and research opportunities, and public service benefits, including hiking and jogging within walking distance of the Campus Park and Southside residential areas.

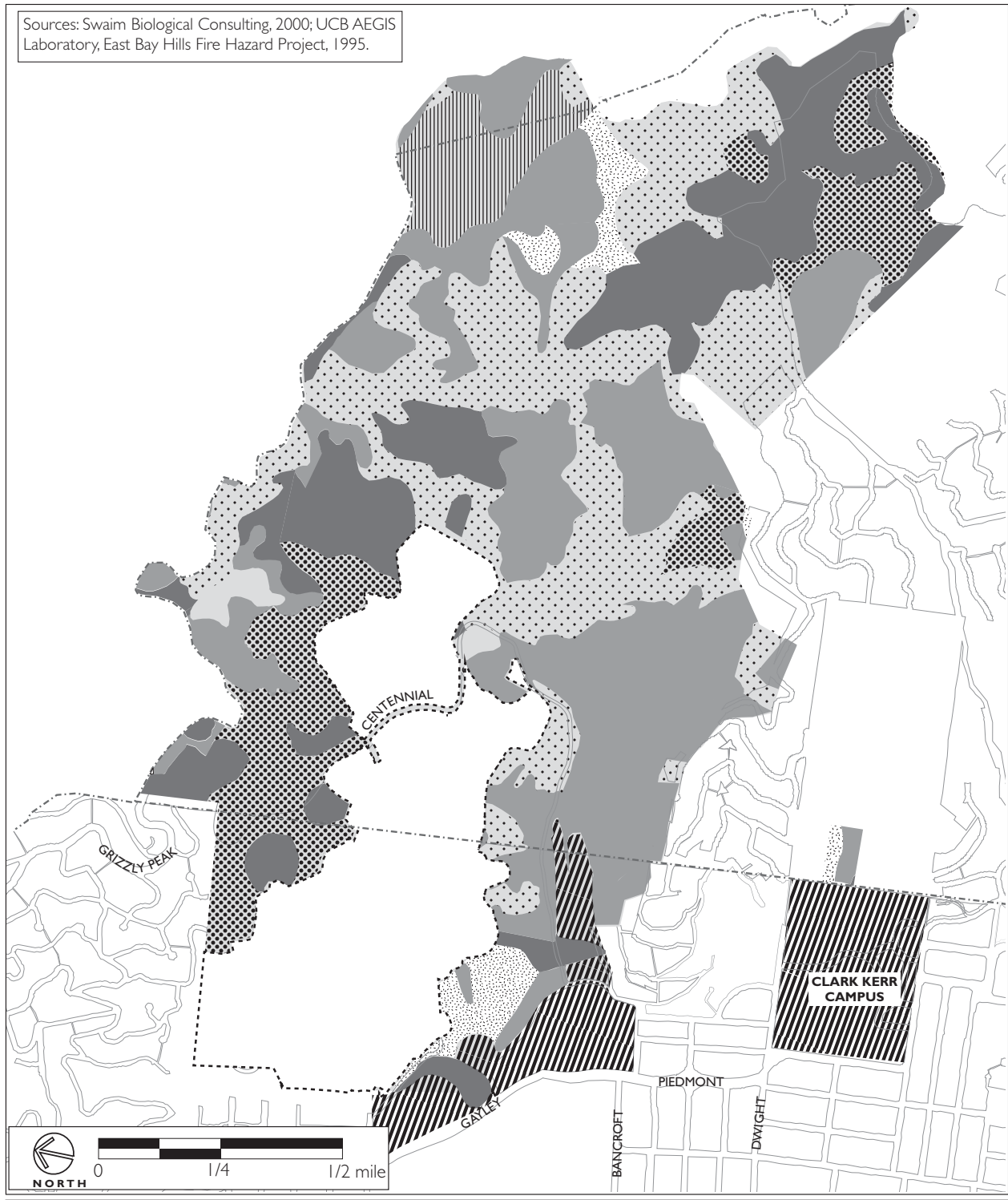
Several factors contribute to the relatively high wildlife habitat values of the Hill Campus as a whole. These include the extent of contiguous undeveloped land in the Hill Campus and the adjacent East Bay Regional Park District (EBRPD) parkland and East Bay Municipal Utility District (EBMUD) watershed lands, limited human access and activity, the varied vegetation cover types, and available surface water. The riparian corridors and adjacent oak-bay woodlands, scrub, and remnant grasslands are particularly valuable to wildlife, supporting a diverse array of amphibians, birds, and small mammals. This includes suitable habitat for the state and federally-threatened Alameda whipsnake, several special-status plant species, and numerous bird species of concern. The mosaic of native habitat provides important foraging opportunities for a number of mammalian and avian predatory species, including mountain lion, bobcat, grey fox, coyote, striped and spotted skunk, great horned owl, red-tailed hawk, and other raptors.

In contrast, wildlife habitat values are relatively low in the vicinity of existing development in the Hill Campus, supporting species typical of urban and suburban habitat. This is especially true where these areas are intensively managed, such as the recreation fields of the Strawberry Canyon Recreation Area, the parking lots and landscaped areas surrounding the Lawrence Hall of Science, and portions of the Botanical Garden. Mature trees, including blue gum and conifers, do provide suitable nesting substrate for a number of bird species, particularly raptors such as red-tailed hawk and great horned owl. The spread of non-native species from planted woodlots and road margins, particularly the highly invasive blue gum, yellow star thistle, and French broom, degrade the remaining natural habitats in the Hill Campus by out competing and eventually replacing native vegetation.

SPECIAL-STATUS SPECIES

A number of special-status plant and animal species are known or suspected to occur in the Hill Campus, based on the occurrence records of the CNDDDB and other information sources. Table 4.3-1 lists the special-status species which have been reported from or are considered to have the highest potential for occurrence in the Hill Campus, and includes information on their status, preferred habitat conditions, and likelihood of occurrence. A few species such as Berkeley kangaroo rat (presumed extinct), California red-legged frog, Bridge's Coast Range shoulderband snail, and robust monardella are reported as occurring in Strawberry Canyon and vicinity from old records, but have not been found in recent years. However, detailed surveys have not necessarily been conducted to confirm the presence or absence of these and other species in the Hill Campus.

Sources: Swaim Biological Consulting, 2000; UCB AEGIS Laboratory, East Bay Hills Fire Hazard Project, 1995.



- | | | | |
|--|---|--|---|
| | North Coast Scrub | | Developed/ Landscaped |
| | Grassland | | City Limit Line |
| | Successional Scrub | | Lawrence Berkeley National Laboratory Boundary |
| | Eucalyptus Canopy | | |
| | Tree Canopy (Native oaks & non-native trees other than eucalyptus) | | |
| | Young Eucalyptus with scrub understory | | |

FIGURE 4.3-2
HILL CAMPUS VEGETATION

In addition to protected special-status species, numerous other raptor species, such as great horned owl, red-tailed hawk, and American kestrel, most likely forage, roost, and nest in the upper watersheds of the Hill Campus. Raptor nests in active use would be protected from destruction by the Migratory Bird Treaty Act and provisions in the CDFG Code. There is also a possibility that one or more species of special-status bat forage and roost in the Hill Campus. Special-status bat species were not addressed in the 1990-2005 LRDP EIR, as amended, but there is a remote possibility they roost in the vicinity or forage in suitable habitat in the Hill Campus. Special-status bats may use crevices in exfoliating tree bark, hollow cavities in trees, or abandoned and seldom used structures.

Perhaps the species of greatest concern in the Hill Campus is the state and federally-threatened Alameda whipsnake, for which much of the Hill Campus was previously designated as critical habitat by the USFWS. Alameda whipsnake (AWS) is a slender, fast moving diurnal snake found exclusively in the inner coast ranges of western and central Alameda and Contra Costa counties. The AWS is found in chaparral, Diablan sage scrub, and northern coyote brush scrub, as well as adjacent riparian scrub, grasslands, and woodlands. Typical habitat characteristics include open to partially open scrub/chaparral cover on east, southeast, and southwest-facing slopes with abundant rock outcrops, rodent burrows, and western fence lizard prey.

Existing development has fragmented habitat for AWS into what are considered five separate populations or units, identified by the USFWS as the Tilden-Briones, Oakland-Las Trampas, Hayward-Pleasanton Ridge, Mount Diablo-Black Hills, and the Sunol-Cedar Mountain populations. In November 2000, the USFWS designated most of the area encompassing these populations as “critical habitat.”⁶ However, a court ruling in May 2003 rescinded the mapped critical habitat areas. The previously mapped critical habitat for AWS extended over most of the Hill Campus, contained within the Tilden-Briones and the Caldecott Tunnel Units.

A preliminary habitat assessment was conducted for the Hill Campus in 2000.⁷ The assessment describes the ecology of AWS, methodology used in mapping habitat suitability, and conclusions regarding probable occurrence in the Hill Campus. The study area encompassed all of the Hill Campus as well as a 3-acre portion of the Clark-Kerr Campus mapped as critical habitat, and specifically excluded much of the property within the boundaries at the Lawrence Berkeley National Laboratory.

While much of the upper watershed on the Hill Campus was considered to be suitable habitat for AWS, four areas were considered to be of little value to the conservation or recovery of the species. These consisted of: the lower portion of Strawberry Canyon south of Centennial Drive, which consists of primarily north-facing slopes dominated by closed-canopy tree cover; the area north of Centennial Drive and west of the Botanical Garden, which includes the Study Site S1; the area north of Lawrence Berkeley Laboratory which includes the Faculty Housing Sites H1 and H2, Lawrence Hall of Science, and the vicinity of the Silver Laboratory Addition and Mathematical Sciences Research Institute Addition; and the area above the Clark Kerr Campus.

TABLE 4.3-1

SPECIAL-STATUS PLANT AND ANIMAL SPECIES KNOWN OR SUSPECTED TO OCCUR ON THE HILL CAMPUS

Species	Status State/Federal/CNPS	Preferred Habitat	Possibility of Occurrence on Hill Campus
Plants			
Pallid manzanita <i>Arctostaphylos pallida</i>	FT/SE/1B	Broadleaved upland forest, chaparral, and open woods on siliceous shales of slopes and ridges in the Berkeley-Oakland Hills.	Not known but suitable habitat present.
Mt. Diablo fairy lantern <i>Calochortus pulchellus</i>	--/--/1B	Wooded slopes, chaparral, and valley and foothill grasslands.	Not known but suitable habitat present.
Western leatherwood <i>Dirca occidentalis</i>	--/--/1B	Moist, partially shaded slopes; broadleaved upland forests, closed-cone conifer forests, riparian habitats, and chaparrals.	Reported from Strawberry Canyon, Claremont Canyon, and Chaparral Peak.
Fragrant fritillary <i>Fritilaria liliacea</i>	--/--/1B	Coastal scrub, valley and foothill grassland, often on serpentine.	Reported from Tilden Park Country Club in 1938.
Diablo helianthella <i>Helianthella castanea</i>	--/--/1B	Open, grassy areas, often associated with broadleaved upland forests, riparian woodland, chaparral, and coastal scrub.	Reported from "Little Grizzly" of Berkeley Hills in 1933 and 1973.
Santa Cruz tarplant <i>Holocarpha macradenia</i>	FT/SE/1B	Coastal prairie and valley and foothill grasslands.	Planted on EBMUD/EBRPD watershed land. Not known but suitable habitat present.
Robust monardella <i>Monardella villosa ssp. gloluesa</i>	--/--/1B	Chaparral, woodland and coastal scrub.	Reported from Strawberry Canyon in 1937.
Mammals			
Ringtail <i>Bassariscus astutus</i>	--/SP	Chaparral and foothill canyons, preferring riparian areas.	Not known but suitable habitat present.
Berkeley kangaroo rat <i>Dipodemys heermanni berkeleyensis</i>	FSC/--	Open grassy hilltops and open areas in chaparral and woodland, with fine, deep soil for burrowing.	Reported from Strawberry Canyon in 1938 but not found since. Presumed extinct.
Mountain lion <i>Felis concolor</i>	--/SP	Forested and brush habitat, tends to avoid open areas.	Reported from Hills Campus and surrounding parkland and watershed land.
Birds			
White-tailed kite <i>Elanus leucurus</i>	--/SP	Open grasslands with trees and shrubs used for nesting.	Marginally suitable habitat present.

TABLE 4.3-1
SPECIAL-STATUS PLANT AND ANIMAL SPECIES KNOWN OR SUSPECTED TO OCCUR ON THE HILL CAMPUS

Species	Status State/Federal/CNPS	Preferred Habitat	Possibility of Occurrence on Hill Campus
Sharp-shinned hawk <i>Accipiter striatus</i>	--/CSC	Open deciduous woodlands, mixed or coniferous forests, and thickets.	Suitable foraging and nesting habitat present.
Cooper's hawk <i>Accipiter cooperii</i>	--/CSC	Forests or woodlands; prefers broadleaved trees in riparian areas for nesting.	Suitable foraging and nesting habitat present.
Ferruginous hawk <i>Buteo regalis</i>	--/CSC	Western plains and prairies.	Marginally suitable wintering habitat present.
Golden eagle <i>Aquila chrysaetos</i>	--/CSC, SP	Forages in open grasslands, nests on cliff ledges and trees in hilly areas.	Suitable foraging habitat present but not known to nest in proximity to Hill Campus.
Merlin <i>Falco columbrius</i>	--/CSC	Frequents coastlines, open grasslands, savannas, woodlands, lakes, and wetlands.	Suitable wintering habitat present.
American peregrine falcon <i>Falco peregrinus anatum</i>	Delisted/SE, SP	Riparian areas, open woodlands, coastal and inland wetlands.	Suitable foraging habitat present but nesting habitat absent.
Prairie falcon <i>Falco mexicanus</i>	--/CSC	Grasslands, savannas, rangeland, agricultural fields, and desert scrub areas.	Suitable foraging habitat present but nesting habitat absent.
California horned lark <i>Eremophila alpestris actia</i>	--/CSC	Fields and open grasslands.	Suitable foraging habitat present.
Loggerhead shrike <i>Lanius ludovicianus</i>	FSC/CSC	Open brushy areas with lookout perches.	Suitable foraging and nesting habitat present.
Yellow warbler <i>Dendroica petechia</i>	--/CSC	Frequents riparian zones, woodlands, and forests with a brushy understory during breeding season. Found in a variety of sparse to dense woodland and forest habitats during migration.	Suitable riparian nesting habitat present.
Reptiles			
California horned lizard <i>Phrynosoma caronatum frontale</i>	--/CSC	Variety of habitats, most common in lowlands along sandy washes with scattered low bushes. Requires open areas for sunning, bushes for cover, patches of loose soil for burial, and abundant supply of ants and other insects.	Suitable habitat present.

TABLE 4.3-1

SPECIAL-STATUS PLANT AND ANIMAL SPECIES KNOWN OR SUSPECTED TO OCCUR ON THE HILL CAMPUS

Species	Status State/Federal/CNPS	Preferred Habitat	Possibility of Occurrence on Hill Campus
Alameda whipsnake <i>Masticophis lateralis</i> <i>eryxanthus</i>	FT/ST	Restricted to valley-foothill hardwood habitat of the Coast Range. Prefers south-facing slopes and ravines where shrubs form a vegetative mosaic of woodland and grassland with available prey.	Known from Hill Campus. Formerly, USFWS designated critical habitat extended through much of Hill Campus. Under review.
Amphibians			
California red-legged frog <i>Rana aurora draytonii</i>	FT/CSC	Marshes, ponds, streams, lakes and reservoirs, prefers emergent vegetation for cover.	Historic occurrence throughout west slope of Berkeley Hills but no recent occurrences. Marginal habitat present.
Invertebrates			
Bridge's coast range shoulderband <i>Helminthoglypta nickliniana bridgesi</i>	FSC/--	Prefers rock piles, sometimes in grassland on open hillsides.	Reported from Berkeley Hills in 1950.

Source: Environmental Collaborative, 2003.

Status Explanations:

Federal

FE = Listed as endangered under the federal Endangered Species Act.
 FT = Listed as threatened under the federal Endangered Species Act.
 FSC = Federal Species of Concern.

State

SE = Listed as endangered under the California Endangered Species Act.
 ST = Listed as threatened under the California Endangered Species Act.

SP = Fully protected under CDFG Code.

CSC = Considered a California Special Concern species by CDFG.

California Native Plant Society

1B = List 1B species: rare, threatened, or endangered in California and elsewhere.

4 = List 4 species plants of limited distribution.

3 = List 3 species more information needed to determine status.

WETLANDS

Wetland resources on the Hill Campus consist of the main channels of Strawberry and Claremont Creeks, many of the tributary drainages, and scattered seeps and springs. The tributaries include both intermittent and ephemeral drainages where creek beds and banks are present. Wetlands include areas where emergent vegetation is present within the drainage, as well as active springs and seeps where surface water is sufficient to support hydrophytic vegetation. While most of the seeps and springs are associated with established drainage channels, there is a possibility that some may be hydrologically isolated, and therefore not regulated by the Corps. Isolated wetland seeps and springs would most likely still be regulated by the RWQCB under the provisions of Section 401 of the Clean Water Act and the Porter-Cologne Water Quality Control Act.

POTENTIAL DEVELOPMENT AREAS IN HILL CAMPUS

As shown in Figure 3.1-10, two locations have been identified as potential development areas in the Hill Campus. These consist of approximately 7.5 acres at the Faculty Housing Site H1 near the intersection of Grizzly Peak Boulevard and Centennial Drive, and 5.5 acres in the Upper Hill Terraces Parking between Lawrence Hall of Science and the Silver Laboratory Addition/Mathematical Sciences Research Institute Addition, Faculty Housing Site H2. These two potential development areas have undergone considerable alteration in the past, affecting existing vegetative cover and potential for occurrence of sensitive resources, as summarized below. The 2020 LRDP also identifies up to 100,000 GSF of net new academic and support space in the Hill Campus. This additional development may occur in any zone except the Ecological Study area or the Reserve Study Areas.

HOUSING SITE H1. This area has been only moderately altered by adjacent roadway improvements, but appears to lack sensitive habitat resources. Existing vegetation consists of scattered blue gum, planted redwood, Monterey pine, and other trees, and scattered native live oak and bay. Most of the trees are either non-native eucalyptus and planted ornamentals, or natives with trunks under 20 inches dbh. Groundcover is either absent where duff from the trees limits plant growth, or is dominated by non-native grassland species such as wild oat, filaree, thistles, and miner's lettuce. Two small swales occur at the northwestern edge of the area, but do not contain wetland vegetation or evidence of surface water flows. No evidence of any special-status plant species were observed on the site, but detailed surveys during the spring and summer months would be necessary to confirm absence of any less conspicuous species.

Wildlife species associated with this site are typical of grasslands and woodlots, primarily bird species such as scrub jay, Anna's hummingbird, and nuthatches, and small mammals such as Botta's pocket gopher and California vole. No evidence of raptor nesting or denning by larger mammal species was observed on the site. Although the site is located near the extensive open space lands of Tilden Regional Park to the north, it is not believed to function as an important wildlife movement corridor. Grizzly Peak Boulevard and Centennial Drive separate the site from the nearby open space lands, existing residential development occurs to the west, the Upper Hill Terraces Parking and Lawrence Hall of Science to the south, and the Silver Laboratory Addition to the southeast.

An updated habitat assessment for AWS prepared in 2002⁸ focused on the potential for occurrence of this species at three locations in the Hill Campus, the vicinity of the Chaparral Hill Reserve Study Area, at Housing Sites H1, and in the vicinity of Study Site

S1. The assessment provided conclusions on the habitat suitability and potential for occurrence of AWS at each location. The assessment concluded that no suitable habitat for AWS occurs at Housing Site H1 or immediate vicinity. Only the upper portion of this site, between Grizzly Peak Boulevard, Centennial Road, and Silver Laboratory Addition was contained within the previously mapped critical habitat for AWS.

HOUSING SITE H2. This area has been completely altered by construction of the existing terraced parking lot on the site. Most of the area consists of paved surfaces from parking, access roads, and sidewalks and stairways. Non-native grassland and ruderal species dominate most of the surrounding slopes, with a stand of blue gum occurring along Centennial Drive to the northeast and southeast of the lot. Much of the slope appears to be treated with herbicide, inhibiting the growth of non-native grasses such as wild oats, vetch, and thistles. Sapling oaks and other trees have been planted as part of landscape improvements, together with groundcover species such as mat manzanita and prostrate coyote brush. The site provides only limited foraging opportunities for bird species common in developed areas, and possibly for small mammals such as pocket gopher and California vole along the fringe of the lot. No wetlands, potential for occurrence of special-status species, wildlife movement corridors, or important biological resources occur on this site.

An additional habitat assessment for AWS prepared in 2001 focused on the potential for occurrence of this species at the Math Sciences Research Institute expansion site, just southeast of Housing Site H2. The assessment concluded that the proposed expansion would not have a significant impact on Alameda Whipsnake habitat, and Housing Site H2 is generally outside the limits of the previously mapped critical habitat for AWS.⁹

ADDITIONAL 100,000 GSF ACADEMIC AND SUPPORT SPACE. Future development associated with the additional 100,000 GSF of academic and support space may occur in any zone except the Ecological Study Area or the Reserve Study Areas. Based on a review of vegetative cover and other information on characteristics of the Hill Campus, this additional development could occur in a range of habitat types, depending on the specific location selected for improvements. As indicated in Figure 4.3-2, vegetative cover outside the Ecological Study Area and Reserve Study Areas consists of north coastal scrub, successional scrub, grassland, eucalyptus, oak woodland, and other non-native tree plantings.

Parts of this potential development area are already developed with roadways, parking lots, ornamental landscaping, and structures associated with research facilities such as the Botanical Garden and Lawrence Hall of Science, all of which would limit the likelihood that sensitive biological or wetland resources are present. However, a large part of this area remains undeveloped and could support occurrences of special-status species, wildlife movement corridors, wetlands, or other important biological resources. Strawberry Creek passes through the Botanical Garden, and several tributary drainages occur on the designated Research Area which may be considered wetlands.

OTHER LAND USE ZONES

The remaining land use zones addressed as part of the LRDP occur in urbanized areas with little or no remaining natural vegetation and limited wildlife habitat values. No sensitive natural communities, special-status species, wetlands or important wildlife move-

ment corridors occur in these zones. Given the absence of any sensitive biological or wetland resources, no additional discussion or analysis is provided for the other land use zones in this section of the EIR.

4.3.5 STANDARDS OF SIGNIFICANCE

The significance of the potential impacts of the 2020 LRDP and Tien Center on biological and wetland resources was determined based on the following standards:

Standard: Would the project conflict with any adopted Habitat Conservation Plan, Natural Communities Conservation Plan, or other approved local, regional, or state habitat conservation plan?

Standard: Would the project 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 CDFG or USFWS?

Standard: Would the project have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, or regulations, or by the CDFG or USFWS?

Standard: Would the project have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act through direct removal, filling, hydrological interruption, or other means?

Standard: Would the project 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?

Standard: Would the project conflict with any local policies or ordinances protecting biological resources?

4.3.6 POLICIES AND PROCEDURES GUIDING FUTURE PROJECTS

This section describes existing policies and procedures that would help to minimize biological resource impacts of development under the 2020 LRDP. It discusses both the policies in the 2020 LRDP itself and other University agreements affecting biological resources.

2020 LRDP

The provisions of the 2020 LRDP would eliminate or minimize the effect on biological resources by guiding the location, scale, form and design of individual projects implemented under the 2020 LRDP. While several of the Objectives described in Chapter 3.1 bear directly or indirectly on biological resources, three are particularly relevant:

- **Plan every new project as a model of resource conservation and environmental stewardship.**
- **Maintain and enhance the image and experience of the campus, and preserve our historic legacy of landscape and architecture.**
- **Maintain the Hill Campus as a natural resource for research, education, and recreation, with focused development on suitable sites.**

The 2020 LRDP includes a number of policies and procedures to guide individual project reviews in support of these Objectives. The Campus Park Framework and Guidelines in the 2020 LRDP include policies to preserve and protect significant Campus Park natural areas and open spaces, including the riparian habitats along Strawberry Creek; to implement an ongoing program of investment to restore and renew the Campus Park landscape; and to implement a program of strategic investment in new and enhanced Campus Park open spaces. The Campus Park Guidelines designate the riparian areas along the Creek, and the woodland areas adjacent to those riparian areas, as Natural Preserves into which no new buildings may intrude: the Natural Preserves incorporate the three currently designated Natural Areas.

The Hill Campus Framework in the 2020 LRDP includes policies to establish a management authority for the Ecological Study Area; to ensure that future management of, and investments in, the Ecological Study Area and the Botanical Garden are integrated and synergetic; to maintain the visual primacy of the natural landscape in the Hill Campus; and to manage the Hill Campus landscape to reduce fire risk and restore native vegetation patterns.

The proposed Ecological Study Area management authority would:

- maintain a registry of all instructional and research projects in the ESA,
- track external funding prospects for new research initiatives,
- implement strategies to improve coexistence of recreation, education, and research, and
- implement strategies for protection of sensitive natural areas from invasive plants, animals and human activities.

CAMPUS POLICIES AND PROCEDURES

STRAWBERRY CREEK MANAGEMENT PLAN

The Strawberry Creek Restoration Program began in 1987, in response to campus and community concerns over the deteriorated environmental quality of Strawberry Creek. The campus Office of Environmental Health and Safety (EH&S) sponsored a comprehensive study of the creek with the results of the study, completed by Robert Charbonneau, published in December 1987 as the "Strawberry Creek Management Plan" (SCMP).

The SCMP study began as a water quality management plan but ultimately expanded into a comprehensive study of the watershed with a focus on overall urban creek and riparian habitat preservation and restoration¹⁰. The SMCP provides recommendations for implementation of management strategies for point and non-point source pollution control, channel stabilization, aquatic and riparian habitat restoration and watershed management.

An advisory committee, the Strawberry Creek Environmental Quality Committee (SCEQC), consisting of faculty, staff from campus planning and operations departments, and students, was created to help direct restoration activities including erosion control and bank stabilization, sanitary engineering and point source investigations, public outreach and other activities.

Implementation of the SCMP from 1987 through the present successfully led to substantially improved overall water quality conditions, enhanced ecological integrity as measured by biological criteria (macroinvertebrates and fish), increased environmental education for students and the campus public, and stabilization of the most critical central campus and upper canyon erosion sites. It is an internationally recognized program.

Implementation of the SCMP continues and the SCEQC meets regularly. The SCMP is currently being updated to reflect substantial changes in water quality and changes in applicable regulatory law since 1987 and to revise restoration goals and objectives. While the plan still specifically excludes other campus creeks (i.e., Derby and Claremont), it has been developed cooperatively with input from faculty, EH&S scientists, a fire management planner, an environmental planner, and a grounds maintenance supervisor to provide holistic and comprehensive approaches to creek and watershed management.

The SCMP is being updated concurrently with the 2020 Hill Area Fire Fuel Management Plan and the 2020 LRDP to ensure a coordinated long-range approach to watershed management. Thus, all projects that may occur under the 2020 LRDP will be informed by three integrated policy and management tools to protect resources and beneficial uses, as well as by adjacent jurisdictions' creek and watershed programs and codes.

CAMPUS LANDSCAPE MASTER PLAN AND LANDSCAPE HERITAGE PLAN

The campus Landscape Master Plan (LMP)¹¹ is a comprehensive long-range plan that provides a broad vision for stewardship and enhancement of the natural areas and open spaces of the Campus Park. The LMP supplements the policies and guidelines of the 2020 LRDP with more specific guidance for the treatment of, and investment in, the Campus Park landscape.

The LMP vision is presented in 29 landscape initiatives, which focus on selected sites based on historical importance, resource preservation, areas of intensive use, and the potential to create places of interaction for the campus community. Goals and policies in the LMP address six campus-wide objectives: Educational Mission, Campus Image, Historic Continuity, Stewardship, Landscape Character, and Community. The LMP also characterizes use and perception of areas of the Campus Park, including Natural Areas, Glades, Classical Core, Areas of Interaction, Campus Greens, and Edges and Gateways.

The purpose of the Landscape Heritage Plan is to determine periods of significance and character-defining elements of the Campus Park classical core. This leads to development of a strategy for restoring the landscape of the classical core and for ensuring its continued enhancement. Following the completion of the Landscape Heritage Plan, the LMP will be supplemented with an implementation section of detailed Landscape Guidelines for the Campus Park. These Guidelines, like the LMP itself, will supplement the Campus Park Design Guidelines in the 2020 LRDP with more specific criteria for the natural and formal elements of the landscape.

CAMPUS SPECIMEN TREE PROGRAM

UC Berkeley has an existing campus program that it uses to guide the evaluation and designation of specimen trees. Other plants (shrubs, groundcover or grasses) which meet the criteria may also be considered as specimen flora. The Campus Landscape Architect makes the determination of status, using the following criteria: to be considered a specimen, the tree or plant should be in good health and not pose a hazard to pedestrian and automotive traffic, existing buildings or utilities, and should have one or more of the following qualities:

- **Aesthetics:** The tree is an integral part of an architectural theme, or plays an important role in framing or screening a building or other feature.
- **Historical:** The tree was planted as part of a memorial planting or is a particularly outstanding example of the original botanical garden plantings. The tree is identified by landmark status, named with a plaque, is identified as a contributing feature in an historic structures report and/or identified in the LHP as a character defining feature of the landscape.
- **Educational:** The tree represents a special taxonomic or morphological feature, is unique to the Campus or the San Francisco Bay Area, is a particularly outstanding example of California flora, is part of an experimental planting with a special landscape or agricultural value, or is regularly used by campus instructors as an example of the species.
- **Strawberry Creek:** Removal of the tree would significantly increase erosion potential, affect the natural species diversity of the Creek as a riparian corridor.
- **Natural Area:** The tree is located within either the Wickson, Grinnell or Goodspeed Natural Areas.¹²

Determination of specimen status may extend to a group of trees where individually a tree may not merit such status, but as a group or association the collective import is greater than the individual plants alone.

Under this program, the retention of existing specimen trees, shrubs and grass areas is a priority in the final design of proposed projects. Projects are reviewed with the UC Berkeley Design Review Committee to minimize impacts to specimens. Site preparation is conducted to minimize removal and/or damage of specimen trees or plant species to the full feasible extent. Sensitive construction practices are used to avoid possible damage to trees to be retained, including construction setbacks, installation of temporary construction fencing around individual trees to be preserved, and monitoring by a certified arborist of any required limb removal or disturbance within the dripline of trees to be retained. Grading, vegetation removal and replacement plans, where necessary, are coordinated with the Campus Landscape Architect. Specimens impacted are replaced by successful transplanting, or must be replaced by new planting at a ratio of 3 to 1 in closest available sizes. Landscaped areas are restored to the full feasible extent.¹³

4.3.7 2020 LRDP IMPACTS

This section describes the potential biological impacts of the 2020 LRDP, based on the Standards of Significance, whether they are significant or less than significant, and whether any significant impacts can be mitigated to less than significant levels.

EFFECTS FOUND NOT TO BE SIGNIFICANT

The Initial Study found that the 2020 LRDP would have no significant impact in regard to the following threshold:

Would the project conflict with any adopted Habitat Conservation Plan, Natural Communities Conservation Plan, or other approved local, regional, or state habitat conservation plan?

No local, regional, or state conservation plans have been approved which encompass the Campus Park or Hill Campus. No further analysis regarding this threshold and the 2020 LRDP is required.

It should be noted that the USFWS is currently in the process of reviewing a Draft Recovery Plan for Chaparral and Scrub Community Species East of San Francisco Bay, California. The draft Recovery Plan addresses six species including the federally threatened Alameda whipsnake and pallid manzanita, together with four species which are federally identified as Species of Concern, specifically the Contra Costa manzanita, Mt. Diablo Bird's-beak, and Mt. Diablo buckwheat, and Berkeley kangaroo rat (presumed extinct). The federal Endangered Species Act requires a recovery plans for listed species unless such a plan would not promote the conservation of a particular species.

Recovery plans describe actions considered necessary for the conservation of the species, establish criteria for downlisting or delisting listed species, and estimate time and cost for implementing recovery measures. As currently proposed, the Draft Recovery Plan extends into the upper watershed of the Hill Campus, and includes actions affecting existing and potential development, as well as vegetation management strategies. The Draft Recovery Plan emphasizes the use of fire as a method to facilitate ecosystem restoration and improved habitat quality for target plant and animal species.

UC Berkeley submitted comments on the Draft Recovery Plan, focusing on assumptions used in the draft plan and the risks associated with use of fire as a management tool. Key comments noted that: proposed mapping was originally developed as part of the rescinded Alameda Whipsnake Critical Habitat designation which does not use best available scientific data and includes areas where the species is not known to occur and is unlikely to colonize in the future; no evidence is presented that the four Species of Concern are known to occur or likely to colonize or migrate through the campus; the proposed breadth of the draft plan is not necessary to promote conservation of the named species; and the draft plan fails to consider the potential to impair public safety through fire risks or the economic impacts of implementation on the University's mission and resources.

The Final Recovery Plan has not been prepared, and it is uncertain whether it will encompass a portion of the Hill Campus if and when it is approved. Accordingly, no further analysis regarding this threshold is required or evaluated in this EIR section.

LESS THAN SIGNIFICANT IMPACTS

LRDP Impact BIO-1: New construction, land management and other 2020 LRDP activities would not have a substantial adverse effect on special-status species, or unique vegetation elements that contribute to the campus character.

No special-status plant species are suspected to occur on the Campus Park, and essential habitat for most special-status animal species, such as California red-legged frog, Alameda whipsnake, and steelhead is absent from the Campus Park. However, there is a remote possibility that one or more raptor species may establish nests in mature trees at UC Berkeley in the future. As noted previously, a pair of Cooper's hawks have recently nested in the Wickson Natural Area. Tree removal or construction in the immediate vicinity of a nest in active use could result in its abandonment, which would be a violation of the Migratory Bird Treaty Act and Fish and Game Code. Conducting a preconstruction survey would serve to avoid the potential loss of any active raptor nests. There is also a remote possibility that one or more species of special-status bat may occur in isolated building areas on the Campus Park. Although it is considered highly unlikely that any bat roosts are present, further evaluation of individual buildings as part of any future demolition or reuse would confirm absence of any bat roosting locations.

There is a greater potential for occurrence of special-status species in the Hill Campus, which is known to support AWS and contains suitable habitat for a number of other special-status animal and plant species. Detailed surveys would typically be required to confirm presence or absence of any populations of special-status species. Of the potential development areas in the Hill Campus, only the Faculty Housing Site H2 does not appear to have any potential for occurrence of special-status species. Past disturbance has eliminated the potential for occurrence of any special-status plant populations on this site, which is also outside the previously mapped critical habitat for AWS and does not contain essential habitat features for other special-status species.

The Faculty Housing Site H1 is also generally outside the previously mapped critical habitat for AWS. Although past disturbance limits the likelihood of occurrence of any special-status plant populations on Housing Site H1, detailed surveys would be necessary during the appropriate time of the year to confirm presence or absence. There is also a possibility that one or more raptor or other special-status bird species could establish nests in proposed development areas in the Hill Campus. Similarly, there is a remote possibility that one or more species of special-status bat utilize trees in proposed development areas where trees could be removed. Again, preconstruction surveys would be necessary to confirm proposed development or vegetation management would not adversely affect nesting birds or bat roosts.

The additional 100,000 GSF of academic and support space in the Hill Campus could be constructed in previously undeveloped areas. Although past disturbance limits the likelihood of occurrence of any special-status species in the Botanical Garden and designated Research areas of the Hill Campus, detailed surveys would be necessary during the appropriate time of the year to confirm presence or absence. Detailed surveys would also be necessary to confirm presence or absence of any jurisdictional wetlands, wildlife movement corridors, or other potentially sensitive biological resources.

Future development and land management practices would require removal of existing vegetation, which could include specimen trees and other unique vegetation. Coast live oak is relatively abundant in the Hill Campus, and both specimen and sapling trees occur throughout the Campus Park. Future construction projects and land management activities would avoid specimen live oaks, other native trees, and any mature ornamental plantings worthy of preservation to the full feasible extent. Sensitive construction and land management practices would also be used in the vicinity of significant vegetation to avoid possible damage to trees and landscaping to be retained.

Implementation of the best practices and mitigation measures described below would continue to ensure that special-status species and unique vegetation are adequately identified and protected, and potential impacts would remain *less than significant*.

LRDP Mitigation Measure BIO-1-a: UC Berkeley will, to the full feasible extent, avoid the disturbance or removal of nests of raptors and other special-status bird species when in active use. A pre-construction nesting survey for loggerhead shrike or raptors, covering a 100 yard perimeter of the project site, would be conducted during the months of March through July prior to commencement of any project that may impact suitable nesting habitat on the Campus Park and Hill Campus. The survey would be conducted by a qualified biologist no more than 30 days prior to initiation of disturbance to potential nesting habitat. In the Hill Campus, surveys would be conducted for new construction projects involving removal of trees and other natural vegetation. In the Campus Park, surveys would be conducted for construction projects involving removal of mature trees within 100 feet of a Natural Area, Strawberry Creek, and the Hill Campus. If any of these species are found within the survey area, grading and construction in the area would not commence, or would continue only after the nests are protected by an adequate setback approved by a qualified biologist. To the full feasible extent, the nest location would be preserved, and alteration would only be allowed if a qualified biologist verifies that birds have either not begun egg-laying and incubation, or that the juveniles from those nests are foraging independently and capable of survival. A pre-construction survey is not required if construction activities commence during the non-nesting season (August through February).

LRDP Mitigation Measure BIO-1-b: UC Berkeley will, to the full feasible extent, avoid the remote potential for direct mortality of special-status bats and destruction of maternal roosts. A preconstruction roosting survey for special-status bat species, covering the project site and any affected buildings, would be conducted during the months of March through August prior to commencement of any project that may impact suitable maternal roosting habitat on the Campus Park and Hill Campus. The survey would be conducted by a qualified biologist no more than 30 days prior to initiation of disturbance to potential roosting habitat. In the Hill Campus, surveys would be conducted for new construction projects prior to grading, vegetation removal, and remodel or demolition of buildings with isolated attics and other suitable roosting habitat. In the Campus Park, surveys would be conducted for construction projects prior to remodel or

demolition of buildings with isolated attics. If any maternal roosts are detected during the months of March through August, construction activities would not commence, or would continue only after the roost is protected by an adequate setback approved by a qualified biologist. To the full feasible extent, the maternal roost location would be preserved, and alteration would only be allowed if a qualified biologist verifies that bats have completed rearing young, that the juveniles are foraging independently and capable of survival, and bats have been subsequently passively excluded from the roost location. A pre-construction survey is not required if construction activities commence outside the maternal roosting season (September through February).

LRDP Mitigation Measure BIO-1-c: During planning and feasibility studies prior to development of specific projects or adoption of management plans in the Hill Campus, a habitat assessment would be conducted by a qualified biologist to assess any potential impacts on special-status species. Detailed surveys would be conducted during the appropriate season where necessary to confirm presence or absence of any special-status species. Where required to avoid a substantial adverse effect on such species, in consultation with the CDFG and the USFWS feasible changes to schedule, siting and design of projects or management plans would be developed and implemented.

Continuing Best Practice BIO-1-a: UC Berkeley will continue to implement the Campus Specimen Tree Program to reduce adverse effects to specimen trees and flora. Replacement landscaping will be provided where specimen resources are adversely affected, either through salvage and relocation of existing trees and shrubs or through new plantings of the same genetic strain, as directed by the Campus Landscape Architect.

Continuing Best Practice BIO-1-b: Implementation of the 2020 LRDP, particularly the Campus Park Guidelines, as well as the Landscape Master Plan and project-specific design guidelines, would provide for stewardship of existing landscaping, and use of replacement and expanded tree and shrub plantings to preserve and enhance the Campus Park landscape. Coast live oak and other native plantings would continue to be used in future landscaping, serving to partially replace any trees lost as a result of projects implemented under the 2020 LRDP.

Continuing Best Practice BIO-1-c: Because trees and other vegetation require routine maintenance, as trees age and become senescent, UC Berkeley would continue to undertake trimming, thinning, or removal, particularly if trees become a safety hazard. Vegetation in the Hill Campus requires continuing management for fire safety, habitat enhancement, and other objectives. This may include removal of mature trees such as native live oaks and non-native plantings of eucalyptus and pine.

LRDP Impact BIO-2: New construction, land management and other 2020 LRDP activities would be designed and implemented to avoid any substantial adverse effect on any riparian habitat or sensitive natural communities.

Sensitive natural communities in the Campus Park are limited to the remnant segments of riparian vegetation along Strawberry Creek. The Campus Park Guidelines designate the riparian areas along the streamcourse, and the woodland areas adjacent to those riparian areas, as Natural Preserves into which no new buildings may intrude. The Natural Preserves incorporate the three existing designated Natural Areas.

Sensitive natural communities in the Hill Campus include areas of well-developed riparian vegetation along Strawberry Creek and tributary drainages, freshwater seeps which also typically support riparian vegetation, and remnant stands of native grasslands. While the stands of oak woodland and scattered specimen native coast live oaks are not recognized as a sensitive natural community by the CNDDDB, they are of concern to the CDFG and should be protected and avoided. Any development or land management activities in the Hill Campus should identify, avoid, and enhance the remaining sensitive natural communities.

Implementation of the continuing best practices described below would ensure that sensitive natural communities are adequately identified and protected.

Continuing Best Practice BIO-2-a: Implementation of the 2020 LRDP, including provisions that ensure proposed projects on the Campus Park will be designed to avoid Natural Preserves and provide for protection and enhancement of riparian habitat along Strawberry Creek as prescribed in the Campus Park Design Guidelines, will avoid substantial adverse effect on riparian habitat or sensitive natural communities. The Natural Preserves are comprised of two subzones: the riparian areas along the streamcourse, and other rustic woodlands adjacent to these riparian areas. The riparian areas are dominated by native and naturalized plants forming dense woodlands along the streamcourse: their width may vary in response to local conditions, but in general should be at least 100', centered on the streamcourse. Management of the Natural Preserves will be based on ecological principles, including replacing invasive exotic plants with native plants suited to this biotic zone, replacing unhealthy plants and plants at the ends of their natural lives, and preserving and enhancing the habitat value of the zone., as prescribed in the 2020 LRDP.

Continuing Best Practice BIO-2-b: The Strawberry Creek Management Plan will continue to be revised and implemented, in consultation with CDFG, to include recommendations for habitat restoration and enhancement along specific segments of the creek on both the Campus Park and Hill Campus. This will include minimum development setbacks, targets on invasive species controls, appropriate native plantings, and in-channel habitat improvements such as retention of large woody debris and creation of a refugio and deep plunge pools where feasible.

Continuing Best Practice BIO-2-c: During planning and feasibility studies prior to development of specific projects or implementation of management plans in the Hill Campus, a habitat assessment will be conducted by a qualified biologist to identify and minimize potential impacts on riparian habitat, freshwater seeps, and native grassland sensitive natural communities. Detailed surveys will be conducted at appropriate times where necessary to confirm and map the extent of any sensitive natural communities. Where required to avoid a substantial adverse effect on such communities, in consultation with the CDFG, feasible changes to schedule, siting and design of projects or management plans will be developed and implemented.

LRDP Impact BIO-3: Construction, land management practices, and other 2020 LRDP activities would be designed and implemented to avoid any substantial adverse effect on jurisdictional wetlands.

Wetlands on the Campus Park are limited to the Strawberry Creek channel, which would generally be protected and enhanced in accordance with the provisions of the 2020 LRDP, the Strawberry Creek Management Plan, and the Landscape Master Plan. Any modifications to this feature would require authorization from the CDFG and Corps, which regulate projects to ensure no net loss of wetland functions or values.

Strawberry Creek and its tributary drainages form the principal jurisdictional wetlands subject to Section 404 of the Clean Water Act in the Hill Campus. However, there is also a potential for seeps and springs to occur in the Hill Campus, most of which are hydrologically connected to the creek and tributary channels and would be subject to regulation by the Corps. Any future development would require identification of potential jurisdictional wetlands. These areas would generally be protected, but authorization for some fill or disturbance may be necessary. Neither of the two identified potential development areas in the Hill Campus appear to contain potential jurisdictional wetlands. Wetlands, such as Strawberry Creek and tributary drainages, may also occur in the Reserve Study Areas and Botanical Garden where the additional 100,000 GSF of academic and support space have been proposed.

Continuing implementation of Continuing Best Practice BIO-2-c, above, and BIO-3, below would ensure that jurisdictional wetlands and waters are adequately identified and protected.

Continuing Best Practice BIO-3: Proposed projects on the Campus Park and Hill Campus will be designed to avoid designated jurisdictional wetlands and waters along the Strawberry Creek channel. As necessary, wetlands will be mapped and the extent of jurisdictional waters verified by the Corps during planning and feasibility studies prior to development of specific projects or implementation of management plans in the Hill Campus. When unavoidable, any modifications to Strawberry Creek and other jurisdictional waters will be coordinated with jurisdictional agencies, including the CDFG, Corps, and the RWQCB as necessary.

LRDP Impact BIO-4: Construction, land management practices, and other 2020 LRDP activities would be designed and implemented to avoid any substantial interference with the movement of any native resident or migratory fish or wildlife species, or with established wildlife corridors or native wildlife nursery sites.

Proposed development on the Campus Park and Hill Campus is not expected to interfere substantially with the movement of any resident or migratory wildlife, impede the use of important native wildlife corridors or nursery sites, or result in the destruction of sensitive wildlife habitat. Sensitive habitat features such as the Strawberry Creek corridor, areas of native vegetation, and specimen landscaping would generally be protected from future development and management activities. Protection of Strawberry Creek on the Campus Park and Hill Campus would serve to protect the major movement corridor for wildlife.

Proposed development would generally be contained within areas of limited habitat value, and would avoid sensitive habitat features such as Strawberry Creek, sensitive natural communities, and specimen trees. The Campus Park and Hill Campus Housing Sites H2 and H1 are of limited wildlife habitat value due to the extent of past disturbance, lack of protective cover, and intensity of human activity. Future development associated with the additional 100,000 GSF of academic and support space could affect opportunity for wildlife movement in the Hill Campus, depending on location and need for security fencing. Avoidance of sensitive habitat features and any essential habitat for special-status species would address potential impacts on sensitive wildlife habitat, and no additional mitigation would be required.

Existing fencing currently impedes and obstructs opportunities for movement in a number of locations in the Hill Campus. This includes the perimeter of the Botanical Garden and the Strawberry Recreation Center. While fencing is necessary for security purposes, it does interfere with wildlife movement opportunities. Any expansion of areas requiring controlled access and security would consider the affects of fencing on wildlife movement opportunities on the Hill Campus.

Implementation of the continuing best practices described below would ensure that opportunities for wildlife movement are adequately identified and protected, and potential impacts would be reduced to *less than significant* levels.

Continuing Best Practice BIO-4-a: Proposed projects in the Hill Campus will be designed to avoid obstructing important established wildlife corridors to the full feasible extent. Before any new fencing is installed for security purposes, UC Berkeley will consider the effect of such fencing on opportunities for wildlife movement, and will avoid new or expanded fencing which would obstruct important established movement corridors.

Continuing Best Practice BIO-4-b: During planning and feasibility studies prior to development of specific projects or implementation of management plans in the Hill Campus, a habitat assessment will be conducted by a qualified biologist to identify and minimize potential impacts on wildlife movement opportunities, including avoidance of new fencing across Strawberry Creek and tributary drainages.

LRDP Impact BIO-5: Construction, land management and other 2020 LRDP activities would not result in a significant environmental effect upon biological resources due to conflict with local ordinances.

Future development may require the removal of native coast live oak trees, which would be in conflict with the City of Berkeley's Coast Live Oak Tree Removal Ordinance (No. 6462-N.S.). The City of Berkeley's Coast Live Oak Tree Removal Ordinance is a moratorium on the removal of any coast live oak with a circumference of 18 inches for a single trunk or an aggregate circumference of 26 inches for a multi-trunk tree. The University is not subject to the requirements of the Coast Live Oak Tree Removal Ordinance, and authorization by the City of Berkeley would not be required for specific projects where tree removal is unavoidable; however, any removal of a protected coast live oak would be in conflict with the intent of this ordinance.

Coast live oak is relatively abundant in the Hill Campus, and both specimen and sapling trees occur on the Campus Park. As described in Continuing Best Practice BIO-1-a, above, future construction projects would avoid specimen plants, including live oaks, by implementing the Campus Specimen Tree Program. Sensitive practices would also be used in the vicinity of specimen vegetation to avoid possible damage to trees and landscaping to be retained. Coast live oak plantings would also continue to be used in future landscaping, serving to replace any trees lost as a result of development. Together these measures would serve to fully mitigate potential impacts of future construction on tree loss.

4.3.8 TIEN CENTER IMPACTS

This section describes the potential biological resources impacts of the Chang-Lin Tien Center for East Asian Studies, based on the Standards of Significance, whether they are significant or less than significant, and whether any significant impacts can be mitigated to less than significant levels.

EFFECTS FOUND NOT TO BE SIGNIFICANT

The Initial Study found that the Tien Center project would have no significant impacts in regard to the following thresholds:

Would the project have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, or regulations, or by the CDFG or USFWS?

Would the project have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act through direct removal, filling, hydrological interruption, or other means?

Would the project conflict with any adopted Habitat Conservation Plan, Natural Communities Conservation Plan, or other approved local, regional, or state habitat conservation plan?

No wetlands occur on the Tien Center site, and no potential impacts to such resources would therefore occur as a result of the project. No local, regional, or state conservation

plans have been approved which encompass the Campus Park. Therefore, no further analysis regarding these thresholds and the Tien Center project is required.

LESS THAN SIGNIFICANT IMPACTS

Tien Center Impact BIO-1: Development of the Tien Center would not substantially affect any sensitive natural community.

Most of the project site is currently covered with landscaping or paved surfaces, but the proposed project would also eliminate approximately 0.7 acres of oak woodland habitat. Trees would be retained along the northern and eastern edges of the new Phase I building. The proposed areas of landscaping, paved surfaces, and new structures would have little value as habitat for native plants and wildlife.

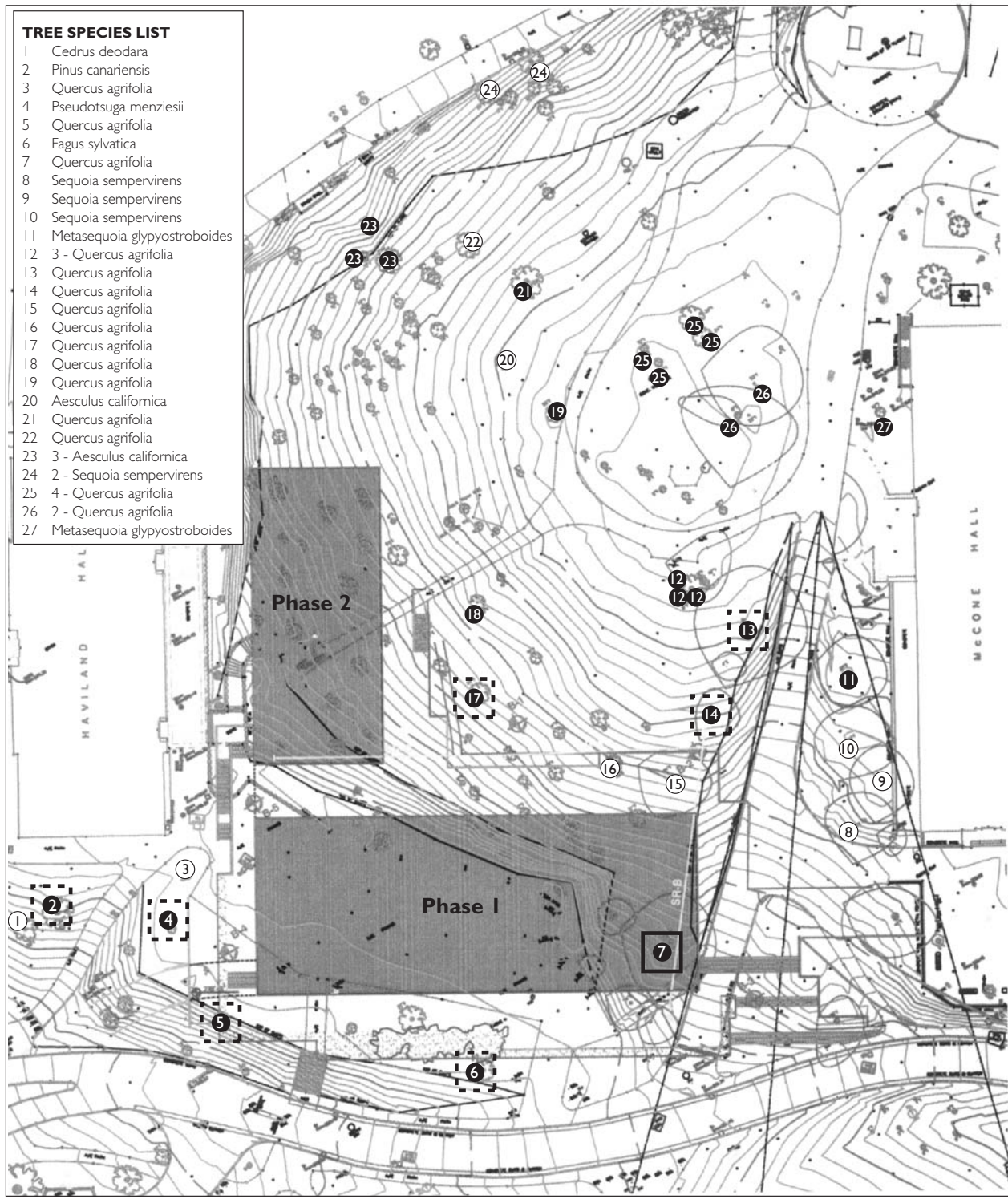
The oak woodland is not recognized as a sensitive natural community by the CDFG, but it is an unusual and valued habitat type in the relatively developed Campus Park. Some limited reduction in oak woodland habitat would occur along the south and west base of Observatory Hill, although the brow and crest of the hill would be retained intact. However, this area has little value as a sensitive natural community due to its intensively developed surroundings, the intensity of human activity, and its relative isolation.

Tien Center Impact BIO-2: Development of the Tien Center would not substantially interfere with movement of native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, nor impede the use of native wildlife nursery sites.

Wildlife associated with the site are relatively common in urban and landscaped habitats, and no important movement corridors would be affected since the site is bordered by buildings, parking lots or roads on all sides. The North Fork of Strawberry Creek passes approximately 50 feet to the north-west of the site, but is separated from the site by an existing road. The proposed project is not expected to have a significant impact on wildlife movement opportunities or impede the use of wildlife nurseries, and no mitigation is required.

Tien Center Impact BIO-3: The Tien Center project design would not create significant adverse impacts to special-status species, including raptors, or specimen trees or plants.

No significant adverse impacts on special-status species are anticipated as a result of project implementation. No special-status plant species are believed to occur on the Campus Park due to the extent of past development and on-going habitat modifications such as herbicide application. Although portions of Observatory Hill remain undeveloped, the area is not believed to support any populations of special-status plant species due to the extent of past disturbance and absence of any reported populations on the intensively studied Campus Park.



TREE SPECIES LIST

1	Cedrus deodara
2	Pinus canariensis
3	Quercus agrifolia
4	Pseudotsuga menziesii
5	Quercus agrifolia
6	Fagus sylvatica
7	Quercus agrifolia
8	Sequoia sempervirens
9	Sequoia sempervirens
10	Sequoia sempervirens
11	Metasequoia glyptostroboides
12	3 - Quercus agrifolia
13	Quercus agrifolia
14	Quercus agrifolia
15	Quercus agrifolia
16	Quercus agrifolia
17	Quercus agrifolia
18	Quercus agrifolia
19	Quercus agrifolia
20	Aesculus californica
21	Quercus agrifolia
22	Quercus agrifolia
23	3 - Aesculus californica
24	2 - Sequoia sempervirens
25	4 - Quercus agrifolia
26	2 - Quercus agrifolia
27	Metasequoia glyptostroboides

- Specimen trees
- Significant tree desirable to retain
- Tree to be removed will be replaced with a new tree on Observatory Hill
- ⋯ The current plan is to retain - the tree will be protected during construction with fencing

FIGURE 4.3-3
TIEN CENTER TREES

Similarly, no special-status animal species are suspected to occur in the vicinity of the Tien Center site. However, there is a remote possibility that one or more species of raptor may establish a nest in the oaks on the site prior to construction. Implementation of LRDP Mitigation Measure BIO-1-a, described above, would ensure against the inadvertent loss of raptors or roosting special-status species bats. Potentially suitable roosting habitat by special-status bat species would not be affected by the project. Therefore, no impact to raptors or special-status bats are anticipated as a result of the development of the Tien Center.

Proposed development of the Tien Center would require the removal of at least one specimen tree and could affect other significant trees. In accordance with campus best practices, the Tien Center site and vicinity were surveyed by the Campus Landscape Architect, most recently in February 2004. Thirty-six trees were identified as either specimen trees, or significant trees that would preferably be retained. Of these specimen trees, only one would necessarily require removal to accommodate the project and would be replaced with a new tree on Observatory Hill. Two other specimen trees occur within a few feet of the proposed project and two other live oaks occur within the possible limits of grading for the project. See Figure 4.3-3 for the location of the trees.

The siting of Phase 1 improvements reflects the objectives to respect and enhance the formal spatial relationships of the classical core, and to minimize the need to remove any large specimen oaks: the siting of Phase 2 and other project components of the Tien Center will reflect the same objectives, in accordance with the Campus Specimen Tree Program. Sensitive construction practices would be used to avoid possible damage to trees to be retained. This would include provisions for construction setbacks and disturbance to the root zone of trees to be retained, installation of temporary construction fencing around individual trees and woodland areas to be preserved, and monitoring by a certified arborist of any required limb removal or disturbance within the dripline of trees to be retained. Coast Live Oak plantings would also be provided as part of project landscaping, serving to partially replace trees lost as a result of development. Together these measures would serve to fully mitigate potential impacts of the project on tree loss to a *less than significant* level.

4.3.9 CUMULATIVE IMPACTS

This section evaluates whether the 2020 LRDP, in combination with other University and non-University projects which are reasonably foreseeable, would result in significant cumulative impacts in regard to biology.

This analysis considers cumulative growth as represented by the implementation of municipal general plans, implementation of the proposed Lawrence Berkeley National Laboratory 2004 LRDP, the proposed redevelopment of University Village Albany, the draft Southside Plan, the AC Transit Major Investment Study, and implementation of the 2020 LRDP, as described in 4.0.5. The analysis also includes growth anticipated by the City of Berkeley General Plan EIR and by previously certified UC Berkeley EIRs, including EIRs for the Northeast Quadrant Science and Safety Projects (SCH 2001022038), Seismic Replacement Building 1 (SCH 99122065), and the Underhill Area Projects (SCH 99042051).

The geographic context for the analysis of cumulative impacts to biological resources includes the City of Berkeley and the areas of the City of Oakland within the scope of the 2020 LRDP. All the projects implemented under the 2020 LRDP or the Lawrence Berkeley National Laboratory LRDP would be located within this area.

The lands to the south, north and west of the Campus Park are extensively developed with urban residential, commercial, and institutional uses: in general, sensitive vegetation and wildlife resources are absent in these areas. The same is true for the LRDP Housing Zone. The eastern edge of the Southside area, along the upper slopes of the Clark Kerr Campus and Smyth-Fernwald, does contain areas of undeveloped habitat, including native woodland and grassland, and remnants of riparian habitat along open segments of creek channels. However, no construction projects within this area are currently anticipated within the time horizon of the 2020 LRDP. This analysis of cumulative impacts, therefore, is focused on potential impacts in the Hill Campus and on the Lawrence Berkeley National Laboratory site.

Given the localized nature of impacts under the Standards of Cumulative Significance, below, any potential cumulative impacts are presumed to occur within this geographic context. The only effects that may occur outside this area would be private-sector residential or other projects on previously undeveloped sites indirectly induced by the aforementioned projects: for example, housing to accommodate new employees at UC Berkeley or Lawrence Berkeley National Laboratory. However, any such projects would be governed by local, state and federal laws to protect biological resources from significant adverse impacts.

While the proposed redevelopment of University Village Albany may, in combination with other nearby projects, contribute to short-term cumulative impacts on Codornices Creek, these impacts would be mitigated by measures prescribed in the UVA Draft EIR. While the proposed replacement of agricultural fields by playfields and hardscape would reduce urban wildlife habitat, due to the limited size, isolation and urban environs of the fields, this was not found to be a considerable contribution to cumulative habitat loss.¹⁴

The significance of the potential cumulative impacts was determined based on the following standards, which are identical to those presented in section 4.3.5.

Standard: *Would the project 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 CDFG or USFWS?*

Standard: *Would the project have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, or regulations, or by the CDFG or USFWS?*

Standard: *Would the project have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act through direct removal, filling, hydrological interruption, or other means?*

Standard: *Would the project 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?*

Standard: *Would the project conflict with any local policies or ordinances protecting biological resources?*

The one other standard listed in 4.3.5, related to conflicts with adopted Habitat Conservation Plans, was determined in the Initial Study to have no potential for environmental impact due to the 2020 LRDP, and is not considered further in this section.

The analysis above in section 4.3.7 found impacts to be *less than significant* for the 2020 LRDP. The question posed in this section is twofold:

- Is the potential *cumulative* impact of the 2020 LRDP *and* other reasonably foreseeable projects under these standards significant?
- Is the contribution of the 2020 LRDP to these impacts cumulatively considerable?

Cumulative Impact BIO-1: The 2020 LRDP, in combination with other reasonably foreseeable projects, would not have a substantial adverse affect upon special-status species. The cumulative impact would be *less than significant*.

The Lawrence Berkeley National Laboratory is contiguous with the UC Berkeley Hill Campus. LBNL's 2004 LRDP would increase its on-site population by 1,200, or 28 percent, and on-site building space by 800,000 gsf, or 45 percent. Potential impacts to special-status species are to be analyzed in the EIR for the Lawrence Berkeley National Laboratory 2004 LRDP.¹⁵ While the previously mapped critical habitat area for the Alameda Whipsnake encompassed a substantial portion of the eastern LBNL site, the LBNL 2004 LRDP is expected to identify special habitat protection areas to reduce potential impacts to special status species.¹⁶

Adverse effects to special-status species can combine to create a significant impact even when the effects of individual projects are not significant in themselves. The overall cumulative effect of development is dependent on the degree to which significant resources are protected or mitigated as part of site-specific developments. This includes protection of essential habitat for special-status plant or animal species. Given best practices and mitigation measures to be employed in implementing the 2020 LRDP; given protections of federal, state and local law and regulation that apply to private developers in the geographic context; and given protection areas anticipated under the LBNL 2004 LRDP, the cumulative impact to special status species is expected to be *less than significant*.

Cumulative Impact BIO-2: The 2020 LRDP, in combination with other reasonably foreseeable projects, would not have a substantial adverse affect upon sensitive natural communities, jurisdictional wetlands, wildlife corridors and movement opportunities, and wildlife nursery sites. The cumulative impact would be *less than significant*.

Some limited development under the 2020 LRDP could occur in areas of the Hill Campus upland from Lawrence Berkeley National Laboratory; where adverse effects could combine with similar effects due to development under the LBNL 2004 LRDP. Sensitive natural communities in the Hill Campus and in the area of the LBNL 2004 LRDP include areas of well-developed riparian vegetation, freshwater seeps, and remnant stands of native grasslands. Proposed 2020 LRDP development would generally be contained within areas of limited habitat value, and would avoid sensitive habitat features such as Strawberry Creek, sensitive natural communities, and specimen trees.

The overall cumulative effect of development is dependent on the degree to which significant resources are protected or mitigated as part of site-specific developments. This includes preservation of areas of sensitive natural communities such as riparian woodland, riparian scrub, and native grasslands, protection of essential habitat for special-status plant or animal species, and avoidance and enhancement of wetlands. Given best practices and mitigation measures to be employed in implementing the 2020 LRDP; given protections of federal, state and local law and regulation that apply to private developers in the geographic context; and given protection areas anticipated under the LBNL 2004 LRDP, the cumulative impact upon sensitive natural communities, jurisdictional wetlands, wildlife corridors and movement opportunities, and wildlife nursery sites is expected to be *less than significant*.

4.3.10 REFERENCES

- ¹ UC Berkeley, *Long Range Development Plan Draft Environmental Impact Report*, January 1990, pages 4.4-1 through 4.4-26.
- ² Special-status species include: 1) listed (rare, threatened, or endangered) and candidate species for listing by the CDFG, 2) listed (threatened or endangered) and candidate species for listing by the USFWS, 3) Species considered to be rare or endangered under the conditions of Section 15380 of the CEQA Guidelines, such as certain of those species identified on lists 1A, 1B, and 2 in the *Inventory of Rare and Endangered Plants of California* by the California Native Plant Society (CNPS), and 4) possibly other species which are considered sensitive or of special concern due to limited distribution or lack of adequate information to permit listing or rejection for state or federal status, such as those identified as “California Special Concern” (CSC) species by the CDFG. California Special Concern species have no legal protective status under the California Endangered Species Act but are of concern to the CDFG because of severe decline in breeding populations in California. Source: Environmental Collaborative
- ³ The federal Endangered Species Act (FESA) of 1973 declares that all federal departments and agencies shall utilize their authority to conserve endangered and threatened plant and animal taxa. The California Endangered Species Act (CESA) of 1984 parallels the policies of FESA and pertains to native California species. Source: Environmental Collaborative.
- ⁴ “Take” as defined by the FESA means “to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect” a threatened or endangered species. “Harm” is further defined by the USFWS to include the killing or harming of wildlife due to significant obstruction of essential behavior patterns (i.e., breeding, feeding, or sheltering) through significant habitat modification or degradation. The CDFG also considers the loss of listed species habitat as “take”, although this policy lacks statutory authority and case law support under the CESA.
Two sections of FESA contain provisions which allow or permit “incidental take.” Section 10(a) provides a method by which a state or private action which would result in “take” may be permitted. The applicant must provide the USFWS with an acceptable conservation plan and publish notification for a permit in the Federal Register. Section 7 pertains to a federal agency which proposes to

conduct an action which may result in “take,” requiring consultation with USFWS and possible issuance of a jeopardy decision. Under the CESA, “take” can be permitted under Section 2081 of the Fish and Game Code. The applicant must enter into a habitat management agreement with the CDFG, which defines the permitted activities and provides adequate mitigation. Source: Environmental Collaborative.

- ⁵Charbonneau, Robert B., *Strawberry Creek Management Plan*, prepared for the Office of Environmental Health and Safety, University of California at Berkeley, December 1987.
- ⁶Critical habitat is a term used by the USFWS in identifying and designating a specific geographic area as lands which were part of the historic distribution of the AWS and which may continue to provide an important function as essential occupied habitat; may possibly serve as movement corridors that would allow for dispersal and re-establishment; or areas that may be suitable for future habitat restoration and re-introduction of the species where it is no longer found. The critical habitat designation does not necessarily mean that either individuals or suitable habitat for the species is present on a particular site. Projects requiring a federal permit or authorization (such as a permit from the Corps for proposed filling of wetlands) receive additional scrutiny from the USFWS when located within critical habitat for a listed species. Source: Environmental Collaborative.
- ⁷Swaim Biological Consulting, *Preliminary Alameda Whipsnake Habitat Assessment, University of California Berkeley Property, Alameda and Contra Costa Counties, California*, prepared for Capital Projects, Physical and Environmental Planning, July 24, 2000.
- ⁸Swaim Biological Consulting, *Habitat Assessment for the Alameda Whipsnake, Masticophis lateralis euryxanthus, at Several Locations Within the “Hill Area” of the University of California, Berkeley, Alameda County, California*, prepared for Capital Projects, Physical & Environmental Planning, May 20, 2002.
- ⁹Swaim Biological Consulting, *Habitat Assessment for the Alameda Whipsnake, Masticophis lateralis euryxanthus, at the Proposed Math Sciences Research Institute Building Expansion Site*, University of California Berkeley, Livermore CA December 6, 2001.
- ¹⁰UC Berkeley, *Long Range Development Plan Draft Environmental Impact Report*, January 1990, page 4.8-16.
- ¹¹UC Berkeley, *Landscape Master Plan*, February 2004.
- ¹²UC Berkeley, *Hearst Memorial Mining Building Seismic and Program Improvements Draft EIR*, December 1996, page 6-5.
- ¹³UC Berkeley, *Long Range Development Plan Draft Environmental Impact Report*, January 1990, Mitigation Measures 4.4-1(a) through (d), page 4.4-19; and revised March 2004 by CLA Horner.
- ¹⁴UC Berkeley, *Subsequent Focused Draft EIR for the University Village & Albany/Northwest Berkeley Properties Master Plan Amendments*, January 30 2004, pages 80-84.
- ¹⁵Lawrence Berkeley National Laboratory, *Revised Notice of Preparation, Draft Environmental Impact Report*, October 28 2003, Checklist pages 20-21.
- ¹⁶Lawrence Berkeley National Laboratory, *Revised Notice of Preparation, Draft Environmental Impact Report*, October 28 2003, Project Description page 9.

4.4 CULTURAL RESOURCES

This chapter addresses historic buildings, features, and landscapes, and archaeological and paleontological resources in the study area for the 2020 LRDP and the Tien Center, and evaluates the potential effects of the components of the 2020 LRDP on these resources.

During the scoping period for this EIR, questions were received about the methodology for determining historic significance and cumulative impacts on cultural resources. Various methodologies were suggested and considered during the preparation of this chapter.

4.4.1 ANALYTICAL METHODS

HISTORICAL RESOURCES

To establish baseline conditions, the listings of historical resources in this chapter were drawn from the National Register of Historic Places, the State Historic Resources Inventory (State Inventory) compiled by the Northwest Information Center at Sonoma State University, the Physical and Environmental Planning unit in Facilities Services at UC Berkeley, and registers of the cities of Berkeley and Oakland. Federal, state and local land use plans and ordinances relevant to historic resources were reviewed and are summarized in Sections 4.4.2 and 4.4.3. 2020 LRDP program and specific Tien Center impacts were then evaluated, including the adequacy of existing programs and proposed 2020 LRDP policies intended to protect and enhance cultural resources.

ARCHAEOLOGICAL AND PALEONTOLOGICAL RESOURCES

Data on archaeological and paleontological resources used in the preparation of this chapter were obtained from several sources, particularly the 1990 LRDP EIR, the Northwest Information Center and staff of the UC Museum of Paleontology. Previous EIRs prepared for UC Berkeley projects, the City of Berkeley General Plan EIR, and the Oakland Land Use and Transportation Element EIR were also reviewed. Federal, state and local land use plans and ordinances applicable to archaeological and paleontological resources were reviewed and are summarized in Sections 4.4.2 and 4.4.3.

4.4.2 REGULATORY FRAMEWORK

FEDERAL

NATIONAL HISTORIC PRESERVATION ACT OF 1966

The National Historic Preservation Act of 1966 (NHPA) is the most influential federal law dealing with historic preservation. Numerous other federal statutes are also relevant to historic properties.

NATIONAL REGISTER. The NHPA authorized the Secretary of the Interior to maintain and expand a National Register of Historic Places. Districts, sites, buildings, structures, and objects are eligible for listing in the Register. Nominations are listed if they are significant in American history, architecture, archaeology, engineering, and culture at the national, state or local level. The National Register is administered by the National Park Service.

Listing in the National Register provides recognition of a significant property, consideration in the planning for federal or federally assisted projects, eligibility for federal tax benefits, and qualification for federal assistance. The National Register is influential beyond its statutory role because it established uniform standards of documentation and

evaluation. Projects involving properties listed in the National Register must be evaluated under CEQA.

SECRETARY OF THE INTERIOR'S STANDARDS FOR REHABILITATION AND GUIDELINES FOR REHABILITATING HISTORIC BUILDINGS. To guide preservation efforts of federal agencies, the Secretary of the Interior has developed "Standards for Rehabilitation and Guidelines for Rehabilitating Historic Buildings". The Secretary of the Interior's Standards are codified in 36 CFR, part 67. "Rehabilitation" is defined as "the process of returning a property to a state of utility, through repair or alteration, which makes possible an efficient contemporary use while preserving those portions and features of the property which are significant to its historic, architectural, and cultural values." The Secretary of the Interior's Standards have been widely used over the years to guide federal agencies in carrying out their historic preservation responsibilities, and by state and local officials in reviewing both federal and non-federal rehabilitation proposals. The State Historic Preservation Officer is responsible for reviewing and interpreting the Secretary of the Interior's Standards for projects in California.

STATE

CALIFORNIA ENVIRONMENTAL QUALITY ACT

The California Environmental Quality Act (CEQA) requires that project impacts to historical resources be analyzed. This EIR is being prepared to provide such analysis for the 2020 LRDP. CEQA consists of Sections 21000 through 21177 of the Public Resources Code Division 13. The Guidelines for CEQA consist of Sections 15000 through 15387 of the California Code of Regulations, Title 14, Division 6, Chapter 3.

HISTORICAL RESOURCES. CEQA provisions codified in Public Resources Code Section 21084.1 define a "historical resource" as a resource listed in, or determined to be eligible for listing in, the California Register of Historical Resources (CRHR). Resources included in a local register, or deemed significant pursuant to criteria established in Public Resources Code Section 5024.1(g), are also presumed historically or culturally significant, unless a preponderance of evidence supports a contrary finding. A lead agency may also make its own determination of significance for unlisted resources.

In accordance with Public Resources Code Section 5024.1(c), an historical resource may be eligible for inclusion in the CRHR if it:

- Is associated with events that have made a significant contribution to the broad patterns of California's history and cultural heritage,
- Is associated with the lives of persons important in our past,
- 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, or
- Has yielded, or may be likely to yield, information important in prehistory or history.

ARCHAEOLOGICAL RESOURCES. CEQA distinguishes between two classes of archaeological resources: archaeological sites that meet the definition of a historical resource as described above, and "unique archaeological resources." Section 21083.2(g) defines "unique archaeological resources" as "an archaeological artifact, object, or site about which it can be clearly demonstrated that, without merely adding to the current body of knowledge, there is a high probability that it meets any of the following criteria:

- Contains information needed to answer important scientific research questions and that there is a demonstrable public interest in that information,
- Has a special and particular quality such as being the oldest of its type or the best available example of its type, or
- Is directly associated with a scientifically recognized important prehistoric or historic event or person.”

PALEONTOLOGICAL RESOURCES. Appendix G of the CEQA Guidelines asks whether a project would “directly or indirectly destroy a unique paleontological resource or site or unique geologic feature.” CEQA does not define what is “a unique paleontological resource or site.”

CALIFORNIA PUBLIC RESOURCES CODE, DIVISION 5: PARKS AND MONUMENTS; CHAPTER I: STATE PARKS AND MONUMENTS, ARTICLE 2: HISTORICAL RESOURCES, SECTION 5024

Section 5024 of the California Public Resources Code (along with PRC 5027 and Executive Orders B-64-80, W-26-92) is broadly similar to provisions of the National Historic Preservation Act. It requires state agencies “to preserve and maintain, when prudent and feasible” properties which are eligible for the National Register and to provide the State Historic Preservation Officer (SHPO) with an inventory of such structures which are more than 50 years old. The SHPO is required to work with agencies to maintain a master list of state-owned historic structures. Agencies must submit documentation of projects which could affect these buildings to the SHPO for comment. The SHPO must also be made aware of any proposed actions that may transfer, relocate, or demolish an historic resource. Agencies are required to incorporate reasonable measures to eliminate or mitigate any adverse effects on historic resources.

CALIFORNIA PUBLIC RESOURCES CODE, DIVISION 5: PARKS AND MONUMENTS, CHAPTER I.7: ARCHAEOLOGICAL, PALEONTOLOGICAL AND HISTORICAL SITES, SECTION 5097

Public Resources Code 5097 specifies the procedures to be followed in the event of the unexpected discovery of human remains on nonfederal land. The disposition of Native American burials falls within the jurisdiction of the Native American Heritage Commission.

Section 5097.5 of the Code states the following:

“No person shall knowingly and willfully excavate upon, or remove, destroy, injure or deface any historic or prehistoric ruins, burial grounds, archaeological or vertebrate paleontological site, including fossilized footprints, inscriptions made by human agency, or any other archaeological, paleontological or historical feature, situated on public lands, except with the express permission of the public agency having jurisdiction over such lands. Violation of this section is a misdemeanor.”

As used in this section, “public lands” means lands owned by, or under the jurisdiction of, the state, or any city, county, district, authority, or public corporation, or any agency thereof. Consequently, the University of California is required to comply with PRC 5097.5 for its activities.¹

CALIFORNIA HEALTH AND SAFETY CODE, DIVISION 7: DEAD BODIES, CHAPTER 2: GENERAL PROVISIONS, SECTION 7052 AND 7050.5

Section 7052 of the Health and Safety Code states that the disturbance of Indian cemeteries is a felony. Section 7050.5 requires that construction or excavation be stopped in the vicinity of discovered human remains until the coroner can determine whether the remains are those of a Native American. If determined to be Native American, the coroner must contact the California Native American Heritage Commission.²

CALIFORNIA NATIVE AMERICAN HISTORICAL, CULTURAL AND SACRED SITES ACT

The California Native American Historical, Cultural and Sacred Sites Act applies to both state and private lands. The Act requires that upon discovery of human remains, that activity cease and that the county coroner be notified. If the remains are of a Native American, the coroner must notify the Native American Heritage Commission (NAHC). The NAHC then notifies the most likely descendants. The Act stipulates the procedures the descendants may follow for treating or disposing of the remains and associated grave goods.³

4.4.3 LOCAL PLANS AND POLICIES

Although the University is constitutionally exempt from local regulations when using its property in furtherance of its educational purposes, it is University policy to evaluate proposed projects for consistency with local plans and policies. Therefore, this section outlines the plans and policy goals of the cities of Berkeley and Oakland related to cultural resources.

CITY OF BERKELEY

The City of Berkeley implements controls over the design and extent of local development through land use zoning, master plans, and city ordinances.

BERKELEY GENERAL PLAN

The Berkeley General Plan provides a comprehensive and consistent set of policies designed to guide the development and preservation of the city. The General Plan includes an Urban Design and Preservation Element, the goal of which is to “protect and enhance Berkeley’s special built environment and cultural heritage by carefully conserving the numerous existing good buildings, areas, and other features and ensuring that new elements are so located and designed as to respect and strengthen the whole.”⁴

The element traces the history of Berkeley’s neighborhoods and architecture and discusses major preservation measures in previous plans and ordinances. The element states that “preservation and good design” offer two types of benefits: economic (including neighborhood and district stability, cost and time savings over new construction, conservation of resources, increased opportunities for small businesses, and attracting residents and business activity) and community identity (beauty, continuity, and understanding of history).

The element calls for protecting existing resources, including historic buildings, districts, and landscapes, and it states that new construction should be designed so that it not only “complements and enhances the old, but that it also makes its own distinctive contribution to the built and natural environments.” The Urban Design and Preservation

Element includes 39 policies and actions which spell out how the city should survey, inventory, regulate, and promote historic structures, sites, districts, and neighborhoods.

FINDINGS OF THE BERKELEY GENERAL PLAN EIR

The Berkeley General Plan EIR found that implementation of the General Plan would not be expected to result in environmental impacts in the area of cultural resources, and that implementation of some policies would benefit this resource area. The EIR further found a “high potential for Native American cultural resources exists within the city limits.” An EIR mitigation measure requires the city to establish standard conditions of approval and criteria for determining which discretionary projects require further information about potential archaeological impacts.

The EIR also stated the General Plan provisions for increased residential development in the Downtown in association with the University and along transit corridors could have the potential to encourage demolition of historic resources in these areas, but due to city mechanisms for designating and protecting historic structures, and to the role of the Landmarks Commission in reviewing demolition permits for non-residential structures more than 40 years old, the increased development would not cause an impact which would require mitigation.⁵ The EIR concluded that implementation of the General Plan would not result in any significant impacts to cultural and historic resources. It further stated that “Proposed new development would not contribute to any cumulative regional loss of historic resources”⁶ given state-mandated mitigations and policies.

LANDMARKS PRESERVATION ORDINANCE

Berkeley also has a Landmarks Preservation Ordinance, adopted in 1974, that requires the city to establish a list of potential buildings that should be considered for landmark, historic district, or structure of merit status. The ordinance outlines procedures for designating properties to landmark status and review procedures for physical changes to landmark buildings. A City Council-appointed Landmarks Preservation Commission and city staff administer the ordinance. Buildings designated as landmarks or as structures of merit must meet criteria for consideration set forth in the ordinance. The Landmark Preservation Ordinance codifies policies stipulated by the city General Plan to preserve and enhance historic buildings.

The criteria used in evaluation of buildings afford three levels of designation for historic buildings, including properties of exceptional significance (landmarks); structures of merit; and properties that do not meet landmark criteria but are worthy of preservation as part of a neighborhood, block, or street front. The lists in this chapter include specific properties on and off the UC Berkeley campus which have been listed as City of Berkeley landmarks.

CITY OF OAKLAND

The City of Oakland regulates the treatment of historic resources through its planning and zoning regulations. The Oakland General Plan, updated in 1998, lays out the goals and policies for development in the city, implemented through the planning and zoning regulations in the Oakland Planning Code. The planning and zoning regulations were under revision in November 2003.⁷

Development in the City of Oakland is administered by the Community and Economic Development Agency under the direction of the City Planning Commission, the Mayor and the City Council. The Landmarks Preservation Advisory Board plays a special role in regulation of historic properties. The Landmarks Board, appointed by the Mayor and confirmed by the City Council, has seven members, including at least one architect, one landscape architect or city planner, one person with a background in Oakland history or architectural history, and one real estate expert.

OAKLAND GENERAL PLAN

The Oakland General Plan includes an extensive Historic Preservation Element. The goals of the preservation element are to “use historic preservation to foster economic vitality and quality of life” and to “prevent unnecessary destruction of properties of special historical, cultural, and aesthetic value.”

The Historic Preservation Element includes provisions governing the treatment of two classes of resources: Designated Historic Properties and Potential Designated Historic Properties. There are about 130 officially designated individual city landmark properties and six districts, in addition to 40 individual properties and one district on the National Register. Local landmarks are designated after hearings by the Landmarks Board, the Planning Commission and the City Council.

A windshield survey of the city, completed in 1997, and the more detailed Oakland Cultural Heritage Survey, which covered fewer resources but in far greater detail, greatly augment the scope of the local and national landmark registers. Both surveys rate individual buildings (from A to F, with A to D having decreasing levels of historical significance and E and F having no established significance) and districts (with 1 indicating an area eligible to the National Register as a district, 2 indicating a zone of local significance, and 3 indicating no historic district exists). Buildings rated C or higher, and properties which contribute to districts rated 1 or 2, are considered Potential Designated Historic Properties. Buildings rated A or B, and districts rated 1, are treated by the city as historic resources under CEQA.

The Historic Preservation Element includes a range of incentives for preserving Designated Historic Properties, including a wider range of permitted uses than for other properties. It also requires design review by the Landmarks Preservation Advisory Board for exterior changes, and restrictions on demolition or alterations. For Potential Designated Historic Properties, the Element provides review and possible postponement for demolition, design review, and potential reclassification as Designated Historic Properties. There are also a variety of preservation incentives for potential historic properties.

4.4.4 EXISTING SETTING

HISTORICAL RESOURCES

In this EIR, the numerous historical resources located within the geographic scope of the 2020 LRDP are divided into two separate categories: Primary Historical Resources and Secondary Historical Resources. Primary Historical Resources include those listed on the California Register of Historical Resources. Secondary Historical Resources include resources listed on local registers, as well as resources listed on the state Inventory.

Secondary Historical Resources are presumed significant *unless* a preponderance of evidence demonstrates otherwise.⁸ Historic resources covered here include buildings, sites (which encompass landscapes), structures (such as bridges), and objects (such as Founders' Rock).

This section begins with an explanation of the different types of historical resources described in Section 5024.1 of the Public Resources Code. Then, for each 2020 LRDP land use zone, the resources in each of these categories are presented in a table. Brief histories of the Primary and Secondary Historical Resources owned by the University are included in Appendix D.

PRIMARY HISTORICAL RESOURCES: CALIFORNIA REGISTER OF HISTORICAL RESOURCES

The California Register of Historical Resources includes the following, in accordance with California Public Resource Code Section 5024.1(d):

- Resources listed on the National Register of Historic Places.
- Resources that have a State Historical Landmark number of 770 or higher.

There are no resources in the 2020 LRDP area that are listed as California Points of Historical Interest: such properties would also qualify if they existed.

SECONDARY HISTORICAL RESOURCES: LOCAL REGISTER AND STATE INVENTORY RESOURCES

Secondary Historical Resources include all the resources that may be listed in the California Register of Historical Resources in accordance with California Public Resource Code Section 5024.1, subsections (e), (f), and (g). All of these resources are presumed historically or culturally significant, unless a preponderance of evidence supports a contrary finding.⁹ California Public Resource Code Section 5024.1(e) states the California Register may include:

- Individual historical resources.
- Historical resources contributing to the significance of an historic district under criteria adopted by the State Historical Resources Commission.
- Historical resources identified as significant in historical resources surveys, if the survey meets the criteria listed in subdivision (g).
- Historical resources and historic districts designated or listed as city or county landmarks or historic properties or districts pursuant to any city or county ordinance, if the criteria for designation or listing under the ordinance have been determined by the office to be consistent with California Register criteria adopted by the State Historical Resources Commission.
- Landmarks or historic properties designated under any municipal or county ordinance.

The first two types of resources, “individual resources” and “resources contributing to a historic district”, refer to those not yet listed on any official surveys or registers: these are not considered further in this EIR. The third type of resource, “resources identified as significant”, consists of resources listed in the State Inventory, and therefore listed in this EIR as Secondary Historical Resources. The last two types of resources, those designated by cities and counties, are as also listed as Secondary Historical Resources in this EIR.

CALIFORNIA REGISTER CRITERIA. California Public Resource Code Section 5024.1(g) states that a resource identified as significant in an historical resource survey may be listed in the California Register if the survey meets all of the following criteria:

- The survey has been or will be included in the State Historic Resources Inventory.
- The survey and the survey documentation were prepared in accordance with Office of Historic Preservation procedures and requirements.
- The resource is evaluated and determined by the Office of Historic Preservation to have a significance rating of Category 1 to 5 on DPR Form 523.
- If the survey is five or more years old at the time of its nomination for inclusion in the California Register, the survey is updated to identify historical resources which have become eligible or ineligible due to changed circumstances or further documentation and those which have been demolished or altered in a manner that substantially diminishes the significance of the resource.

The first two criteria can essentially be combined since all surveys that were prepared in accordance with office procedures and requirements are included in the State Historic Resources Inventory (referred in this document as the State Inventory). The third criterion – Category 1 to 5 on DPR Form 523 – requires a brief explanation.

DPR Form 523 is the Department of Parks and Recreation Historic Resources Inventory Form, which is an application completed for an individual resource nomination to either a local or state register. If and when the resource is evaluated at the state level (by the Office of Historic Preservation), the resource is given a Category designation, which rates the likelihood of the resource becoming registered in the National Register of Historic Places. This Category is listed under the heading NR (short for National Register) on the DPR Form 523 and is listed on the State Inventory under the heading National Register Status Code. (Please note that even though these ratings have different names, the codes/categories are exactly the same.)

Each code is alphanumeric, starting with a number, then a letter, and then another number. For the purposes of this EIR, only a brief explanation of the first number and select sub classifications (that are cited in this EIR) will be given because the entire list of designations consists of approximately 110 codes and sub-codes. For a more complete explanation of the designations, refer to “Appendix 2: National Register Status Codes” of the California Office of Historic Preservation Technical Assistance Series #8.¹⁰

- | | |
|----------|--|
| Code 1. | Property is listed on the National Register |
| Code 2. | Determined eligible for National Register in a formal process |
| Code 3. | Appears eligible for National Register to person completing or reviewing form |
| Code 3S. | Appears eligible for National Register as a separate property |
| Code 4. | May become eligible for listing on the National Register |
| Code 4S. | May become eligible for National Register as a separate property |
| Code 4X. | May become eligible for National Register as contributing to a District not yet documented |
| Code 5. | Ineligible for the National Register but still of local interest |
| Code 5S. | Eligible for local listing only |
| Code 6. | Determined ineligible for National Register listing |
| Code 7. | Not evaluated |

Note that historical resources with a National Register Status Code of 1 or 2 are automatically listed in the California Register of Historical Resources and are therefore listed as Primary Historical Resources. Therefore, only historical resources that have Codes of 3, 4 or 5 are listed in this EIR as Secondary Historical Resources.

CAMPUS PARK

The Campus Park contains 23 resources listed on the CRHR, as listed in Table 4.4-1. There are also 28 buildings that are Secondary Historical Resources, listed in Table 4.4-2.

In 1982, many buildings on the Campus Park were given National Register status under a Multiple Resource Area designation. The individual buildings or structures include Hearst Greek Theatre (which is in the Adjacent Blocks North), North Gate Hall, Hearst Memorial Mining Building, Sather Gate and Bridge and the Hearst Gymnasium for Women. The buildings that were designated with their landscaped settings were the Faculty Club and the Campanile Way and Esplanade. The Faculty Club designation includes the (Men's) Faculty Club and Faculty Glade. The Campanile Way and Esplanade designation includes the following: Sather Tower (Campanile) and the Esplanade; South Hall; Wheeler Hall; Durant Hall; Doe Memorial Library; and California Hall. The Agricultural Complex and University House Buildings includes Wellman Hall, Hilgard Hall, Giannini Hall and the University House. Finally, Founders' Rock was also a part of this Multiple Resource Area. The same group of buildings is listed as a State Landmark under the name "University of California, Berkeley Campus" with the record number 946 and recognition date of August 7, 1981.

ADJACENT BLOCKS

The Adjacent Blocks North contain four listings on the CRHR, which are listed in Table 4.4-3. Table 4.4-4 further lists the seven Secondary Historical Resources in the Adjacent Blocks North. The Adjacent Blocks West land use zone contains three CRHR properties, which are listed in Table 4.4-5. Table 4.4-6 lists the 43 Secondary Historical Resources in the Adjacent Blocks West. The Adjacent Blocks South land use zone contains three resources listed on the CRHR, which are listed in Table 4.4-7. Table 4.4-8 lists the 18 Secondary Historical Resources in the Adjacent Blocks South.

SOUTHSIDE

The Southside land use zone contains four resources listed on the CRHR. These resources are listed in Table 4.4-10. Table 4.4-10 further lists the 70 Secondary Historical Resources in the Southside land use zone.

HILL CAMPUS

The Hill Campus contains no CRHR properties and two Secondary Historical Resources. Table 4.4-11 lists the two Secondary Historical Resources in the Hill Campus.

LRDP HOUSING ZONE

The portion of the Housing Zone within Berkeley contains 27 resources listed in the CRHR, which are listed in Table 4.4-12. Table 4.4-13 lists 165 Secondary Historical Resources located in the Berkeley portion of the Housing Zone. The portion of the Housing Zone within Oakland contains two CRHR properties, which are listed in Table 4.4-14. Table 4.4-13 lists six Secondary Historical Resources in the Oakland portion of the Housing Zone.

TABLE 4.4-1
CAMPUS PARK, PRIMARY HISTORICAL RESOURCES

	Construction Date	Architect (s)	Recognition Date	National Designation	State Code
1	Founders' Rock	Natural Landscape Feature	3/25/1982	N	L
2	South Hall	1872-1903 David Farquharson	3/25/1982	N	L
3	Faculty Club / Faculty Glade	1899-1903 Bernard Maybeck	3/25/1982	N	L
4	California Hall	1903-1905 John Galen Howard	3/25/1982	N	L
5	North Gate Hall	1906 John Galen Howard	3/25/1982	N	L
6	Senior Hall	1906 John Galen Howard	11/5/1974	N	R
7	Hearst Memorial Mining Building	1901-1909 John Galen Howard	3/25/1982	N	L
8	Sather Gate and Bridge	1908-1910 John Galen Howard	3/25/1982	N	L
9	Girton Hall ("Senior Women's Hall")	1911 Julia Morgan	9/26/1991	N	R
10	University House	1911 Albert Pissis	3/25/1982	N	L
11	Wellman Hall	1912 John Galen Howard	3/25/1982	N	L
12	Durant Hall (Former Boalt Hall)	1908-1911 John Galen Howard	3/25/1982	N	L
13	Naval Architecture / Drawing Bldg.	1914 John Galen Howard	11/18/1976	N	R
14	Doe Memorial Library	1907-1917 John Galen Howard	3/25/1982	N	L
15	Sather Tower & Esplanade	1913-1917 John Galen Howard	3/25/1982	N	L
16	Wheeler Hall	1915-1917 John Galen Howard	3/25/1982	N	L
17	Room 307, Gilman Hall	1917 John Galen Howard	10/15/1966	L	R
18	Hilgard Hall	1916-1918 John Galen Howard	3/25/1982	N	L
19	Haviland Hall	1923 John Galen Howard	2/1/1982	N	R
20	Hearst Gymnasium for Women	1927 Maybeck / Morgan	3/25/1982	N	L
21	Giannini Hall	1930 William Charles Hays	3/25/1982	N	L
22	George C. Edwards, Stadium	1932 Warren Perry / Stafford Jory	4/1/1993	N	R
23	First Unitarian Church Dance Studio 2401 Bancroft Way	1898 A.C. Schweinfurth of A. Page Brown & Co	11/16/1981	L	R

Notes:

National Designations:

- N = National Register of Historic Places
- L = National Historic Landmark
- D = National Register of Historic Places – District

State Codes:

- R = California Register of Historical Resources (National Resource Status Codes 1 or 2)
- L = State Historic Landmark
- D = California Register of Historical Resources – District

TABLE 4.4-2

CAMPUS PARK, SECONDARY HISTORICAL RESOURCES

	Name	Construction Date	Architect (s)	City Landmark	City Structure of Merit	National Register Status Code
1	Leuschner (Students') Observatory, Observatory Hill	1885	Clinton Day			3S
2	Warren Cheney House 2241 College Avenue	1885	Warren Cheney	7/18/1990		3S
3	Cupola from Giauque Lab (remnant of old Chemistry building)	1889	Clinton Day			3S
4	Tilden Football Statue	1899	Douglas Tilden			3S
5	Warren Cheney House, 2243 College Avenue	1902	Carl Ericson	7/18/1990		3S
6	Old Power House (University Art Gallery)	1904	John Galen Howard			3S
7	Charles E Bancroft House 2222 Piedmont	1908	Fred D. Voorhees			3S
8	Prof Charles A Noble House 2224 Piedmont	1908	William A. Knowles			3S
9	Walter Y Kellogg House 2232 Piedmont	1908	Julia Morgan			3S
10	Dr. B.P. Wall House 2234 Piedmont	1909	William C. Hayes			3S
11	Zeta Psi Fraternity (Archaeological Research Facility) 2251 College	1910	Charles Peter Weeks			3S
12	Class of 1910 Bridge	1910	John Bakewell, Jr., Arthur Brown, Jr.			3S
13	Class of 1877 Sundial	1915	Clinton Day			3S
14	Lawson Adit	1916	College of Mining			3S
15	Stephens Memorial Union (Stephens Hall)	1922	John Galen Howard			3S
16	Sigma Epsilon Fraternity 2240 Piedmont	1923	Gwynn Officer			3S

TABLE 4.4-2

CAMPUS PARK, SECONDARY HISTORICAL RESOURCES

Name	Construction Date	Architect (s)	City Landmark	City Structure of Merit	National Register Status Code
17 Women's Faculty Club	1923	John Galen Howard			3S
18 Life Sciences Building	1928	George W. Kelham			3S
19 Harmon Gym - Haas Pavilion	1932	George Kelham	9/3/1996		
20 Anthony Hall ("Pelican Bldg")	1956	Joseph Esherick			3S
21 Sproul Plaza	1959	Hardison and DeMars w/Lawrence Halprin			3S
22 Wurster Hall	1964	DeMars, Esherick and Olsen			3S
<i>Landscape Features</i>					
23 Willey Redwood	N/A	N/A	11/4/1996		
24 Eucalyptus Grove	N/A	N/A	11/4/1996		3S
25 Dawn Redwoods adjacent to McCone Hall	N/A	N/A	11/4/1996		
26 Campanile Esplanade (London Plane Trees)	N/A	N/A	11/4/1996		
27 Melaleuca Copse adjacent to Esplanade	N/A	N/A	11/4/1996		
28 California Buckeye Tree in Faculty Glade	N/A	N/A	11/4/1996		

Source: Page and Turnbull, 2003.

Note: National Register Status Codes are explained in Appendix D.

TABLE 4.4-3

ADJACENT BLOCKS NORTH, PRIMARY HISTORICAL RESOURCES

Name	Construction Date	Architect (s)	Recognition Date	National Designation	State Code
Gayley Road					
1 Bowles Hall	1928	George Kelham	3/16/1989	N	R
Hearst Avenue					
1 Phi Delta Theta Chapter House 2717 Hearst Ave / 1822 Highland Place	1914	John Reid, Jr.	5/25/1982	N	R
Le Roy Avenue					
1 Cloyne Court 1875 Le Roy Ave / 2600 Ridge Road	1904	John Galen Howard	11/15/1982	N	
Stadium Rimway					
1 Hearst Greek Theatre (Part of the 1982 MRA)	1903	John Galen Howard	3/25/1982	N	L

Notes: Resources in **bold** text are University-owned.

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Source: Page and Turnbull, 2003.

TABLE 4.4-4

ADJACENT BLOCKS NORTH, SECONDARY HISTORICAL RESOURCES

	Name	Construction Date	Architect (s)	City Landmark	City Structure of Merit	National Register Status Code
Euclid Avenue						
1	Proctor Apartments 1865 Euclid Avenue	1912	John Galen Howard			3S
Hearst Avenue						
1	Stern Hall Hearst Avenue	1941	Corbett & MacMurray and William Wurster			4S
2	Smith House (Harris House) 2301 Hearst Avenue/ 2300 Le Conte Avenue	1939	John B. Anthony	6/21/1976		3S
3	Robert H Whetmore House 2323 Hearst Avenue	1923				3S
4	Benjamin Ide Wheeler House and Garden 2325-2355 Hearst Avenue 1820 Scenic Avenue	1900	E.A. Mathews 1900 L. Hobart 1911	7/15/1985		
5	Beta Theta Pi House (Goldman School of Public Policy) 2601-2607 Hearst Avenue 1879 Le Roy Avenue	1893	Ernest Coxhead	11/15/1982		3S
Spruce Street						
1	Normandy Village 1781-1851 Spruce Street (except 1815 Spruce Street)	1928	William R. Yelland	12/19/1983		3S

Note: Resources in **bold** text are University-owned.

Source: Page and Turnbull, 2003.

TABLE 4.4-5
ADJACENT BLOCKS WEST, PRIMARY HISTORICAL RESOURCES

Name	Construction Date	Architect(s)	Recognition Date	National Designation	State Code
Addison Street					
1 Studio Building 2107 Addison / 2037-45 Shattuck Avenue	1905	F.H. Dakin	4/6/1978	N	R
Bancroft Way					
1 Masonic Temple/Crocker Bank (Berkeley Conference Center) 2105 Bancroft Way / 2295 Shattuck Avenue	1905	William Wharff	7/15/1982	N	
Shattuck Avenue					
1 Tupper & Reed Building 2271-75 Shattuck Avenue	1925	William R. Yelland	1/21/1982	N	R

Notes:

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Source: Page and Turnbull, 2003.

TABLE 4.4-6
ADJACENT BLOCKS WEST, SECONDARY HISTORICAL RESOURCES

	Name	Construction Date	Architect (S)	City Landmark	City Structure of Merit	National Register Status Code
Addison Street						
1	Mobilia Furniture Building (aka The Mason-McDuffie Company Building) 2104 Addison, 2101 Shattuck Avenue	1928	Walter Ratcliff, Jr.	1/21/1985		3S
2	Underwood Building 2110 -14 Addison	1905	F.E. Armstrong		11/01/93	3S
3	Terminal Place 2113 Addison Street	1906				4S
4	Heywood Apts 2119 Addison Street	1906				3S
5	Stadium Garage, Stadium Body Shop 3020 Addison Street	1925				3S
Allston Way						
1	Berkeley Farms Creamery, Red Cross (demolished) 2116 Allston Way	1924				4S
2	Lederer, Street, and Zeus Building 2121 Allston Way	1938				4S
3	YWCA 2134 Allston Way	1938	Edwin Lewis Snyder	1/6/1992		3S
4	William Such Building/ Oxford Hall 2175 -9 Allston Way 2140-50 Oxford Street	1906	George Mohr	8/17/1981		3S
Bancroft Way						
1	Waste & Clark Apts. 2126 Bancroft Way	1913	Walter Ratcliff, Jr.	4/12/1993		3S
2	Odd Fellows Temple 2177-99 Bancroft Way, 2280-88 Fulton Street	1926	James Plachek	1/20/1982		3S
Berkeley Way						
1	Richfield Oil Co. (University Garage) 2180-2198 Berkeley Way, 1952-1957 Oxford Street	1930	Walter Ratcliff, Jr.	12/21/1981		3S

TABLE 4.4-6

ADJACENT BLOCKS WEST, SECONDARY HISTORICAL RESOURCES

	Name	Construction Date	Architect (S)	City Landmark	City Structure of Merit	National Register Status Code
Center Street						
1	Mikkelsen & Berry Building 2124-26 Center Street	1902	Stone & Smith	12/19/1983		
2	Thomas Black Bldg, La Loma Apts 2132 Center Street	1904				3S
3	Enwor's Restaurant, Act One/Act Two 2138 Center Street	1923				4S
4	Globe Stamp Store 2146 Center Street	1902				3S
Durant Avenue						
1	Bishop Photo Studio 2125 Durant Avenue	1939	Carl Fox	7/21/1986		
Fulton Street						
1	3 Houses For Charles Finney 2142, 2144, 2146 Fulton Street	1899				3S
Kittredge Street						
1	Fox California, T & D Theatre (Currently Called The California Theater) 2113 Kittredge Street	1914				3S
2	A.H. Broad House And Storefronts 2117-2119 Kittredge Street (House – 1894; Storefronts – 1928)	1894 & 1928	A.H. Broad		10/1/01	3S
3	Robert Elder House, Morgan And Agost. 2125 Kittredge Street	1895				3S
4	John C Fitzpatrick House 2138 Kittredge Street	1904				3S
Oxford Street						
1	UC Printing Department 2120 Oxford	1939				3S

TABLE 4.4-6
ADJACENT BLOCKS WEST, SECONDARY HISTORICAL RESOURCES

	Name	Construction Date	Architect (S)	City Landmark	City Structure of Merit	National Register Status Code
Shattuck Avenue						
1	MacFarlane Building/ U.S. Realty Co. 1987-1979 Shattuck Avenue, 2101-2109 University	1925	Earle Bertz	9/15/1986		3S
2	University and Shattuck Store Bldg 2001 Shattuck Avenue	1909				3S
3	Chase Building 2107-2111 Shattuck Avenue	1909	William Wharff		1/3/2000	
4	Blums Flower Shop 2151 Shattuck Avenue	1906				4S
5	F W Foss Co., Martinos Restaurant 2177 Shattuck Avenue	1895				3S
6	Samson Market, Central Bank 2187 Shattuck Avenue	1922				4S
7	Hinkel Block, Havens Block 2201 Shattuck Avenue	1895				3S
8	Radstons Stationary, Alko Office 2225 Shattuck Avenue	1913				3S
9	Brooks Apts, Amherst Hotel 2231 Shattuck Avenue	1906				3S
10	Wanger Block, Blue & Gold Market 2257 Shattuck Avenue.	1903				4S
11	Capdevilles University 2281 Shattuck Avenue	1904				4S
12	Fidelity Savings Building 2323 Shattuck Avenue	1925/ 1926	Walter Ratcliff, Jr./ Walter Sorensen	10/17/1983		3S
University Avenue						
1	Acheson Physician's Building 2125-2135 University Avenue	1908	George Mohr	1/7/1983		3S
2	Sills, Berkeley Hardware Store 2139 University Avenue	1915				3S

TABLE 4.4-6
ADJACENT BLOCKS WEST, SECONDARY HISTORICAL RESOURCES

	Name	Construction Date	Architect (S)	City Landmark	City Structure of Merit	National Register Status Code
Walnut Street						
1	Apartment House For William Heywood 1907 Walnut Street	1909				3S
2	1922 Walnut Street	1905	Unknown			3S
3	1925 Walnut Street	1905	Unknown			3S
4	1930 Walnut Street	1905	Unknown			3S

Note: Resources in **bold** text are University-owned.
 Source: Page and Turnbull, 2003.

TABLE 4.4-7

ADJACENT BLOCKS SOUTH, PRIMARY HISTORICAL RESOURCES

Name	Construction Date	Architect(s)	Recognition Date	National Designation	State Code
Bancroft Way					
1 College Women's Club 2680 Bancroft Way	1928	Walter Steilberg	1/21/1982		
Durant Avenue					
1 Berkeley Women's City Club 2315 Durant Avenue	1929	Julia Morgan	10/28/1977 (City Only)		L
Piedmont Avenue					
1 Public-right-of-way between Gayley Road and Dwight Way, Piedmont Avenue	1864	Frederick Law Olmstead	5/26/1989		L

Notes:

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Source: Page and Turnbull, 2003.

TABLE 4.4-8
ADJACENT BLOCKS SOUTH, SECONDARY HISTORICAL RESOURCES

Name	Construction Date	Architect(s)	City Landmark	City Structure of Merit	National Register Status Code
Bancroft Way					
1 St. Mark's Episcopal Church 2300 Bancroft Way	1901	William Curtlett			3S
2 Gray Gables, Canterbury Foundation 2346 Bancroft Way	1902	Unknown.			3S
3 Stiles Hall 2400 Bancroft Way	1949				4S
4 Campus Theatre, Fox Campus Theatre 2434 Bancroft Way	1925				4S
5 Fred Turner Building 2546-54 Bancroft Way	1940	Julia Morgan	12/21/1981		3S
6 University Art Museum (Berkeley Art Museum) 2626 Bancroft Way	1968	Mario J. Ciampi			3S
7 Westminster House and Grounds 2700 Bancroft Way	1926	Walter H. Ratcliff, Jr.	4/3/2000		3S
8 Richard A. Clark House, Davis House 2833 Bancroft Way	1913	Unknown.			3S
Bowditch Street					
1 Christian Science Building 2315 Bowditch Street	1933	Unknown.			3S
Durant Avenue					
1 Cornelius Beach Bradley House 2639 Durant Avenue	1895	Edgar A. Mathews	11/3/1997		3S
2 P H Atkingon House 2735 Durant Avenue	1908	Bernard Maybeck			3S
Piedmont Avenue					
1 International House Piedmont Avenue	1928	George W. Kelham			3S
2 California Memorial Stadium Piedmont Avenue	1923	John Galen Howard			3S

TABLE 4.4-8
ADJACENT BLOCKS SOUTH, SECONDARY HISTORICAL RESOURCES

Name	Construction Date	Architect(s)	City Landmark	City Structure of Merit	National Register Status Code
Telegraph Avenue					
1 El Granada The Granada Apartments 2301 Telegraph Avenue	1905	Myers and Ward			3S
2 Hotel Carlton 2328 Telegraph Avenue	1906	Unknown			3S

Note: Resources in **bold** text are University-owned.

Source: Page and Turnbull, 2003.

TABLE 4.4-9
SOUTHSIDE, PRIMARY HISTORICAL RESOURCES

Name	Construction Date	Architect (s)	Recognition Date	National Designation	State Code
Bancroft Way					
1 Thorsen, William R., House (Sigma Phi Fraternity) 2806 Bancroft Way / 2307 Piedmont Avenue	1909	Greene & Greene	11/20/1978	N	
Bowditch Street					
1 Anna Head School for Girls 2410-20 Bowditch St / 2538 Channing Way, C 2538A Channing Way D/2536 Channing Way E 2536A Channing Way, F / 2527-47 Haste Street	1892-1927	Soule Edgar Fisher/ Walter Ratcliff, Jr.	8/11/1980	N	
Dwight Way					
1 First Church of Christ, Scientist 2619 Dwight Way	1910	Bernard Maybeck	12/22/1977	N	R
Piedmont Avenue					
1 California Schools for the Deaf and Blind (State Asylum for the Deaf, Dumb and Blind) (Clark-Kerr Campus) 2951-3001 Derby Street / 2601 Warring Street	1914-59	Office of the State Architect	10/14/1982	N	

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Source: Page and Turnbull, 2003.

TABLE 4.4-10

SOUTHSIDE, SECONDARY HISTORICAL RESOURCES

	Name	Construction Date	Architect(s)	City Landmark	City Structure of Merit	National Register Status Code
Bowditch Street						
1	B Carrington House (relocated to 1029 Addison) 2323 Bowditch Street	1893	Seth Babson			3S
2	Rose Berteaux Cottage ("Fox Cottage") 2350 Bowditch (relocated from Channing Way)	1930	Carl Fox	6/7/1999		3S
3	People's Park 2448 Bowditch Street, 2551 Dwight Way, 2526 Haste Street	1969		11/19/1984		3S
Channing Way						
1	J & C Luttrell House 2328 Channing Way	1889				3S
2	2515 Channing Way		Walter H. Ratcliff	9/13/1999		
3	Epworth Hall 2521 Channing Way		James L. Plachek	9/13/1999		
4	Samuel Davis House 2547 Channing Way	1899	William Mooser and Son	2/27/1984		3S
5	Channing House 2721 Channing Way	1890				3S
6	Dr. J. Knox House 2725 Channing Way	1908				3S
7	Dr. Sherrel W Hall House, Fraternity 2728 Channing Way	1911				4S
8	Hearst Hall Site, Gamma Phi Beta 2732 Channing Way	1899				4S
9	William E. Colby House 2901 Channing Way	1905	Julia Morgan	7/15/1985		3S

TABLE 4.4-10
SOUTHSIDE, SECONDARY HISTORICAL RESOURCES

Name	Construction Date	Architect(s)	City Landmark	City Structure of Merit	National Register Status Code
College Avenue					
1 Yummers, Espresso Experience (Café Strada) 2300 College Avenue	1969				3S
2 Alma A Smith House 2310 College Avenue	1905				3S
3 Channing Apartments 2409 College Avenue	1913				3S
Dana Street					
1 James A Squire House 2400 Dana Street	1892				3S
2 Seneca Gale House 2446 Dana Street	1895				3S
3 Town & Gown Club 2447 Dana Street 2401 Dwight Way	1899	Bernard Maybeck	12/15/1979		
Durant Avenue					
1 Mary A Helphinstine House (Chief Justice William Waste), 2222 Durant Avenue	1891				3S
2 H J Merritt Apartments 2236 Durant Avenue	1914				3S
3 Marsh House 2308-10 Durant Avenue	1891	Charles F. Mau & James Toohig	8/18/1986		3S
4 McCreary-Greer House 2318 Durant Avenue	1901-02	Unknown	8/18/1986		3S
5 Cambridge Apts 2500 Durant Avenue	1914				3S
7 The Brasfield (Beau Sky Hotel) 2520 Durant Avenue	1911	Shea & Lofquist	9/13/1999		3S
8 Blood House 2526 Durant Avenue	1891	R. Gray Frise		9-13-99	3S

TABLE 4.4-10
SOUTHSIDE, SECONDARY HISTORICAL RESOURCES

	Name	Construction Date	Architect(s)	City Landmark	City Structure of Merit	National Register Status Code
9	The Albra 2530-34 Durant Avenue	1921	Walter H. Ratcliff		9-13-99	
10	Durant Hotel 2600 Durant Avenue	1928	William Weekes		2-01-93	3S
11	U.C. Berkeley Unit 1 (partly demolished) 2650 Durant Avenue	1957-1959	John Carl Warnecke, Lawrence Halprin & William Wilson Wurster		9-11-00	
12	Parsons House, Student Residence 2732 Durant Avenue	1905				4S
Dwight Way						
1	Nelson S Trowbridge House 2239 Dwight Way	1892				3S
2	James L Barker House 2247 Dwight Way	1895				3S
3	McKinley Elms 2419 Dwight Way	c. 1903				3S
4	James Edgar House 2437-41 Dwight Way	1869	Unknown		11-16-81	
5	2441 Dwight Way	1880				3S
6	Bishop Berkeley Apts 2709 Dwight Way	1928				3S
7	Paget-Gorrill House, Gorrill House 2727 Dwight Way	1891				3S
Fulton Street						
1	3 Houses For Charles Finney 2142, 2144, 2146 Fulton Street	1899				3S
2	Federal Land Bank (UC Extension) 2233 Fulton Street	1922, 1949	James Plachek, Michael Goodman			4S
3	Odd Fellows Temple 2288 Fulton Street	1926	James Plachek			3S

TABLE 4.4-10
SOUTHSIDE, SECONDARY HISTORICAL RESOURCES

	Name	Construction Date	Architect(s)	City Landmark	City Structure of Merit	National Register Status Code
Haste Street						
1	Haste Street Building/McKinley School 2419 Haste Street	1906	A.H. Broad	2-5-96		3S
2	George D Hutchinson Apt 2436 Haste Street	1904				3S
3	Sequoia Apts, Studio Guild Theatre 2441 Haste Street	1916				3S
4	People's Bicentennial Mural 2500 Haste Street 2455 Telegraph Avenue	1976	Osha Newman et al.	2/22/1990		
5	The Wooley House 2509 Haste Street	1876	Unknown	10/16/1989		3S
6	Casa Bonita Apartments 2605 Haste Street	1928	John A. Marshall	11/1/1999		3S
7	U.C. Berkeley Unit 2 (partly demolished) 2650 Haste Street	1957-1960	John Carl Warnecke; Lawrence Halprin & William Wilson Wurster		9/11/00	
Hillside Avenue						
1	Shepard House 2422 Hillside Avenue	1911				3S
2	Ford House, Crocker Hall 2425 Hillside Avenue	1895				3S
3	Prof Geo. M. Stratton House 2434 Hillside Avenue	1901				3S
4	2444 Hillside Avenue	1905				3S

TABLE 4.4-10

SOUTHSIDE, SECONDARY HISTORICAL RESOURCES

Name	Construction Date	Architect(s)	City Landmark	City Structure of Merit	National Register Status Code
Hillside Court					
1 Joseph N. LeConte House 19 Hillside Court	1908				3S
Orchard Lane					
1 Steilberg Family Home 1 Orchard Lane	1922				3S
Panoramic Way					
1 Steilburg Cottage 1 Panoramic Way	1921	Walter T Steilburg			3S
2 Clifton Price Apartments 9 Panoramic Way	1912				3S
3 Boke House 23 Panoramic Way	1902	Bernard Maybeck			3S
4 Walter T. Steilburg House 38 Panoramic Way	1917				3S
5 Howard Maise House 69 Panoramic Way	1929				3S
6 Price Apts. 73 Panoramic Way	1909				3S
Piedmont Avenue					
1 The Lewis Hicks House, Chi Psi Fraternity 2311 Piedmont Avenue	1906				3S
2 George Tasheira House, Fuente House 2336 Piedmont Avenue	1914				3S
3 Gayley House 2378 Piedmont Avenue	1905				3S
4 Phi Gamma Delta House 2395 Piedmont Avenue	1928	Frederick Reimers	5/21/1990		3S

TABLE 4.4-10
SOUTHSIDE, SECONDARY HISTORICAL RESOURCES

Name	Construction Date	Architect(s)	City Landmark	City Structure of Merit	National Register Status Code
Prospect Street					
1 John F. Sims House, Alpha Delta Phi 2422 Prospect Street	1893				3S
Telegraph Avenue					
1 Public Food Store 2369 Telegraph Avenue	1932				3S
2 Sprouse-Reitz Store, Sunset Theatre 2411 Telegraph Avenue	1941				4S
3 Berkeley Food Center 2455 Telegraph Avenue	1933				3S
Warring Street					
1 Charles Washington Merrill House 2307 Warring Street	1911				3S
2 The Thomas Olney House, Sigma Pi House 2434 Warring Street	1911				3S

Note: Resources in **Bold** text are owned by the University of California.
 Source: Page and Turnbull, 2003.

TABLE 4.4-11
HILL CAMPUS, SECONDARY HISTORICAL RESOURCES

	Name	Construction Date	Architect(s)	City Landmark	City Structure of Merit	National Register Status Code
1	Charter Hill and the Big C	1905	Classes of 1907 and 1908			3S
2	Botanical Garden	1920-1926	John W. Gregg, Landscape Architect with Thomas Harper Goodspeed			3S

Source: Page and Turnbull, 2003.

TABLE 4.4-12
LRDP HOUSING ZONE, PRIMARY HISTORICAL RESOURCES

Name	Construction Date	Architect (s)	Recognition Date	National Designation	State Codes
Addison Street					
1 Berkeley Day Nursery – West Berkeley Children's Center / Health Center 829 Addison Street, 2031 6th Street	1927	Walter H. Ratcliff, Jr.	9/15/1977	N	R
2 Golden Sheaf Bakery (Annex) 2069 -2071 Addison Street	1905	Clinton Day	3/31/1978	N	R
Allston Way					
1 Old City Hall Annex 1835 Allston Way (part of the Berkeley Historic Civic Center District)	1926	James Plachek	11/21/1988	D	D
2 Berkeley High School Community Center 1930 Allston Way (part of the Berkeley Historic Civic Center District) (also known as the Grove Street Buildings because Martin Luther King Jr. Way was originally known as Grove Street)	1937	William Corlett Sr./ Henry Gutterson (Jacques Schnier and Robert Howard, Sculptors)	12/3/98	D	D
3 Civic Center Park, now called the Martin Luther King Junior Civic Center Park. Boundaries: Allston Way, Martin Luther King Jr. Way, Milvia Street, Center Street (part of the Berkeley Historic Civic Center District)	1940-42	Henry Gutterson, John Gregg	12/3/1998	D	D
4 Downtown YMCA 2001 Allston Way (part of the Berkeley Historic Civic Center District)	1910	Benjamin McDougall	2/20/1990	D	D
5 Berkeley Main Post Office 2004 Allston (part of the Berkeley Historic Civic Center District)	1914	Oscar Wenderoth	6/16/1980	D	D

TABLE 4.4-12

LRDP HOUSING ZONE, PRIMARY HISTORICAL RESOURCES

Name	Construction Date	Architect (s)	Recognition Date	National Designation	State Codes
Bancroft Way					
1 Corder Bldg./Shattuck Apts. 2048 Bancroft Way 2300-50 Shattuck Avenue 2047 Durant Avenue	1921	James Plachek	1/11/1982	N	R
Berkeley Square					
1 Chamber of Commerce, Kaldor's Knit 100 Berkeley Square	1940		08/19/85	N	R
Center Street					
1 Veterans Memorial Building 1931 Center Street (part of the Berkeley Historic Civic Center District)	1928	Henry H. Meyers	12/03/98 (National) 4/15/1988 (City)	D	R
2 State Farm Insurance Co Building 1947 Center Street (part of the Berkeley Historic Civic Center District)	1947	James Plachek	12/03/98 (National)	D	R
3 American Trust Building, Wells Fargo 2081 Center Street 2140 Shattuck	1925	Walter Ratcliff, Jr.	08/25/85	N	R
College Avenue					
1 Mercantile Trust Co./Wells Fargo Bank, Elmwood 2959 College Avenue	1925	Walter Ratcliff, Jr.	3/15/1982 (City)		R
Delaware Street					
1 802 Delaware Street Alphonso House (originally at 1731-33 Fifth Street)	1878	Joseph Alphonso	12-17-79 (City) 10/28/77 (State Reg.)		R
Durant Avenue					
1 Boone's University School 2029 Durant Avenue	1880	Unknown	11/1/1982	N	R

TABLE 4.4-12

LRDP HOUSING ZONE, PRIMARY HISTORICAL RESOURCES

Name	Construction Date	Architect (s)	Recognition Date	National Designation	State Codes
Fifth Street					
1 Heywood House, Estrada House 1808 Fifth Street	1878	Unknown	01/01/78 (State Reg.)		R
Fourth Street					
1 Heywood Ghego House 1809 -11 Fourth Street	1877	William Heywood	6/21/1982 (City) 10/27/77 (State Reg.)		R
Haste Street					
1 Morrill Apts. 2101 Haste Street 2484-2494 Shattuck Avenue	1911	George F. King	5/21/1984 (City) 2/2/96 (State Reg.)		R
Hearst Avenue					
1 Davis Harmes House 733 Hearst Avenue	1890	C.W. Davis	9/15/1986 (City Only)		
Hillegass Street					
1 Hillegass Site American Baptist Seminary (Smith House and Smith Cottage) (Smith House demolished) 2527-29 Hillegass	1902-27	Henry Gutterson et al.	1/21/1980	N	R
Kittredge Street					
1 Berkeley Public Library 2090 Kittredge Street	1930	James Plachek	3/19/1982	N	R

TABLE 4.4-12

LRDP HOUSING ZONE, PRIMARY HISTORICAL RESOURCES

Name	Construction Date	Architect (s)	Recognition Date	National Designation	State Codes
Martin Luther King Jr. Way					
1 Civic Center Fountain 2100 Martin Luther King Jr. Way (Part Of The Berkeley Historic Civic Center District)	1938		12/03/98	D	D
2 Old City Hall 2134 Martin Luther King, Jr. Way (part of the Berkeley Historic Civic Center District)	1908	Bakewell & Brown	9/11/1981 12/03/98 (District)	D	D
Sixth Street					
1 Andrews House 1812 Sixth Street	1880	Unknown	6/15/1992 (City) 3/19/86 (State Reg.)		R
University Avenue					
1 Fox Court 1472-78 University Avenue	1928-30	Fox Brothers	2/4/1982	N	R
2 UC Theater 2018-2036 University Avenue	1916	James Plachek	5/6/2002 (City Only)		
3 2054 University Avenue	–	–	2/2/01 (State Only)		R

Notes:

National Designation:

- N = National Register of Historic Places
- L = National Historic Landmark
- D = National Register of Historic Places – District

State Codes:

- R = California Register of Historical Resources (National Register Status Codes 1 or 2)
- L = State Historic Landmark
- D = California Register of Historical Resources – District

Source: Page and Turnbull, 2003.

TABLE 4.4-13
LRDP HOUSING ZONE, SECONDARY HISTORICAL RESOURCES

Name	Construction Date	Architect (s)	City Landmark	City Structure of Merit	National Register Status Code
Addison Street					
1 Manuel Silva House 743 Addison Street	1886				3S
2 Joseph Mcvey House, Hoppe/Glosser 814 Addison Street	1892				3S
3 Edward Mcvey House, Bay House 816 Addison Street	1890				3S
4 Charles Foster House 828 Addison Street	1878				3S
5 Carrington House 1029 Addison Street (Moved From 2323 Bowditch Street)	1893	Seth Babson & R. Wenk		3/15/82	
6 Framat Lodge 1900 Addison Street	1927	Sanford G. Jackson/ Sommarstrom Bros.	4/7/1997		
7 National Guard Armory, Barney's Gen. 1950 Addison Street	1915				3S
8 American Railway Express, Swedberg 2070 Addison Street	1895				3S
Adeline Street					
1 Frederick H. Dakin Warehouse 2750 Adeline Street	1906				3S
2 Hull & Durgin Funeral Chapel 3031 Adeline Street	1922				3S
3 T. M. Lukes Nicklelodeon 3192 Adeline Street	1909				4S
4 Carlson's Block 3228 -3230 Adeline Street	1903	William Wharff/ C. Eckman	7/19/1982		3S
5 India Block 3250 -52 Adeline 1820-22 Harmon Street	1903	A.W. Smith	7/19/1982		3S
6 Wells Fargo Bank, South Berkeley Bank 3286 -90 Adeline Street	1906	John Galen Howard/ John Debo Galloway	7/19/1982		3S

TABLE 4.4-13
LRDP HOUSING ZONE, SECONDARY HISTORICAL RESOURCES

Name	Construction Date	Architect (s)	City Landmark	City Structure of Merit	National Register Status Code
Allston Way					
1 Elks Club 2018 Allston Way	1913	Walter H. Ratcliff, Jr.	10/7/1991		3S
2 Shattuck Hotel/Hink's 2068 -2070 Allston Way 2060 Kittredge 2200-2240 Shattuck Avenue	1909-13	Benjamin McDougall	5/16/1983		
Ashby Avenue					
1 Webb Bldg., Hudson Antiques 1985 Ashby Avenue	1905				3S
Ashby Place					
1 Mrs. C.L. Goddard House 2733 Ashby Place	1908				3S
Bancroft Way					
1 Pasand Hotel/Donogh Arms/Morse Block 2037-43 Bancroft Way 2276-86 Shattuck Avenue	1906	Dickey & Reed	6/18/1979		3S
Benvenue					
1 Ayers House 2528 Benvenue Avenue	1899	Unknown/ pos. Arthur Ayers	6/18/1990		3S
2 Charles John Dickman House 2555 Benvenue	1894				3S
3 Woodsum House 2933 Benvenue Avenue	1907				3S
Berkeley Square					
1 124 Berkeley Square	1938				3S
2 Southern Pacific Office 134 Berkeley Square	1938				4S

TABLE 4.4-13

LRDP HOUSING ZONE, SECONDARY HISTORICAL RESOURCES

Name	Construction Date	Architect (s)	City Landmark	City Structure of Merit	National Register Status Code
Berkeley Way					
1 George Morgan 2053 Berkeley Way	1904				3S
Blake Street					
1 Haney Ice Co. 2015 Blake Street	1910				4S
Bonita Avenue					
1 Anton A. Fink House 1901 Bonita Avenue	1891				3S
Center Street					
1 Chamber Of Commerce Bldg., Wells Fargo 2081 Center Street	1925				3S
Channing Way					
1 Avansino House 1940 Channing Way	1893				3S
Claremont Avenue					
1 John Muir School 2955 Claremont Avenue	1915	James Plachek	7/18/1983		3S
College Avenue					
1 O. J. Bettis House 2530 College Avenue	1890				3S
2 Strand Theater/Elmwood Theater 2966 College Avenue	1914	Albert Cornelius	5/24/1982		3S
Durant Avenue					
1 Howard Automobile Co./Maggini Chevrolet Building 2136-40 Durant Avenue 2236 Fulton Street	1930	Frederick H. Reimers	10/17/1983		3S

TABLE 4.4-13
LRDP HOUSING ZONE, SECONDARY HISTORICAL RESOURCES

Name	Construction Date	Architect (s)	City Landmark	City Structure of Merit	National Register Status Code
Dwight Way					
1 Barker Building 2033-49 Dwight Way 2484-94 Shattuck Avenue	1905	A. W. Smith	1/16/1978		
2 Williamson Building 2120-24 Dwight Way	1905	George L. Mohr	2/25/1991		3S
3 Williams Building 2126-28 Dwight Way	1902	George L. Mohr	2/24/1991		
4 Davis-Byrne Building 2134-40 Dwight Way	1895	Remodeled by George L. Mohr	2/25/1991		
5 Hutton House, Woolsey House 2244 Dwight Way	1885				3S
6 Alta Bates/Benjamin Ferris House 2314 Dwight Way	1880	Unknown	1/26/1987		3S
7 Stuart House 2524 Dwight Way	1891	Pissis and Moore	9/13/1999		3S
8 George Edwards House (relocated to adjacent lot) 2530 Dwight Way	1886	A.H. Broad	4/6/1998		
9 Baptist Divinity School/Hobart Hall 2600-06 Dwight Way	1918-21	Julia Morgan	9/8/1998		3S
10 Charles Wilkinson House 2730 Dwight Way	1876	Clinton Day	2/6/1995		3S
Eighth Street					
1 1940 Eighth Street 915-921 University Avenue	1875	Unknown	11/18/1985		
2 W Berkeley College Settlement 2015 Eighth Street	1895				3S
3 George Durrell House 2028 Eighth Street	1890				3S

TABLE 4.4-13

LRDP HOUSING ZONE, SECONDARY HISTORICAL RESOURCES

	Name	Construction Date	Architect (s)	City Landmark	City Structure of Merit	National Register Status Code
4	Kawneer Manufacturing Co. 2547 Eighth Street 927 Parker Street	1913	C.H. Miller, Alben Frober	7/21/1988		
Etna Street						
1	Albert Derge House 2514 Etna Street	1908				3S
2	Cedric Wright House 2515 Etna Street	1921				3S
3	Reverend Holmes Cottage 2525 Etna Street	1906				3S
4	2531 Etna Street	1908				3S
Fifth Street						
1	Haller/Dowd House, Stephens House 2105 Fifth Street	1886				3S
2	W Berkeley News, Manning House 2107 Fifth Street	1886				3S
3	Velasca House, Kennedy House 2109 Fifth Street	1878				3S
4	Mrs. Sanchez House 2117 Fifth Street	1895				3S
5	Charles Spear House 2212 Fifth Street	1888				3S
Fulton Street						
1	Northern Bertha Bosse Cottage 2424 Fulton Street	1884	Vietch & Knowles	6/2/2003		3S
2	Southern Bertha Bosse Cottage 2424 Fulton Street	1884	Vietch & Knowles	6/2/2003		3S
3	Kueffer House 2340 Fulton Street	1891	Unknown	5/5/2003		

TABLE 4.4-13
LRDP HOUSING ZONE, SECONDARY HISTORICAL RESOURCES

Name	Construction Date	Architect (s)	City Landmark	City Structure of Merit	National Register Status Code
Harold Way					
1 Armstrong College 2222 Harold Way	1923	Walter Ratcliff, Jr.	9/6/94		
Haste Street					
1 Monroe C Hamlin House 1920 Haste Street	1892				3S
Hazel Road					
1 W E Chamberlin House 8 Hazel Rd.	1923				3S
Hearst Avenue					
1 Davis Harmes House 733 Hearst Avenue	1890	C.W. Davis	9/15/1986		3S
2 Albert Ferreira House, Mr. Kahns House 809 Hearst Avenue	1880				3S
3 Antonio Brown House 815 Hearst Avenue	1875				4S
Hillegass Avenue					
1 2501-21 Hillegass	1919-21	Julia Morgan, et al.	2/1/1999		
2 Miss Eleanor M. Smith House 2527 Hillegass Avenue	1927	Henry Higby Gutterson			3S
Lincoln Street					
1 Whittier School 2022 Lincoln Street 2015 Virginia 1645 Milvia Street	1939	Dragon, Officer, Hardman, Schmidts	6/25/1984		
Le Conte Avenue					
1 Harris House 2300 Le Conte Street	1939	John B. Anthony			3S
2 Delta Zeta Sorority 2311 Le Conte Street	1923				4S

TABLE 4.4-13

LRDP HOUSING ZONE, SECONDARY HISTORICAL RESOURCES

	Name	Construction Date	Architect (s)	City Landmark	City Structure of Merit	National Register Status Code
3	Warren T Clarke House 2317 Le Conte Street	1912				3S
4	Phoebe Hearst House 2368 Le Conte Street	1900				3S
Milvia Street						
1	Wheeler Manufacturing Co. (demolished) 2115 Milvia Street	1926				3S
2	Martin Luther King Jr. Civic Center Building (Formerly Federal Land Bank) 2180 Milvia Street	1938	James Plachek	4/15/1985		
Newbury Street						
1	Mary Keon House 2905 Newbury Street	1891				3S
2	Mathew Lee House 2911 Newbury Street	1889				3S
Ninth Street						
1	Lodovico Rosano House And Store 2028 Ninth Street	1890				3S
Ridge Road						
1	Adolf Miller House, Ridge House 2420 Ridge Road	1906				4S
2	Treehaven 2523 Ridge Road	1910				3S
Russell Street						
1	Claremont Ct. Gates Russell Street	1907				3S
2	Lois W. Walcott House 2638 Russell Street	1909				3S
San Pablo Avenue						
1	Rivoli Theatre, 1931 San Pablo Avenue	1926				4S

TABLE 4.4-13
LRDP HOUSING ZONE, SECONDARY HISTORICAL RESOURCES

	Name	Construction Date	Architect (s)	City Landmark	City Structure of Merit	National Register Status Code
2	Weisbrod Building (Guys Drugs) 2001 San Pablo Avenue 1102-06 University Avenue	1930	Spiveck & Spiveck		7-15-85	
3	Varsity Theatre, Waynes Donut Shop 2072 San Pablo Avenue	1911				3S
4	Petersons Saloon 2400 San Pablo Avenue	1891				3S
Shattuck Avenue						
1	Lucky Store (Long's Drugs) 1451 Shattuck Avenue	1947				3S
2	Swink House, Cottage And Garden 1525-29 Shattuck Avenue	1903 & 1905	James L. Swink		5-1-00	
3	Plachek Building (Also Known as The Heywood Building) 2014 Shattuck Avenue	1917	James Plachek	4/12/1993		3S
4	Kress Store 2036-2040 Shattuck Avenue	1933	Edward F. Sibbert	4/20/1981		3S
5	Francis K. Shattuck 2100 Shattuck Avenue	1901	Louis Stone/ Henry Smith	2/6/1995		3S
6	Roy O Long Co Morse –Brock Bldg 2122 Shattuck Avenue	1927				3S
7	1 st Savings Bldg Great Western Bldg 2150 Shattuck Avenue	1969				3S
8	Havens Block, Constitution Square 2168 Shattuck Avenue	1906				4S
9	Homestead Loan Association Building 2270 Shattuck Avenue	1905				3S
10	United Artists Theatre 2274 Shattuck Avenue	1932				3S

TABLE 4.4-13

LRDP HOUSING ZONE, SECONDARY HISTORICAL RESOURCES

	Name	Construction Date	Architect (s)	City Landmark	City Structure of Merit	National Register Status Code
11	John K Stewart Bldg Yellow House 2377 Shattuck Avenue	1890				3S
12	Fujikawa & Chun Optometry 2414 Shattuck Avenue	1946				4S
13	Berkeley Theatre 2425 Shattuck Avenue	1911				3S
14	Barker Bldg 2486 Shattuck Avenue	1905	A. W. Smith			3S
15	The Halls or Washing Well 2528 Shattuck Avenue	1894				3S
16	Berkeley Bowl 2777 Shattuck Avenue	1940				4S
Shattuck Square						
1	14,22,24,37,38,39,40,4143,44,48 Shattuck Square (48 Shattuck Square, Palmers is on the State Inventory)	1926	Timothy Pflueger & James Miller	2/27/198		3S
2	63, 64 Shattuck Square, Roos Bros. Building (64 Shattuck Square is on the State Inventory)	1926	Timothy Pflueger & James Miller	10/20/80		3S
3	1,17,11,15,81,82,85,87,98 Shattuck Square (82 Shattuck Square, Watkins Shoe is on the State Inventory)			2/27/198		3S
Seventh Street						
1	Library Hall / 7 th Street School 2016 Seventh Street	1879				3S
Telegraph Avenue						
1	Mrs. E P King House 2501 Telegraph Avenue	1901				3S
2	British Motor Car Sales And Service 2539 Telegraph Avenue	1950				3S
3	Gorman's Furniture Store 2597-2599 Telegraph Avenue			12/4/2000		
4	John Albert Marshall House #3 2740 Telegraph Avenue	1900	C M Cook			3S

TABLE 4.4-13
LRDP HOUSING ZONE, SECONDARY HISTORICAL RESOURCES

	Name	Construction Date	Architect (s)	City Landmark	City Structure of Merit	National Register Status Code
5	John Albert Marshall House #4 2744 Telegraph Avenue	1905	John Marshall			3S
6	Concrete Grid Forms Co, Scandinavia 3075 Telegraph Avenue	1938				3S
7	Edlington Court 3120 Telegraph Avenue	1910				3S
Tenth Street						
1	West Berkeley YWCA 2009 Tenth Street	1939	Walter H. Ratcliff, Jr.		1/6/92	
2	August Peterson House 2010 10 th Street	1882				3S
University Avenue						
1	Southern Pacific Railroad Station 700 University Avenue	1913	Southern Pacific RR architectural bureau	3/5/2001		3S
2	Semerias Dry Goods 982 University Avenue	1878				3S
3	West University Branch Library 1125 University Avenue	1923	Roy O. Long		5/5/2003	
4	Santa Fe Railway Station 1310 University Avenue	1904	Charles Frederick Whittlesey	9/10/2001		3S
5	Fox Commons 1670-1676 University Avenue	1670: 1931 1672: 1940 1674-6: 1983	Fox Brothers	12/7/1998		
6	Elizabeth M Kenney Cottage (relocated) 1719-1725 University Avenue	1887	William H. Wrigley		2/5/2001	
7	Bonita Apartments 1940-44 University Avenue	1905	George Mohr	1/15/1979		3S
8	Bertin Properties 1952 University Avenue	1922	John Bartlett	6/2/2003		
9	Bertin Properties 1960 University Avenue	1923	Harry C. Smith	6/2/2003		

TABLE 4.4-13

LRDP HOUSING ZONE, SECONDARY HISTORICAL RESOURCES

	Name	Construction Date	Architect (s)	City Landmark	City Structure of Merit	National Register Status Code
10	UC Theater 2018-2036 University Avenue	1916	James Plachek	5/6/2002		3S
11	Nash Hotel 2041 University Avenue	1923				3S
12	Joseph Davis Bldg (The Victoria) 2044 University Avenue	1905				3S
13	Koerber Bldg, State Farm Bldg 2050 University Avenue	1923				3S
Vine Street						
1	Squires Block 2100 Vine Street	1895				3S
2	EBMUD Vine Street Pumping Plant 2113 Vine Street	1930	A.J. Calleri/Arthur Johnson	7/18/1983		
Walnut Street						
1	Hanscom House 1525 Walnut	1875				3S

Source: Page and Turnbull, 2003.

TABLE 4.4-14
OAKLAND, PRIMARY HISTORICAL RESOURCES

Name	Construction Date	Architect(s)	Recognition Date	National Codes	State Codes
Martin Luther King Jr Way					
1 University High School 5714 Martin Luther King Jr Way			7/19/94	N	R
Telegraph Avenue					
1 Carnegie Library: Temescal Branch 5205 Telegraph Ave	1918	Donavan and Dickey	11/4/80	N	R

Notes:

National Codes:

- N = National Register of Historic Places
- L = National Historic Landmark
- D = National Register of Historic Places – District

State Codes:

- R = California Register of Historical Resources (National Register Status Codes 1 or 2)
- L = State Historic Landmark
- D = California Register of Historical Resources – District

Source: Page and Turnbull, 2003.

TABLE 4.4-15

OAKLAND, SECONDARY HISTORICAL RESOURCES

	Name	Construction Date	Architect(s)	City Landmark	City Structure of Merit	National Register Status Code
49th Street						
1	Mouser House 449 49 th Street	1892				3S
Martin Luther King Jr. Way						
1	Sacred Heart Church 4001 Martin Luther King Jr. Way	-				4X
Ocean View Avenue						
1	5605 Ocean View Avenue 5609 Ocean View Avenue 5613 Ocean View Avenue 5617 Ocean View Avenue	-				3D
Telegraph Avenue						
1	Bank of Italy 4881 Telegraph Avenue					5S
2	Gunnings Saloon Building, Hotel Ald 4904 Telegraph Avenue	1889				3S
3	Cattaneo Block Buon Gusto Bakery 5006-5010 Telegraph Avenue	-		9/6/1983		3S

Source: Page and Turnbull, 2003.

TIEN CENTER

The Chang-Lin Tien Center for East Asian Studies is a two-phased project for which only the first phase is currently designed and scheduled for Regents' approval. Phase 1 would be located at the south base of Observatory Hill, directly across Memorial Glade from Doe Library, between Haviland Hall and McCone Hall. Phase 2 would be located at the west base of Observatory Hill, adjacent to Haviland Hall. Three National Register buildings are located in the Tien Center vicinity: Haviland Hall, Doe Memorial Library, and North Gate Hall. The site of the Leuschner (or Students') Observatory on Observatory Hill, and the Dawn Redwoods adjacent to McCone Hall, are Secondary Historical Resources.

ARCHAEOLOGICAL & PALEONTOLOGICAL RESOURCES

This section describes archaeological and paleontological resources in the 2020 LRDP planning area. It begins with an explanation of the difference between archeological and paleontological resources and then discusses the presence of these resources in each of the 2020 LRDP land use zones.

ARCHAEOLOGICAL RESOURCES

Archeological resources are the physical evidence of past human activity, including evidence of the effects of that activity on the environment. Archeological resources represent both prehistoric and historic time periods. They are found above and below ground and under water. Examples of prehistoric archeological resources include cliff dwellings, petroglyphs, surface scatters of pottery fragments and chipped stone, and campsites. Examples of historic archeological resources include archeological components of historic structures, battlefields, mining camps, forts and shipwrecks.¹¹

Standard definitions of historic significance are found in the California Register of Historical Resources and the National Register of Historic Places. The California Register generally addresses historic resources that are over 50 years old, but also notes that "a resource less than fifty years old may be considered for listing in the California Register if it can be demonstrated that sufficient time has passed to understand its historical importance." Listing on the National Register can be achieved for "a property achieving significance within the past 50 years if it is of exceptional importance."¹²

All human development can produce culturally valued art, artifacts and architecture that represents the current era in human development. Archaeological value cannot easily be defined by age -- a significant building may have been built, then demolished or accidentally destroyed after only ten years -- yet its remains and footprint may have archaeological meaning to future generations.

PALEONTOLOGICAL RESOURCES

Paleontological resources (fossils/fossilized footprints) are the remains or traces of prehistoric plants and animals. Fossils are important scientific and educational resources because they furnish information about the kinds of animals and plants that existed, when they appeared and vanished, where and how they lived, and the type of environments they preferred. Fossils help us learn how species evolved, how some descended from others, and how groups of organisms are related.¹³

CAMPUS PARK

Two prehistoric archaeological resources have been identified within the Campus Park planning area near the south fork of Strawberry Creek. These consist of a burial and habitation site found during trenching operations for the Faculty Club in 1907. Additional prehistoric archaeological sites are most likely to be found along the north and south forks of Strawberry Creek, and along the previous course of Mining Circle Creek which once traversed the Campus Park area.

Historic-era (post 1860s) artifacts have also been discovered in the Campus Park, including buried foundations of early University buildings and private residences on sites now part of the campus, utility and landscape structures, and a variety of household and workplace objects. These discoveries have typically occurred at sites where previous buildings and facilities were demolished prior to the middle of the 20th century and have not been built on since.¹⁴

Eight historic archaeological sites are known to exist in the Campus Park, and, based upon historic maps, nine additional sites may exist. The known sites include remnants of 19th Century campus buildings including East Hall, Birge Hall, and the 1890s Philosophy Building; and an area scattered with chipped stone where UC students and faculty practiced stone tool making, apparently over a long time period. Additional remnants of historic buildings and features could exist at the following locations within the Campus Park Planning Area: the previous site of 19th century greenhouses, a site used previously for artillery equipment storage by the Cadet Corps in the early 19th century, the previous location of late 19th century residences and 1870s student residences, the previous location of World War I and World War II temporary buildings, and at the previous site of an old mining building. Further, any campus structure 50 years or older may have associated archaeological deposits.

No paleontological resources are known to exist in the Campus Park. However, it is possible that excavations within previously undisturbed areas that contain Quaternary alluvium could encounter limited fossils. An exception is in the northeast corner of the planning area, between the Earth Sciences Building and Hearst Mining Circle, and between Hearst Mining Circle and the Hayward Fault, which is underlain by unfossiliferous geologic units.¹⁵

ADJACENT BLOCKS

Prehistoric archaeological sites have been recorded in the Adjacent Blocks areas. One of these sites consists of a human burial recovered from the Adjacent Blocks West area in the 1950s during ground clearing activities near Strawberry Creek. The other site also consisted of a human burial that was encountered in the Adjacent Blocks North area during construction of Memorial Stadium in 1925. Given the long development history of the adjacent blocks, the likelihood of any significant prehistoric archaeological resources remaining intact is slim, except in areas close to Strawberry Creek. The most likely locations for such resources are in the Northside area and the central portion of the Westside area, adjacent to Strawberry and Mining Circle Creeks.

There are no known historic archaeological resources in the adjacent blocks area. However, historic-era (post 1860s) resources may remain at some sites, given the area's nearly 150 years of continuous use for urban settlement and habitation. When buildings and

facilities were demolished prior to the mid-20th century, it appears to have been common practice for building foundations and other traces of use to be buried and covered over, rather than removed from a site. Such historic-era archaeological remnants may still remain if they are not on sites that have since been deeply excavated or otherwise disturbed in more recent decades.¹⁶

In the Northside area, the remnants of a late 19th century Roman Catholic student center could exist. In the Westside there is a low to moderate potential for the presence of intact remnants of private residences and associated features. The South Shattuck area is considered to have a moderate potential for the existence of such resources.

No paleontological resources are known to exist within the adjacent area; however, based upon local geology, it is possible that excavations within previously undisturbed areas that contain Quaternary alluvium could encounter limited fossils.

SOUTHSIDE

There are no known prehistoric archaeological resources in the Southside.¹⁷ The most likely locations for such resources is along the previous course of Derby Creek, which traversed the extreme eastern portion of the Southside area.

The Southside neighborhood encompasses east Berkeley's earliest historic-era settlements, including neighborhoods platted for development in the 1860s by the private College of California, and numerous sites where 19th century homes, commercial and institutional buildings, and associated structures and facilities stood. Where such buildings were demolished prior to the mid-20th century, buried remnants--including foundations, basements, trash pits, wells, and other artifacts--may remain.¹⁸

No historic archaeological resources are known to exist in the Southside area, but based upon historic maps, at least seven potential resource locations have been identified. These consist of the locations of the grounds of a 19th century private estate, the site of private residences that were demolished in the 1950s and 1960s, the Anna Head property where a school was situated, the location of the old McKinley School, and the previous locations of buildings and associated features of the School for the Deaf and Blind on the current site of the Clark Kerr Campus.

No paleontological resources are known to exist within the adjacent area, however, based upon local geology, it is possible that excavations within previously undisturbed areas that contain Quaternary alluvium could encounter limited fossils.

HILL CAMPUS

The Hill Campus encompasses a large part of the Strawberry Creek watershed. As a majority of prehistoric sites in the hill areas of Alameda County have been found along seasonal and perennial watercourses, the banks of Strawberry and Claremont creeks, and the previous course of Mining Circle Creek are considered the most likely locations for prehistoric archaeological resources.

In the early decades of the historic era, the Hill Campus was used for grazing, dairying, and other agricultural and research activities as well as recreation. 19th century water systems were constructed to supply the campus. Scattered structures were erected and

sites developed. In some cases physical remnants of these facilities and uses may remain.¹⁹ Two historic petroglyph sites have been identified in the canyons of the Hill Campus, and remnants of a barbed wire fence and a cadastral or property line marker have been recorded in this area. Three potential resource locations have been identified in the southwest portion of the area. These are the previous location of the campus poultry husbandry facilities, and the previous location of an early 20th century corporation yard, and at the location of a 1920s dumping site.

No known paleontological resources exist in the Hill Area, and there is a low potential for the occurrence of such resources in the majority of the area, which is underlain by Cretaceous age sandstones and siltstones. An exception is in the northcentral portion of this area where the Orinda Formation could yield scientifically important Miocene aged fossil mammals.

LRDP HOUSING ZONE

Archaeological sites have been discovered within one-half mile of the Campus Park.²⁰ Paleontological resources, such as mastodon teeth and fossilized shellfish and plants, have been located in the East Bay Hills. Native American remains have been found in several places in Oakland.²¹ Evidence suggests that the East Bay was populated by Native American tribes as long ago as 3,500 BC, and that they mainly lived in settlements along shorelines and creeks.²² Thus, the greatest potential for subsurface prehistoric archaeological resources in the LRDP Housing Zone exists near seasonal and perennial watercourses.

During the historic era, from the 1850s onward, many of the sites within the LRDP Housing Zone were initially developed with farms, residences and early commercial or industrial structures. Private rail transit systems served many of these areas. As urbanization intensified, most original structures were later demolished or obscured by successive eras of development, primarily auto-oriented commercial facilities along major transportation corridors. However, remnants of the original facilities and other early historic-era activities--such as trash burials from the period prior to centralized refuse collection services--may remain.²³

TIEN CENTER

Based upon a review of historic maps of the Tien Center project site, it was determined that a high potential existed for the presence of subsurface architectural remnants of the campus' astronomical observatory complex that was constructed in the 1880s and demolished in the early 1970s, and a conservatory building constructed in the 1890s for use by the Agriculture Department and demolished in 1925-26.

To determine the presence and potential significance of any historic archaeological remains that might exist at the site, a test excavation was conducted by faculty and staff of the Campus Archaeological Research Facility in June 2003 as a field course in archaeology field methods. Only sparse remnants of the Student's Observatory foundation were found. Test excavations revealed the front extent of the conservatory foundation, and intact associated materials were located. Initial testing indicates that the accessible portion of this site is well preserved. The remnants of the Conservatory may qualify for listing on the CRHR.

The site of the proposed Tien Center is not located in an area considered to have a high potential for the presence of prehistoric archaeological resources, and such resources were not encountered during recent archaeological test excavations conducted at the site. It is therefore concluded that prehistoric archaeological resources are not present at the site.

The site of the proposed Tien Center is underlain by Cretaceous age sandstone and siltstones²⁴, which have a low potential to yield paleontological resources. Therefore, it is unlikely that paleontological resources are present at the site.

4.4.5 STANDARDS OF SIGNIFICANCE

The significance of the potential impacts of the 2020 LRDP and Tien Center on cultural resources was determined based on the following standards:

Standard: Would the project cause a substantial adverse change in the significance of a historical resource as defined in CCR Section 15064.5?

Standard: Would the project cause a substantial adverse change in the significance of an archaeological resource pursuant to CCR Section 15064.5?

Standard: Would the project directly or indirectly destroy a unique paleontological resource, or site, or unique geologic feature?

Standard: Would the project disturb any human remains, including those interred outside of formal cemeteries?

4.4.6 POLICIES AND PROCEDURES GUIDING FUTURE PROJECTS

This section describes existing policies and procedures that would help to minimize cultural resource impacts of development under the 2020 LRDP. It discusses both the policies in the 2020 LRDP itself and other University agreements affecting cultural resources.

2020 LRDP

In recognition of the fact that more than a third of UC Berkeley buildings are over 50 years old and thus potentially eligible for the National Register, the 2020 LRDP includes several objectives that seek to protect potential historic resources for future generations. These include the following:

- **Plan every new project as a model of resource conservation and environmental stewardship.**
- **Maintain and enhance the image and experience of the campus, and preserve our historic legacy of landscape and architecture.**
- **Plan every new project to respect and enhance the character, livability, and cultural vitality of our city environs.**

The 2020 LRDP would support these objectives by ensuring future Campus Park projects conform to the Campus Park Guidelines, which include special provisions to protect significant landscape and open space features, and to preserve and enhance the in-

tegrity of the classical core. For projects in the City Environs, the 2020 LRDP would continue the existing UC Berkeley practice of presenting all major City Environs projects to the relevant city planning commission and landmarks commission for information and comment, prior to schematic design review by the UC Berkeley Design Review Committee.

CAMPUS POLICIES AND PROCEDURES

SITE ANALYSIS

For major landscape alterations, building alterations and new buildings, UC Berkeley staff undertake a detailed site analysis before conceptual design begins. This analysis includes consideration of historic buildings and landscapes, including at a minimum all resources listed on the National Register or determined eligible for it, and a determination as to the physical characteristics of each resource that convey its historical significance.

PROJECT DESIGN GUIDELINES

Project-specific design guidelines prepared for each project include measures to preserve and enhance the integrity of the significant features of historic buildings and landscapes. The project-specific guidelines inform the review of each project by the UC Berkeley Design Review Committee, as described below.

CONSULTATION WITH SHPO

UC Berkeley staff consult regularly with the California State Office of Historic Preservation about projects which could affect historic resources. This includes sending drawings and project descriptions to the SHPO for review, as well as meeting at UC Berkeley to observe project sites and assess project options.

INDEPENDENT DESIGN REVIEW

University policy requires independent architectural design review and independent cost estimates of projects with a total project cost over \$5 million.²⁵ The policy requires design reviews to be performed early in the preparation of design, at suitable intervals during design, and at the time of completion of design. Selection of the reviewer, or panel of reviewers, and the format for the design review are left to the discretion of the Chancellor, subject to the following:

- The reviewers shall be licensed architects or other design professionals.
- The reviewers shall have no current connection with the firm or firms acting as executive architect or as consultants on the project being reviewed.
- The reviewers shall not be employed by the University, except for qualified faculty.
- The review shall focus on, but need not be limited to, the compatibility of the design with its setting and the suitability of the design to its functional program and project budget.

At UC Berkeley, independent design review of projects is conducted by the UC Berkeley Design Review Committee, with staff support from Facilities Services. The 2020 LRDP stipulates the UC Berkeley Design Review Committee would include at least one architectural historian or other person with equivalent experience and knowledge in historic preservation. As part of project review, the DRC evaluates potential adverse impacts on cultural resources and recommends measures to avoid or minimize such impacts.

4.4.7 2020 LRDP IMPACTS

This section describes the potential cultural resource impacts of the 2020 LRDP based on the Standards of Significance, whether they are significant or less than significant, and whether any significant impacts can be mitigated to less than significant levels.

LESS THAN SIGNIFICANT IMPACTS

LRDP Impact CUL-1: Construction activities under the 2020 LRDP could have the potential to destroy a unique paleontological resource, or site, or unique geologic feature, but campus best practices would ensure this impact is *less than significant*.

There are no known paleontological resources or unique geologic features in the geographic scope of the 2020 LRDP, and the overall paleontologic potential of the planning area is low, with some areas of moderate potential. It is therefore possible that major excavations of previously-undisturbed areas could encounter limited fossil finds. Exceptions are in the northeast corner of the Campus Park and in most of the Hill Area, which are generally underlain by unfossiliferous units, and unlikely to produce fossils. Within the Hill Area, the only location that may contain fossils is in a limited area within the northcentral portion, where exposures of the Orinda Formation are present. Impacts to a paleontological resource, site, or geological feature would be significant if the resource is determined to be “a unique resource” by a qualified paleontologist or geologist. Implementation of the following best practice would ensure any impact on a unique resource would be limited to a less than significant level.

Continuing Best Practice CUL-1: In the event that paleontological resource evidence or a unique geological feature is identified during project planning or construction, the work would stop immediately and the find would be protected until its significance can be determined by a qualified paleontologist or geologist. If the resource is determined to be a “unique resource,” a mitigation plan would be formulated and implemented to appropriately protect the significance of the resource by preservation, documentation, and/or removal, prior to recommencing activities.

SIGNIFICANT IMPACTS AND MITIGATION MEASURES

LRDP Impact CUL-2: Projects developed under the 2020 LRDP could cause adverse changes in the significance of historical resources. However, in general the provisions of the 2020 LRDP and the best practices described below would ensure this impact is *less than significant*.

Projects implementing the 2020 LRDP could materially alter, in an adverse manner, those physical characteristics that convey the historic significance of a campus site or structure. This would constitute a substantial adverse change in the significance of a resource, and would potentially pose a significant impact under CEQA.

Continuing Best Practice CUL-2-a: If a project could cause a substantial adverse change in features that convey the significance of a primary or secondary resource, an Historic Structures Assessment (HSA) would be pre-

pared. Recommendations of the HSA made in accordance with the Secretary of the Interior's Standards would be implemented, in consultation with the UC Berkeley Design Review Committee and the State Historic Preservation Office, such that the integrity of the significant resource is preserved and protected. Copies of all reports would be filed in the University Archives/Bancroft Library.

Continuing Best Practice CUL-2-b: UC Berkeley would make informational presentations of all major projects in the City Environs in Berkeley to the Berkeley Planning Commission and, if relevant, the Berkeley Landmarks Commission for comment prior to schematic design review by the UC Berkeley Design Review Committee. Major projects in the City Environs in Oakland would similarly be presented to the Oakland Planning Commission and, if relevant, to the Oakland Landmarks Preservation Advisory Board.

LRDP Impact CUL-3: Under certain circumstances warranted by public benefits in furtherance of the University's educational mission, projects developed under the 2020 LRDP could cause substantial adverse changes in the significance of historical resources. Under these circumstances, the University would follow the mitigation measure described below, but the impact would remain *significant and unavoidable*.

LRDP Mitigation Measure CUL-3: If, in furtherance of the educational mission of the University, a project would require the demolition of a primary or secondary resource, or the alteration of such a resource in a manner not in conformance with the Secretary of the Interior's Standards, the resource would be recorded to archival standards prior to its demolition or alteration.²⁶

LRDP Impact CUL-4: Projects developed under the 2020 LRDP could destroy significant prehistoric or historic archaeological resources. The mitigations described below would reduce this impact to *less than significant*.

Projects developed under the 2020 LRDP could materially alter in an adverse manner those physical characteristics that make archaeological resources significant. This would constitute a substantial adverse change, and a potential significant impact under CEQA. With implementation of the measures described below, development under the 2020 LRDP would limit impacts on archaeological resources to a less than significant level.

LRDP Mitigation Measure CUL-4-a: UC Berkeley will create an internal document: a UCB Campus Archaeological Resources Sensitivity Map. The map will identify only the general locations of known and potential archaeological resources within the 2020 LRDP planning area. For the Hill Campus, the map will indicate the areas along drainages as being areas of high potential for the presence of archaeological resources. If any project would affect a resource, then either the project will be sited to avoid the location or, in consultation with a qualified archaeologist, UC Berkeley will determine the level of archaeological investigation that is appropriate for the project site and activity, prior to any construction or demolition activities.

Continuing Best Practice CUL-4-a: In the event resources are determined to be present at a project site, the following actions would be implemented as appropriate to the resource and the proposed disturbance:

- UC Berkeley shall retain a qualified archaeologist to conduct a subsurface investigation of the project site, to ascertain the extent of the deposit of any buried archaeological materials relative to the project's area of potential effects. The archaeologist would prepare a site record and file it with the California Historical Resource Information System.
- If the resource extends into the project's area of potential effects, the resource would be evaluated by a qualified archaeologist. UC Berkeley as lead agency would consider this evaluation in determining whether the resource qualifies as a historical resource or a unique archaeological resource under the criteria of CEQA Guidelines section 15064.5. If the resource does not qualify, or if no resource is present within the project area of potential effects, this would be noted in the environmental document and no further mitigation is required unless there is a discovery during construction (see below).
- If a resource within the project area of potential effect is determined to qualify as an historical resource or a unique archaeological resource in accordance with CEQA, UC Berkeley shall consult with a qualified archaeologist to mitigate the effect through data recovery if appropriate to the resource, or to consider means of avoiding or reducing ground disturbance within the site boundaries, including minor modifications of building footprint, landscape modification, the placement of protective fill, the establishment of a preservation easement, or other means that would permit avoidance or substantial preservation in place of the resource. If further data recovery, avoidance or substantial preservation in place is not feasible, UC Berkeley shall implement LRDP Mitigation Measure CUL-5, outlined below.
- A written report of the results of investigations would be prepared by a qualified archaeologist and filed with the University Archives/ Bancroft Library and the Northwest Information Center.

LRDP Mitigation Measure CUL-4-b: If a resource is discovered during construction (whether or not an archaeologist is present), all soil disturbing work within 35 feet of the find shall cease. UC Berkeley shall contact a qualified archaeologist to provide and implement a plan for survey, subsurface investigation as needed to define the deposit, and assessment of the remainder of the site within the project area to determine whether the resource is significant and would be affected by the project, as outlined in Continuing Best Practice CUL-3-a, above. UC Berkeley would implement the recommendations of the archaeologist.

Continuing Best Practice CUL-4-b: In the event human or suspected human remains are discovered, UC Berkeley would notify the County Coroner who would determine whether the remains are subject to his or her authority. The Coroner would notify the Native American Heritage Commission if the remains are Native American. UC Berkeley would comply with the provisions of Public Resources Code Section 5097.98 and

CEQA Guidelines Section 15064.5(d) regarding identification and involvement of the Native American Most Likely Descendant and with the provisions of the California Native American Graves Protection and Repatriation Act to ensure that the remains and any associated artifacts recovered are repatriated to the appropriate group, if requested.

Continuing Best Practice CUL-4-c: Prior to disturbing the soil, contractors shall be notified that they are required to watch for potential archaeological sites and artifacts and to notify UC Berkeley if any are found. In the event of a find, UC Berkeley shall implement LRDP Mitigation Measure CUL-4-b, above.

LRDP Impact CUL-5: Under certain circumstances warranted by public benefits in furtherance of the University's educational mission, projects developed under the 2020 LRDP could cause substantial adverse changes in the significance of archaeological resources. Under these circumstances, the University would follow the mitigation measure described below, but the impact would remain *significant and unavoidable*.

LRDP Mitigation Measure CUL-5: If, in furtherance of the educational mission of the University, a project would require damage to or demolition of a significant archaeological resource, a qualified archaeologist shall, in consultation with UC Berkeley:

- Prepare a research design and archaeological data recovery plan that would attempt to capture those categories of data for which the site is significant, and implement the data recovery plan prior to or during development of the site.
- Perform appropriate technical analyses, prepare a full written report and file it with the appropriate information center and provide for the permanent curation of recovered materials.

4.4.8 TIEN CENTER IMPACTS

This section describes the potential cultural resource impacts of the Chang-Lin Tien Center for East Asian Studies based on the Standards of Significance, whether they are significant or less than significant, and whether any significant impacts can be mitigated to less than significant levels.

LESS THAN SIGNIFICANT IMPACTS

HISTORIC RESOURCES

Tien Center Impact CUL-1: The proposed Phase 1 and Phase 2 buildings have the potential to cause adverse changes in the significance of historical resources, but no such changes are anticipated.

The Chang-Lin Tien Center for East Asian Studies is a two-phased project for which only the first phase is currently designed and scheduled for construction. Phase 1 would be located at the south base of Observatory Hill, directly across Memorial Glade from Doe Library. Phase 2 would be located at the west base of Observatory Hill, adjacent to

the east of Haviland Hall. Three National Register buildings are located in the Tien Center vicinity: Haviland Hall, Doe Memorial Library, and North Gate Hall. The sites of the Leuschner and Students' Observatories on Observatory Hill, and the Dawn Redwoods adjacent to McCone Hall, are Secondary Historical Resources.

The significant resource in closest proximity to the Tien Center is Haviland Hall. Phase 2 of the Tien Center, as currently envisioned in concept, could lie as close as 40 feet to the east, or rear, façade of Haviland Hall. Conceptual studies for the Phase 2 building show the building set into the western base of Observatory Hill to minimize the visual impact of the structure. The design of the exposed west façade of the building would respect and complement the classical forms and composition of Haviland Hall. Detailed building plans would be developed when funding becomes available.

As currently envisioned, however, neither Phase 1 nor Phase 2 of the Tien Center would have the potential to cause adverse changes to the significance of Haviland Hall. As noted in its nomination to the National Register:

“The major significance of Haviland, however, is its role in John Galen Howard’s Beaux Arts plan of the University. It is important to the plan by virtue of both its placement and its design qualities. Haviland is also important because it was built during Howard’s last year as supervising architect, and differs from its predecessors in that it is built of concrete rather than the more expensive granite The building is important because it helps to define both the actual structure of Howard’s plan and the principles on which his plan is based. The values of symmetry, harmony, and classicism which the founders and Regents of the University, as well as Howard himself, hoped to see embodied in their future campus are exemplified by Howard’s work on Haviland.”²⁷

The Phase 1 building has been sited and designed to both respect and complement the same principles of symmetry, harmony and classicism referenced in the Haviland nomination, and strengthen rather than compromise the integrity of the ensemble of neoclassical buildings at the heart of the Campus Park. While the Phase 1 building will not attempt to replicate the ornamental style of details featured on Haviland, it will utilize the same vocabulary of architectural forms and materials used in historic neighboring buildings such as Haviland and Doe Library, including a pitched tile roof and granite exterior walls, and will be sited to reinforce the orthogonal relationships of buildings in the classical core ensemble.

Phase 2 as currently envisioned would neither compete with nor adversely affect the significance of Haviland Hall or other nearby historic resources. However, as the design develops, the 2020 LRDP Campus Park Guidelines and CBPs CUL-2-a and CUL-2-b would serve to preclude any such impacts.

ARCHAEOLOGICAL AND PALEONTOLOGICAL RESOURCES

Tien Center Impact CUL-2: Excavation and site development for the Phase I building would result in the loss of historic archaeological resources, but the best practices described below would reduce this impact to *less than significant*.

Based upon a review of historic maps of the Tien Center project site, it was determined that a high potential existed for the presence of subsurface architectural remnants of the campus' astronomical observatory, constructed in the 1880s and demolished in the early 1970s, and a conservatory building constructed in the 1890s for use by the campus Agriculture Department and demolished in 1925-26.

To determine the presence and potential significance of any historic archaeological remains that might exist at the site, a test excavation was conducted by faculty and students of the Campus Archaeological Research Facility in June 2003 as a field course in archaeology field methods. Test excavations revealed sparse remnants of the Student's Observatory foundation and related buildings: demolition of the buildings, and possible subsequent use of the site as a staging area for the construction of McCone Hall, contributed to the eradication of evidence of the earlier site uses.²⁸ The observatory remnants lack integrity and are not a significant cultural resource warranting further study.

The remnants of the conservatory may be a unique historic archaeological resource. The conservatory structure's foundation and intact associated materials were located, and initial testing indicates that the accessible portion of this site is well preserved. The field report states, "Excavations covering 62 square meters were completed at this locus, revealing the front extent of the building and recovering an abundance of architectural and artifactual data associated with the conservatory and its occupation."

Ceramics, flower pots, building materials, glassware, faunal data, small personal items, coal and slag deposits were found. "The site is a rare example of a 19th century structure and its associated archaeology preserved on the University of California campus, the first public university in California." In order to recover the scientifically consequential information from and about the archaeological resource, limited additional excavation would be conducted in accordance with recommendations of the archaeologist.

In accordance with Continuing Best Practice CUL-4-a above, the campus would implement a further data recovery plan in consultation with a qualified archaeologist, prior to the start of construction for the Phase 1 Tien Center building. Portions of the asphalt parking lot would be removed to conduct systematic archaeological excavations. The purpose would be to ensure that some materials are recovered from each of the five original plant houses, the two additional houses added to the rear of the structure around 1912, and the boiler room. The recovery plan would require the excavation of no less than 55 square meters of the site, and no more than 65 square meters, bringing the total excavated area at the conservatory to 115-125 square meters. This would represent a significant archaeological sample from the structure and would mitigate for any archaeological impacts brought about by the construction of the Tien Center.²⁹

4.4.9 CUMULATIVE IMPACTS

This section evaluates whether the 2020 LRDP, in combination with other University and non-University projects which are reasonably foreseeable, would result in significant cumulative impacts in regard to cultural resources.

This analysis considers cumulative growth as represented by the implementation of municipal general plans, implementation of the proposed Lawrence Berkeley National Laboratory 2004 LRDP, the draft Southside Plan, the AC Transit Major Investment Study, the proposed redevelopment of University Village Albany, and implementation of the 2020 LRDP, as described in 4.0.5. The analysis also includes growth anticipated by the City of Berkeley General Plan EIR and by previously certified UC Berkeley EIRs, including the Northeast Quadrant Science and Safety Projects (SCH 2001022038), Seismic Replacement Building 1 (SCH 99122065), and the Underhill Area Projects (SCH 99042051).

The geographic context for the analysis of cumulative impacts on cultural resources includes the City of Berkeley and the areas of the City of Oakland within the scope of the 2020 LRDP. All the projects implemented under the 2020 LRDP or the Lawrence Berkeley National Laboratory 2004 LRDP would be located within this area. Given the localized nature of impacts under the Standards of Cumulative Significance, below, any potential cumulative impacts to cultural resources would occur within this geographic context.

The only effects that may occur outside these cities would be residential or other projects indirectly induced by the aforementioned projects: for example, housing to accommodate new employees at UC Berkeley or Lawrence Berkeley National Laboratory. However, any such projects would be governed by local codes and ordinances, which are presumed to preclude significant adverse impacts.

The proposed redevelopment of University Village Albany includes one significant and unavoidable impact: the demolition of the Experiment Station buildings, which may be eligible for listing on the CRHR as an historic district. However, no other project or cumulative impacts were identified for cultural resources.³⁰

The significance of the potential cumulative impacts was determined based on the following standards:

Standard: *Would the project cause a substantial adverse change in the significance of a historical resource as defined in CCR Section 15064.5.*

Standard: *Would the project cause a substantial adverse change in the significance of an archaeological resource pursuant to CCR Section 15064.5.*

The other two standards listed in 4.4.5 are determined to be adequately mitigated by project-specific measures to avoid cumulatively considerable impacts, and are not considered further in this section.

The question posed in this section is twofold:

- Is the potential *cumulative* impact of the 2020 LRDP *and* other reasonably foreseeable projects under these standards significant?
- Is the contribution of the 2020 LRDP to these impacts cumulatively considerable?

Cumulative Impact CUL-1: The 2020 LRDP, in combination with other reasonably foreseeable projects, could contribute to cumulative reduction and/or degradation of the resource base of historical or archaeological resources. The contribution of UC Berkeley projects to this impact would be minimized through the best practices and mitigations described above, but the impact would remain *significant and unavoidable*.

Both Lawrence Berkeley National Laboratory and UC Berkeley have missions that may, under certain infrequent circumstances as noted in LRDP Impacts CUL-3 and CUL-5, require the alteration or demolition of historical, archaeological, or paleontological resources that result in substantial adverse changes to their significance. While the effects on individual resources would be discrete, the combined effects of the two programs, along other projects permitted by local jurisdictions, could have an adverse cumulative impact on the resource base as a whole.

As described in 4.4.3, the cities of Oakland and Berkeley both have extensive policies and procedures to address the identification and preservation of cultural resources. While there may be specific instances where such resources must be altered or destroyed in order to achieve other public benefits, the policies and the past practices of both cities suggest such instances would be rare exceptions.

The provisions of the 2020 LRDP, and the best practices and mitigation measures cited in 4.4.7, would minimize the contribution of 2020 LRDP projects to this cumulative impact to the maximum extent feasible. When and if such impacts occur as the result of 2020 LRDP projects, LRDP Mitigation Measures CUL-3 and CUL-5 would be implemented.

4.4.10 REFERENCES

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- ² State of California, *State Preservation Laws*, <http://ceres.ca.gov/nahc/statepres.html>, retrieved on January 27, 2004.
- ³ Arrowheads Dot Com, <http://www.arrowheads.com/burials.htm#CALIFORNIA>, retrieved on January 27, 2004.
- ⁴ City of Berkeley, *Planning Commission General Plan*, April 2002, Urban Design and Preservation Element, page UD-11, <http://www.ci.berkeley.ca.us/planning/landuse/plans/generalPlan/gppdfs.html>, retrieved January 27, 2004.
- ⁵ *City of Berkeley Draft General Plan EIR*, February 2001, pages 180-181.
- ⁶ *City of Berkeley Draft General Plan EIR*, February 2001, page 312.
- ⁷ The regulations are not complete as of November 17, 2003 as per personal communication from Oakland Planning Department to Constance Lai, Page & Turnbull.
- ⁸ California Public Resources Code §21084.1, <http://www.leginfo.ca.gov/cgi-bin/calawquery?codesection=prc>, retrieved March 5, 2004.
- ⁹ California Public Resources Code §21084.1, <http://www.leginfo.ca.gov/cgi-bin/calawquery?codesection=prc>, retrieved March 5, 2004.

- ¹⁰ Office of Historic Preservation, Department of Parks and Recreation, State of California, *California Office of Historic Preservation Technical Assistance Series #8: How to Read an Historic Properties Directory*, May 23, 2001, page 1.
- ¹¹ National Park Service Archaeology and Ethnography Program, http://www.cr.nps.gov/aad/afori/wharre_intr.htm, retrieved on January 27, 2004.
- ¹² California Office of Historic Preservation Technical Assistance Series #6, “California Register and National Register: A Comparison”, May 23, 2001, http://www.ohp.parks.ca.gov/pages/1069/files/06%20cal%20reg_and_%20nat%20reg.pdf, retrieved on January 27, 2004.
- ¹³ California Geological Survey, Note 51, “Fossils”, 2002, http://www.conservation.ca.gov/cgs/information/publications/cgs_notes/note_51/note_51.pdf, retrieved on January 27, 2004.
- ¹⁴ Finacom, Steve, Planning Analyst, UCB Facilities Services. Personal communication with Jennifer Lawrence, Principal Planner, UCB Facilities Services, October 17, 2003.
- ¹⁵ Holroyd, Patricia, UCB Museum Scientist. Personal communication with Carol Kielusiak, UCB Facilities Services, December 4, 2003.
- ¹⁶ Finacom, Steve, Planning Analyst, UCB Facilities Services. Personal communication with Jennifer Lawrence, Principal Planner, UCB Facilities Services, October 17, 2003.
- ¹⁷ UC Berkeley, *Long Range Development Plan Draft Environmental Impact Report*, January 1990, page 4.3-8.
- ¹⁸ Finacom, Steve, Planning Analyst, UCB Facilities Services. Personal communication with Jennifer Lawrence, Principal Planner, UCB Facilities Services, October 17, 2003.
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- ²⁰ UC Berkeley, *Long Range Development Plan DEIR*, January 1990, page 4.3-15.
- ²¹ City of Oakland, *Oakland General Plan, Land Use and Transportation Element, Draft EIR*, page III.G-1.
- ²² City of Oakland, *Oakland General Plan, Land Use and Transportation Element, Draft EIR*, page III.G-2.
- ²³ Finacom, Steve, Planning Analyst, UCB Facilities Services. Personal communication with Jennifer Lawrence, Principal Planner, UCB Facilities Services, October 17, 2003.
- ²⁴ US Geological Survey (USGS), Miscellaneous Field Study MF-2342, “Geologic map and Map Database of the Oakland Metropolitan Area, Alameda, Contra Costa, and San Francisco Counties, California”, <http://geopubs.wr.usgs.gov/map-mf/mf2342/>, overlain with GIS data from UC Berkeley’s GIS Center, December 5, 2003.
- ²⁵ University of California, *Facilities Manual*, Vol 3, Part 1, Chapter 5, Section 5.1, <http://www.ucop.edu/facil/fmc/facilman/volume3/part1/ch5.html>, retrieved February 19, 2004.
- ²⁶ The Historic American Building Survey (HABS), developed by the National Park Service, outlines standards for formally documenting / recording historic structures and sites. HABS standards help insure that documentation is clear and accurate, long-lasting, and of use to future researchers. The Berkeley campus uses an approach similar to that outlined in HABS for photo-documenting historic structures. Key elements include: black and white photography, processed through true black and white development methods; large format (5x7 or similar) prints; contact prints on archival fiber-based paper; labeling and indexing of photographs to accurately document dates and locations of photographs. Photographic sets would be deposited in the permanent collection of the University Archives (Bancroft Library) to ensure their long-term preservation and access to researchers.
- ²⁷ Entries in the National Register, State of California, *Haviland Hall*, Section 8-Significance, February 1 1982.
- ²⁸ Wilkie and Kozakavich, *2003 Archaeological Field Research Report*, page 40
- ²⁹ Wilkie, *Proposed Recovery Plan for Locus A*, January 19 2004.
- ³⁰ UC Berkeley, *Subsequent Focused Draft EIR for the University Village & Albany/Northwest Berkeley Properties Master Plan Amendments*, January 30, 2004, pages 99-101.

4.5 GEOLOGY, SEISMICITY AND SOILS

This chapter assesses the potential geologic, soils and seismic risks of the 2020 LRDP and the Chang-Lin Tien Center for East Asian Studies. A description of the existing geologic and soils conditions at UC Berkeley and in the LRDP area is included to provide context for the analysis.

During the scoping period for this EIR, several geology, soils and seismicity concerns were raised, including concerns about Hill Campus landsliding, the campus' proximity to the Hayward fault and an Alquist-Priolo Earthquake Fault Zone, and the potential for exposure to liquefaction hazards. These issues are addressed in this chapter.

4.5.1 ANALYTICAL METHODS

2020 LRDP

This chapter summarizes previously published geotechnical information, which was reviewed and synthesized for this EIR. The campus-specific background information contained in this chapter is synthesized from several sources, including the geotechnical investigation prepared as part of the study entitled *The Economic Benefits of a Disaster Resistant University*, the *1997 Preliminary Seismic Evaluation, Phase 1*, the *City of Berkeley General Plan Draft EIR*, the *Northeast Quadrant Science and Safety Projects EIR*, and the *1990 LRDP EIR*. Maps by the United States Geological Survey (USGS), the California Division of Mines and Geology (CDMG) and the Association of Bay Area Governments (ABAG) were the other key sources for existing setting information. The potential impacts of implementation of the 2020 LRDP were then evaluated against this baseline in light of the adequacy of existing programs and proposed LRDP policies intended to reduce seismic hazards and geologic impacts..

TIEN CENTER

The resources listed above were examined to provide general local geologic and seismic hazard information for the proposed Tien Center site. The primary resource for the Tien Center analysis, however, was the site-specific geotechnical study that was conducted in October 2003 for the Tien Center site.¹

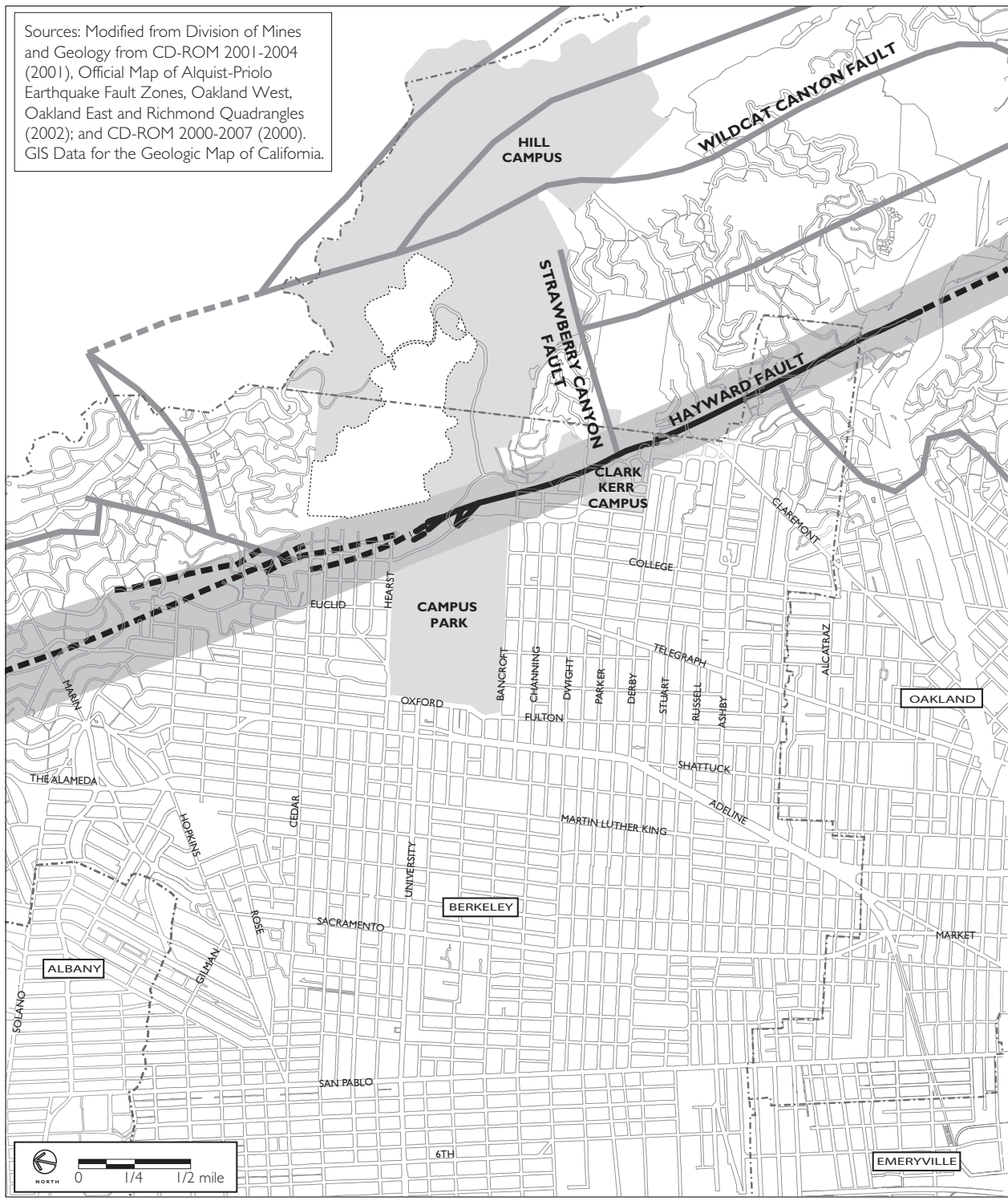
4.5.2 REGULATORY FRAMEWORK

This section summarizes federal and state regulations related to seismic safety to which the University is subject.

UNIFORM BUILDING CODE

The Uniform Building Code (UBC) has been adopted by most jurisdictions in California to oversee construction, including both Berkeley² and Oakland.³ The UBC defines four Seismic Zones in the United States, which are ranked according to their seismic hazard potential. Zone 1 has the least seismic potential and Zone 4 has the highest seismic potential. The Bay Area is located in Zone 4, where stronger standards for buildings have been adopted in the UBC. ⁴

Sources: Modified from Division of Mines and Geology from CD-ROM 2001-2004 (2001), Official Map of Alquist-Priolo Earthquake Fault Zones, Oakland West, Oakland East and Richmond Quadrangles (2002); and CD-ROM 2000-2007 (2000). GIS Data for the Geologic Map of California.



- — — Active fault traces**
 - solid where well located,
 - dashed where location or existence is uncertain
- — — Inactive fault traces**
 - solid where well located, dashed where
 - location or existence is uncertain
- Alquist-Priolo Earthquake Fault Hazard Zone**
- - - - - City Limit Line**
- Lawrence Berkeley National Laboratory Boundary**

FIGURE 4.5-1
**FAULTS & EARTHQUAKE
 FAULT HAZARD ZONE**

STATE

The State of California has established a variety of regulations and requirements related to seismic safety and structural integrity, including the California Building Code, the Alquist-Priolo Earthquake Fault Zoning Act, and the Seismic Hazards Mapping Act.

CALIFORNIA BUILDING CODE

The California Building Code (CBC), based largely on the Uniform Building Code, is the building code used by UC Berkeley (California Code of Regulations Title 24). Through the CBC, the state provides a minimum standard for building design and construction. The CBC contains specific requirements for seismic safety, excavation, foundations, retaining walls, and site demolition. It also regulates grading activities, including drainage and erosion control.⁵

ALQUIST-PRIOLO EARTHQUAKE FAULT ZONING ACT

The Alquist-Priolo Earthquake Fault Zoning Act was passed in 1972 to mitigate the hazard of surface faulting to structures for human occupancy. The main purpose of the Act is to prevent the construction of buildings used for human occupancy on the surface trace of active faults. The Act only addresses the hazard of surface fault rupture and is not directed toward other earthquake hazards.⁶ The law requires the State Geologist to establish regulatory zones (known as Earthquake Fault Zones or Alquist-Priolo Zones) around the surface traces of active faults and to issue appropriate maps. The maps are distributed to all affected cities, counties, and state agencies for their use in planning and controlling new or renewed construction. Local agencies must regulate most development projects within the zones and there can generally be no construction within 50 feet of an active fault zone. The zones vary in width, but average about one-quarter mile wide.⁷

Under the provisions of the Alquist-Priolo Earthquake Fault Zoning Act, sites within 50 feet of an active fault trace are assumed to be underlain by a fault, unless proven otherwise.⁸ The Act states that prior to project approval, cities and counties shall require a geologic report defining and delineating any hazard of surface fault rupture.⁹ No structures for human occupancy may be built across an identified active fault trace.¹⁰

Pursuant to the Act, the State of California has delineated an Earthquake Fault Zone for the Hayward fault, which runs through the eastern portion of the UC Berkeley campus.¹¹ This is the only Earthquake Fault Zone within the 2020 LRDP area, as mapped in Figure 4.5-1.

SEISMIC HAZARDS MAPPING ACT

The Seismic Hazards Mapping Act, passed in 1990, addresses non-surface fault rupture earthquake hazards, including liquefaction and seismically induced landslides.¹² Under the Act, seismic hazard zones are to be mapped by the State Geologist to assist local governments in land use planning. The Act states that “it is necessary to identify and map seismic hazard zones in order for cities and counties to adequately prepare the safety element of their general plans and to encourage land use management policies and regulations to reduce and mitigate those hazards to protect public health and safety”.¹³ §2697(a) of the Act additionally requires that “Cities and counties shall require, prior to the approval of a project located in a seismic hazard zone, a geotechnical report defining and delineating any seismic hazard.”

4.5.3 LOCAL PLANS AND POLICIES

Although the University is constitutionally exempt from local regulations when using its property in furtherance of its educational purposes, it is University policy to evaluate proposed projects for consistency with local plans and policies. Therefore, this section outlines the plans and policy goals of the cities of Berkeley and Oakland related to geology.

CITY OF BERKELEY

BERKELEY GENERAL PLAN

As they relate to geology and soils, City of Berkeley General Plan policies relevant to the 2020 LRDP are those that address safety from geologic hazards. Berkeley General Plan policies address public safety from such hazards in the Disaster Preparedness and Safety Element. Policies in this Element aim to reduce the risk of death, injuries, property damage, and economic and social dislocation from natural and human-made hazards and disasters.¹⁴ This goal is supported by policies that require appropriate mitigation in new development, using the environmental review process to ensure avoidance of hazards and/or adequate mitigation of hazard-induced risk, and maintaining construction standards that minimize risks from hazards, including geological hazards. Additional policies and actions that aim to reduce risk require soil investigation and/or geotechnical reports in conjunction with development/ redevelopment on sites within designated hazard zones.

FINDINGS OF THE BERKELEY GENERAL PLAN EIR

The City of Berkeley General Plan EIR drew several conclusions regarding the influence of the General Plan on geology, soils and seismicity in Berkeley. Because of the generally flat topography of all the developed areas of the city where redevelopment or intensification of uses could occur, no substantial alteration of topography would occur.¹⁵ Since there are no agricultural lands in Berkeley, development under the General Plan was found to have no impact with regard to substantial soil erosion or loss of topsoil. Improving the disaster-resistance of utility and transportation systems by repair and/or relocation projects was determined to be subject to project-specific CEQA review.¹⁶ New housing stock constructed as a result of General Plan policies, including housing that might be constructed by UC Berkeley, would expose more people to potential hazards from severe seismic ground shaking. As mitigation, the EIR proposed advancing implementation of the policies outlined in Table 4.5-1, which would reduce the impact to less than significant

CITY OF OAKLAND

The City of Oakland is in the process of updating its Environmental Hazards and Safety Element. The update was not yet completed as of February 2004.¹⁷ The current Element, adopted in 1974, includes policies that address geologic hazards, such as landsliding and unstable soils, and seismic hazards. Policies that address new building include limiting construction in hazard areas except where adequate corrective measures can be implemented, and requiring proposed developments in Special Studies Zones to submit geologic reports prior to permitting and approval.¹⁸

TABLE 4.5-1

POLICIES PRIORITIZED FOR IMPLEMENTATION AS GEOLOGIC AND SEISMIC HAZARD MITIGATION IN THE CITY OF BERKELEY GENERAL PLAN EIR

LU-7	Preserve and protect the quality of life in Berkeley’s residential areas through careful land use decisions. Action: C. Carefully review and regulate proposals for additional residential development in the Fire Hazard Area and also the Seismic and Landslide Hazard Area
H-14	Seismic Reinforcement. Maintain housing supply and reduce the loss of life and property caused by earthquakes by requiring structural strengthening and hazard mitigation in Berkeley housing.
PD-9	Disaster Resistance and Post Disaster Preparation. Encourage, and where appropriate require, owners of historically or architecturally valuable buildings to incorporate disaster-resistance measures to enable them to be feasibly repaired after a major earthquake or other disaster.
PD-16	Other New Incentives. Consider potential new funding, tax-reduction, and technical-assistance incentives which the City and/or other entities could provide to facilitate preservation. Action: A. Consider providing new or expanded sources of financial assistance for unreinforced-masonry and other structures, including historically or culturally significant ones that need seismic retrofit.
S-1	Response Planning. Ensure that the City’s emergency response plans are current and incorporate the latest information on hazards, vulnerability and resources.
S-2	Neighborhood Preparation and Education. Continue to provide education, emergency preparedness training and supplies to the community at the neighborhood level to support neighborhood and community-based disaster response planning.
S-3	Public Information. Publicize disaster preparedness efforts (such as CERT) and expand public awareness of specific hazards and risks by making available all relevant information including mapping and reports on various hazards, information on vulnerability and risk reduction techniques, evacuation routes, emergency services, and information on financial and technical assistance resources.
S-4	Special Needs Communities: Continue to work with the social service community to ensure the safety of special needs populations.
S-5	The City’s Role in Leadership and Coordination. Ensure that the City provides leadership and coordination of the private sector, public institutions and other public bodies in emergency preparedness.
S-6	Damage Assessment. Establish and maintain a rapid damage assessment capability
S-7	Emergency Water Supply. Protect life and property in the event of an earthquake by evaluating alternate drinking water and fire-fighting water supply in the event of failure of the East Bay Municipal Utility District (EBMUD) water supply.
S-8	Continuity of Operations. Provide for the continuation of City government and services following a major disaster.
S-9	Pre-Event Planning. Establish pre-event planning for post-disaster recovery as an integral element of the emergency preparedness programs of the City Council and each of the City departments.

TABLE 4.5-1

POLICIES PRIORITIZED FOR IMPLEMENTATION AS GEOLOGIC AND SEISMIC HAZARD MITIGATION IN THE CITY OF BERKELEY GENERAL PLAN EIR

S-10	Sustaining Mitigation Initiatives. Improve public awareness and establish new public/private partnerships to implement mitigation initiatives in the community and region through programs such as Project Impact.
S-11	Historic Structures. Encourage and support the long-term protection of historic or architecturally significant structures to preserve neighborhood and community character.
S-12	Utility and Transportation Systems. Improve the disaster-resistance of utility and transportation systems to increase public safety and to minimize damage and service disruption following a disaster.
S-13	Hazards Identification. Identify, avoid and minimize natural and human-caused hazards in the development of property and the regulation of land use.
S-14	Land Use Regulation. Require appropriate mitigation in new development, redevelopment/re-use or in other applications.
S-15	Construction Standards. Maintain construction standards that minimize risks to human lives and property from environmental and human-caused hazards for both new and existing buildings.
S-17 (sic: S-16 missing from text)	Residential Seismic Retrofitting Incentive Program. Maintain existing programs such as the Residential Seismic Retrofitting Incentive Program to facilitate retrofit of potentially hazardous structures.
S-18	Public Information. Establish public information programs to inform the public about seismic hazards and the potential hazards from vulnerable buildings.
S-19	Risk Analysis. Understand and track changes in seismic risk utilizing the best available information and tools.
S-20	Mitigation of Potentially Hazardous Buildings. Pursue all feasible methods, programs and financing to mitigate potentially hazardous buildings.

Source: City of Berkeley, *General Plan Draft EIR*, February 2001, page 212.

4.5.4 EXISTING SETTING

REGIONAL GEOLOGY

The Bay Area is located where the boundaries of the Pacific and North American Plates are in contact.¹⁹ The movement of these plates produces the general northwest-southeast trend of valleys and ridges in the Bay Area and the regional seismicity that is common to this part of northern California.²⁰

The geologic formations in the Bay Area belong to the Coast Ranges geomorphic province. The San Andreas rift system divides the formations of this province between North American and Pacific rock types. Rock types within this zone are intermingled due to the sliding action between the plates.

The oldest well-documented bedrock in the East Bay is the Franciscan assemblage. Much younger formations of consolidated rocks form the core of the Berkeley Hills.

The unconsolidated fluvial gravels, sands, silts and clays deposited in the major north-west-southeast trending valleys are derived from these younger rocks.²¹

LOCAL GEOLOGY AND SOILS

The UC Berkeley campus and City Environs are underlain primarily by shales, sandstones and blue schists of the Cretaceous Franciscan assemblage, and claystones, shale, sandstones and siltstones from the late Cretaceous to Tertiary periods. Most of the 2020 LRDP Housing Zone is underlain by Temescal formation.²² Soils in the area include Xerorthent, Millsholm, Los Osos, Maymen, Tierra associations. Additional information about local geology and soils is located in Appendix B.

SEISMICITY AND SEISMIC HAZARDS

REGIONAL SEISMICITY

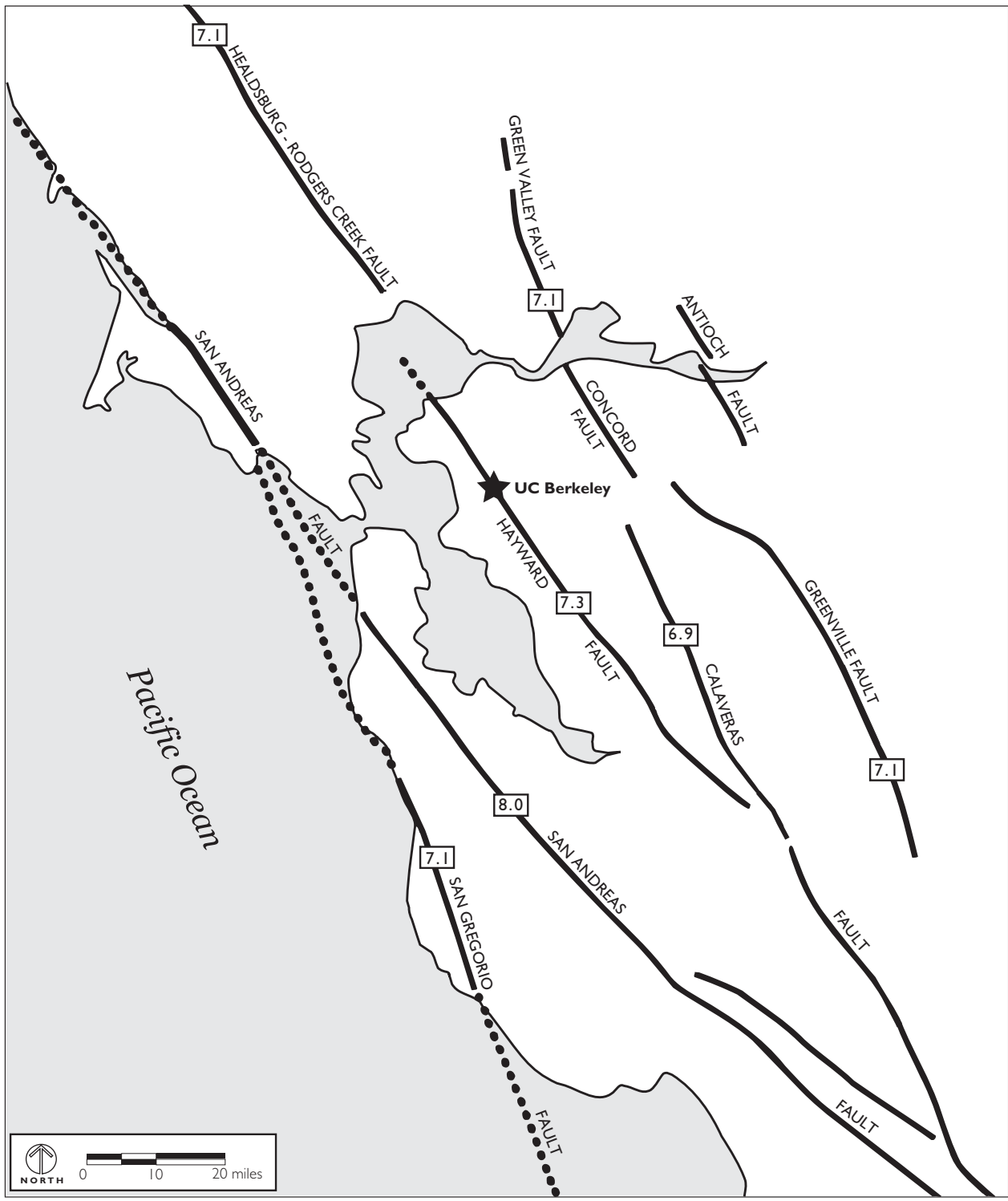
The San Francisco Bay Area is considered one of the more seismically active areas in the world, based on its record of historical earthquakes and its position relative to the North American and Pacific Plate boundaries.²³ As shown in Figure 4.5-2, the major faults that comprise the plate boundary within the Bay Area are the San Andreas, Hayward, Calaveras and San Gregorio faults.²⁴

Other key faults in the Bay Area include the Rodgers Creek-Healdsburg, Concord-Green Valley, and Calaveras, West Napa, and Clayton-Marsh Creek-Greenville faults. Table 4.5-2 lists the distance from the Hearst Memorial Mining Building (on the Campus Park), direction, maximum moment magnitude, and slip rate for each of the major faults in the Bay Area.

Of all the faults in the Bay Area, the Hayward fault is most relevant to UC Berkeley, since it passes through the eastern part of the campus²⁵, under Memorial Stadium and close to Bowles Hall, the Greek Theatre, and Donner Lab. The Hayward fault zone is approximately 53 miles long.²⁶ The width of the fault zone varies from approximately 1.2 to 6.2 miles.²⁷ Fault traces in the LRDP area are shown in Figure 4.5-1.

There are several other faults in the area of the campus. The Strawberry Canyon fault, Lawrence Hall fault complex, and other short faults in the Hill Campus area are not active. The Wildcat fault in the Hill Campus may be active, but the question of activity along it remains unresolved.²⁸ Additional information on these faults is included in Appendix B.1.

A new study assessing the probability of earthquakes in the San Francisco Bay Area was released in April 2003 by the USGS Working Group on California Earthquake Probabilities. The results of the study, which are summarized by fault in Table 4.5-3, indicate that the Bay Area is highly likely to experience a damaging earthquake in the next 30 years, with a 62 percent probability for one or more events of magnitude (M)²⁹ 6.7 or higher. The San Andreas fault, the Hayward-Rodgers Creek fault, and the Calaveras fault pose the greatest threat because they have high quake odds and run through the Bay Area's urban core.³⁰ The USGS recently estimated that the Hayward-Rodgers Creek fault has the highest probability of generating a $M \geq 6.7$ earthquake before 2032 among Bay Area faults.³¹



Sources: DC&E, January 1997; US Geologic Survey, Working Group on California Earthquake Probabilities, 1990; Stellar Environmental Solutions, November 1996.

7.1 Maximum Credible Earthquake (MCE) Magnitude

— Fault

●●●● Suboceanic Fault

FIGURE 4.5-2
REGIONAL FAULTS

TABLE 4.5-2
REGIONAL ACTIVE FAULTS

Fault	Approximate Miles from CampusPark ^A	Direction from Site	Maximum Moment Magnitude ^B	Slip Rate ^B (inches/yr)
San Andreas	19	West	7.9	0.94±0.12
San Gregorio	20	West	7.3	0.2±0.08
Hayward	0.15	East	7.1	0.35±0.04
Rodgers Creek- Healdsburg	14	North	7.0	0.35±0.08
Concord-Green Valley	14	East	6.9	0.24±0.12
Northern Calaveras	14	East	6.8	0.24±0.08
West Napa	20	Northeast	6.5	0.04±0.04
Clayton-Marsh Creek-Greenville	18	East	6.9	0.08±0.04

^A Distances measured from Hearst Memorial Mining Building.

^B Maximum moment magnitude and slip rate data from Petersen and others (1996).

Source: Table-2-1 of Geomatrix Consultants, *Appendix One: Geologic Hazards Investigation, Central Campus, University of California at Berkeley*, January 2000, prepared as part of *Economic Benefits of a Disaster Resistant University* by Dr. Mary Comerio, Institute of Urban and Regional Development, UC Berkeley, April 2000.

GROUND SHAKING. The largest hazard related to seismic activity is earthquake-induced ground shaking. Ground shaking effects can be generated by earthquakes on nearby faults (such as Hayward) or by earthquakes on more distant faults (such as Calaveras or the San Andreas). As a general rule, the severity of ground shaking increases with proximity to the epicenter of the earthquake. The least amount of damaging vibration would occur on sites completely composed of bedrock, as some are in the Hill Campus. Sites underlain by major thicknesses of alluvium, such as those west of the Hayward fault, could experience considerably more vibration because of the tendency for unconsolidated materials to deform to a greater degree than the bedrock.³²

The areas of highest risk for ground shaking in the 2020 LRDP area are those along the trace of the Hayward fault in the Berkeley and Oakland Hills. Areas underlain by bedrock at the greatest distance from the fault would be subject to lower levels of ground shaking.³³ Peak rock accelerations in the vicinity of the Hayward fault are expected to exceed 0.5g (more than 50 percent of the acceleration of gravity). Peak soil accelerations could exceed 0.7g. Buildings to be constructed would need to be built to resist the accelerations actually calculated for the building site.³⁴

The peak ground accelerations that would cause these intensities vary with the substrate through which the seismic vibrations pass. Also, higher intensities occur in buildings with poorer structural design, at lower peak ground accelerations.³⁵

TABLE 4.5-3
PROBABILITIES OF ONE OR MORE $M \geq 6.7$ EARTHQUAKES IN SAN FRANCISCO BAY AREA, 2002-2031

Source Fault	Probability
San Gregorio	0.10
San Andreas	0.21
Hayward-Rodgers Creek	0.27
Calaveras	0.11
Concord-Green Valley	0.04
Greenville	0.03
Mount Diablo	0.03
Background	0.14
Regional Aggregate	0.62

Source: USGS, *Earthquake Probabilities in the San Francisco Bay Region: 2000 to 2031*, Open File Report 03-214, 2003, Table ES-1, page 3.

SURFACE-FAULT RUPTURE. Surface-fault rupture due to earthquakes occurs along fault lines. Due to its proximity to the Hayward fault, surface ruptures have occurred at UC Berkeley during past earthquakes. Movement has been both vertical and horizontal, with recent movements in a right lateral direction.³⁶ A potentially significant surface-fault hazard exists for utility lines (e.g. EBMUD water distribution lines) that cross the active traces of the Hayward fault. West of Gayley Road and Piedmont Avenue, there is not believed to be a significant surface-fault rupture hazard, except as would result from loss of utility services that cross the Hayward fault.³⁷

LIQUEFACTION. Liquefaction can occur in loose soils due to ground shaking. Liquefaction is the transformation of a solid state to a liquid state, resulting in ground settling, landsliding and lurch cracking. Earthquake-induced liquefaction does not affect bedrock; however, it does affect certain types of alluvium under conditions of saturation. Liquefiable material at or near the ground surface usually needs to be replaced or re-compacted before it can be used as structural support.³⁸

Liquefaction generally occurs mostly along the margins of San Francisco Bay and in areas of poorly compacted fill. In the 2020 LRDP area, it could occur along river and creek channels and in poorly compacted fill areas where cohesionless deposits exist.³⁹ Alluvial fan or piedmont areas between the hills and the Bay, such as the setting of the UC Berkeley campus, typically comprise relatively firm ground that is not subject to localized liquefaction.⁴⁰

The Adjacent Blocks and the Hill Campus are not located in a liquefaction hazard zone, except at the Memorial Stadium site. The only portion of the Campus Park which is mapped as a liquefaction hazard zone is along Strawberry Creek.⁴¹ Geotechnical borings drilled across the Campus Park show that earth materials are bedrock or stiff clays or dense clayey soils that are not subject to liquefaction. Thus, no significant hazard due to liquefaction has been identified on the Campus Park.⁴²

Liquefaction hazard maps prepared by ABAG for various earthquake scenarios show a very low to moderately low liquefaction hazard level for most of the area within the 2020 LRDP area. Figure 4.5-3 shows a generalization of the liquefaction hazard level in the 2020 LRDP area as mapped by the California Geological Survey.

EARTHQUAKE-INDUCED FLOODING. Earthquake-induced flooding is caused by failure of dams or other water-retaining structures due to earthquakes. A geologic hazards investigation of the Campus Park and Hill Campus concluded that since there are no dams, bodies of water, or other conditions that could result in flooding in those areas, no significant earthquake-induced flooding hazard exists for the Campus Park or Hill Campus.⁴³

The Berryman and Summit Reservoirs could potentially inundate portions of Berkeley if either was ruptured as the result of a seismic event. However, failure of the Summit Reservoir would not affect any portion of the LRDP Housing Zone. Failure of the Berryman Reservoir could potentially affect several blocks of the LRDP Housing Zone along University Avenue east of Interstate 80, and a few parcels between Martin Luther King Boulevard and Shattuck Avenue north of Cedar Street.⁴⁴ However, seismically induced flooding due to reservoir failure or inundation is considered unlikely in Berkeley.⁴⁵ Small portions of the LRDP Housing Zone between College and Telegraph Avenues lie within the Claremont and Temescal dam failure inundation areas.⁴⁶

EARTHQUAKE-INDUCED LANDSLIDES. Earthquake-induced landsliding of steep slopes can occur in either bedrock or unconsolidated deposits. Firm bedrock usually can stand in steeper slopes than soils are able to maintain. Rock type, grain size, degree of consolidation, and angle of beds all contribute to the strength or weakness of a bedrock hillside. Shales and deeply weathered rocks are very susceptible to slope failures. Seismic activity induces some landsliding, but most slides result from the weight of rain-saturated soil and rock exceeding the shear strength of the underlying material.⁴⁷

SLOPE STABILITY HAZARDS

Landsliding is a significant component of the natural erosional process. Static slope instability is the major cause of landslides other than those induced by seismic vibration. Slope instability can result from earthquakes, weak materials, stream and coastal erosion, and heavy rainfall. Several conditions can exacerbate slope instability, including steep slopes, shallow soil development, the presence of an excessive amount of water, or the lack of shear strength in the soil or at the soil/rock interface. Erosion of supporting material at the toe of the landslide or of the landslide-exposed slopes further contributes to instability. Such human activities as making road cuts, diverting surface runoff or impounding water can reduce the natural shear strength of bedrock slopes and generate landsliding even in areas of normally low susceptibility.⁴⁸

Significant portions of the Hill Campus have been designated landslide hazard areas by the California Geological Survey. Generalized landslide hazard areas in the 2020 LRDP area are shown in Figure 4.5-3. A geologic hazards investigation of the Campus Park and Hill Campus made the following conclusions with respect to landslide and related hazards:



Source: California Geological Survey, Official Maps of Seismic Hazard Zones, Oakland East, Oakland West, Richmond, and Briones Valley Quadrangles, 2003.

- Landslide Hazard Zones**
- Liquefaction Hazard Zones**
- City Limit Line**
- Lawrence Berkeley National Laboratory Boundary**

FIGURE 4.5-3
**LANDSLIDE AND LIQUEFACTION
HAZARD ZONES**

- There is no significant landslide hazard for the Campus Park because no facilities are located within the area of potential landsliding.
- A potential landslide hazard exists for the area upslope and east of Bowles Hall and Stadium Rimway.⁴⁹
- The stadium is stressed by aseismic creep.⁵⁰
- Although there are steep slope cuts occurring along Stadium Rim Way and near several buildings along Gayley Road, these slopes appear to be stable and thus judged not to be a significant landslide hazard.
- A potentially significant hazard due to landsliding may exist for the PG&E 12kv power feeds because these power cables apparently pass through areas of potential landsliding.

A potentially significant hazard may also exist for any other utility services that pass through the area of potential landsliding or other areas susceptible to landsliding east of the Campus Park study area.⁵¹

The City of Berkeley General Plan states that landslide prone areas in Berkeley include several residential areas below Grizzly Peak Boulevard, south of Marin Avenue and east of The Alameda. The magnitude of a landslide occurring in these areas would depend on several factors, including rainfall levels.⁵²

In the portions of the City of Oakland within the 2020 LRDP area, the Hill Campus area is classified as “most susceptible” to landslide potential. Portions of northeastern Oakland between the City of Berkeley and Piedmont borders are classified “moderately susceptible. The rest of Oakland within the 2020 LRDP area is “least susceptible” to landslide potential.⁵³

EXPANSIVE SOILS

Although recent geotechnical investigations for the Campus Park⁵⁴ did not specifically determine soil expansiveness, the Soil Conservation Service soil surveys indicate that soils in the 2020 LRDP area range from Xerorthents-Millsholm soils, which have low shrink-swell potential and are found primarily in the Hill Campus, to low-to-high shrink potential Tierra-Urban land soils which exist in the remainder of the 2020 LRDP area. Soil expansiveness potential likely varies across the Campus Park and in the other land use zones given the variety of geologic units underlying the area.

4.5.5 STANDARDS OF SIGNIFICANCE

The significance of the potential impacts of the 2020 LRDP and Tien Center related to geology, soils and seismicity was determined based on the following standards:

- Standard:** *Would the project expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving:*
- *Rupture of a known earthquake fault?*
 - *Strong seismic ground shaking?*
 - *Seismic -related ground failure, including liquefaction?*
 - *Landslides?*

- Standard:** *Would the project result in substantial soil erosion or the loss of topsoil?*

Standard: Would the project 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 landslides, lateral spreading, subsidence, liquefaction or collapse?

Standard: Would the project be located on expansive soil, as defined in Table 18-1 of the Uniform Building Code, creating substantial risks to life or property?

4.5.6 POLICIES AND PROCEDURES GUIDING FUTURE PROJECTS

This section describes existing policies and procedures that would help to minimize potential geologic and seismic impacts of development under the 2020 LRDP. It discusses both the policies in the 2020 LRDP itself and other University policies affecting geology, soils and seismicity.

2020 LRDP

The 2020 LRDP would guide the location, scale, form and design of new University projects with sensitivity to geology, seismicity and soils considerations.. Three of the LRDP Objectives described in Chapter 3.1 are particularly relevant:

- **Provide the space, technology and infrastructure we require to excel in education, research, and public service.**
- **Plan every new project to represent the optimal investment of land and capital in the future of the campus.**
- **Maintain the Hill Campus as a natural resource for research, education and recreation, with focused development on suitable sites.**

The first objective is supported by policies to eliminate 'poor' and 'very poor' seismic ratings in campus buildings through renovation or replacement; to consider enhanced levels of seismic performance for critical buildings; and to minimize nonstructural hazards in buildings. Under the second objective, the policy to base capital investment decisions on life cycle cost, including the cost of known future expenditures, could help to prioritize seismic safety elements as a factor in safety and recovery of buildings.

The Hill Campus is more susceptible to non-seismic geologic hazards than other UC Berkeley properties. The 2020 LRDP addresses this potential with the general objective of maintaining the Hill Campus as a natural resource for research, education, and recreation, with focused development on suitable sites. More specifically, the policy to manage the Hill Campus landscape to reduce fire risk and restore native vegetation patterns would help to reduce geologic hazards such as landslides, as well as erosion and loss of topsoil.

UNIVERSITY POLICY ON SEISMIC SAFETY

In 1995, the University of California revised its *University Policy on Seismic Safety*, which was first adopted in 1975. The policy states that the University's policy is "to acquire, build, maintain, and rehabilitate buildings and other facilities which provide an acceptable level of earthquake safety." The policy requires that the design and construction of new buildings and other facilities on University premises shall, as a minimum, comply

with current seismic provision of CCR Title 24, California Building Standards Code, or local seismic requirements, whichever are more stringent. A copy of the full policy is located in Appendix B. The overall administration of the *University Policy on Seismic Safety* is the responsibility of the President of the University of California.⁵⁵

CAMPUS POLICIES AND PROCEDURES

SAFER PROGRAM

The SAFER (Seismic Action Plan for Facilities Enhancement and Renewal) Program provides a comprehensive approach to seismic safety at UC Berkeley.⁵⁶ A 1997-1998 survey was conducted jointly by three of California's most experienced structural engineering firms. They analyzed the probable performance of campus structures in the likely event of a major earthquake on the Hayward fault.

The study rated 102 UC Berkeley structures as 'poor' or 'very poor', indicating a significant hazard to life in a major seismic event. At the time, seismic upgrades to several campus buildings had already been completed, but the campuswide evaluations greatly increased the scope of the improvements program. As of 2003, 46% of campus space requiring seismic upgrades had already been improved, and another 25% of space was undergoing upgrade, related new construction, or in design.

SEISMIC DESIGN REVIEW

In recognition of the prevailing earthquake hazard near UC Berkeley, the University of California has implemented a process for the design and retrofit of new and existing facilities that applies the best available engineering procedures to maximize safety and resiliency. The Seismic Review Committee (SRC), appointed by the Chancellor, closely monitors all campus seismic and structural engineering work. Members are nationally recognized experts in earthquake engineering. The SRC sets specific seismic design criteria and periodically reviews all projects in bi-monthly meetings.

All seismic and structural engineering design for new and existing facilities on campus must conform to the California Building Code. The SRC also requires that designs be evaluated using performance-based engineering analysis procedures. These techniques predict expected performance explicitly in terms of life safety, damage, and downtime due to an earthquake. If the code minimum design does not produce adequate performance it is upgraded.

UC Berkeley has developed site-specific seismic ground motion specifications that are used for analysis and design purposes. These have been prepared by expert consultants in engineering seismology to consider the actual characteristics and hazards presented by faults capable of producing damage on campus. The information provides much greater detail than conventional codes and is used for the performance-based analyses mentioned above. UC Berkeley continually updates this information.

The responsible structural engineers present their recommendations, including supporting calculations and analyses, to the SRC for review at appropriate times throughout the design process. The SRC is particularly attentive to the conceptual design phase when basic structural systems are selected. SRC members insist that proposed design solutions reflect the specific performance requirements of each project.

Independent structural engineering peer reviewers thoroughly check structural drawings and calculations at several points during the design process. These engineers are from engineering firms that would be fully qualified to do the design work themselves. They attend the SRC meetings and are responsible to see that specific criteria or other requirements of the SRC are implemented properly.⁵⁷

DISASTER RESISTANT UNIVERSITY INITIATIVE

The Disaster Resistant University Initiative – funded by the Federal Emergency Management Agency (FEMA) and UC Berkeley in 1998 – was developed as a pilot program to help universities find ways to protect the people in their academic communities, their research, and their facilities should a natural or human-caused disaster occur. The University's research led to a detailed loss estimation study, economic impacts study, strategic risk management plan, and guidelines for other universities. Through this work, it was estimated that if the campus were to be closed for one year due to a severe earthquake on the Hayward Fault, the economic losses to the region would be significant – approximately \$680 million in personal income, \$861 million in sales, and some 8,900 jobs lost.

As part of the SAFER program, the planning goal for the campus' Business Operations Seismic Recovery effort is to have the University open for business within 30 days of a major earthquake on the Hayward Fault. The Office of Business Resumption (OBR) was created in 2002⁵⁸ and its mission is to educate and prepare the campus community to effectively respond to a disruption in business. OBR and the Office of Emergency Preparedness hold an annual campus-wide mock disaster event that allows the departments critical for business resumption to practice their response.⁵⁹

Q-BRACE NON-STRUCTURAL SEISMIC PROGRAM

In many campus buildings the great earthquake risk is not structural failure, but rather damage to contents. Poorly mounted light fixtures, ceilings, and unsecured bookcases and metal storage cabinets can injure and kill people during the shaking that occurs during an earthquake. Unsecured electronic and scientific equipment can be smashed, and the time and costs associated with repair and replacement can be excessive.

One of the campus programs aimed at mitigating nonstructural hazards is the Quake-Bracing Assistance Program, or Q-Brace. A component of the SAFER program, Q-Brace began in FY 98-99 with \$100,000 of matching funds from the office of the Vice Chancellor for Business & Administrative Services to induce earthquake mitigation efforts throughout the campus. The program continued for two more years and provided a total of \$300,000 in matching funds over its three years. Academic and administrative departments alike were encouraged to assess their vulnerability to nonstructural seismic damage, and apply these funds to make necessary improvements. The matching grant portion of this program is currently inactive, but since its inception, the Q-Brace Program assisted over 90 departments in making their work places safer.^{60 61}

4.5.7 2020 LRDP IMPACTS

This section describes the potential geologic, seismicity and soils impacts of the 2020 LRDP based on the Standards of Significance, whether they are significant or less than significant, and whether any significant impacts can be mitigated to less than significant levels.

LESS THAN SIGNIFICANT IMPACTS

LRDP Impact GEO-1: Implementation of the 2020 LRDP could expose people and/or structures to potential substantial adverse effects resulting from rupture of a known earthquake fault, strong seismic groundshaking, seismic-related ground failure and landsliding. Given continuing campus best practices, however, a significant increase in risk to people or the environment is not anticipated.

SURFACE-FAULT RUPTURE

The Hayward fault runs directly through the eastern portion of the UC Berkeley campus. Since this is an active fault, the campus is potentially subject to surface-fault rupture hazards, particularly in the areas of Bowles Hall and the California Memorial Stadium.⁶² There is also the potential for loss of the existing Grizzly Peak 12 kv power supply and for loss of part of the EBMUD water supply to the Campus Park.⁶³ For the remainder of the Campus Park, surface-fault rupture hazard is insignificant.⁶⁴

Because of the presence of the Hayward fault, portions of UC Berkeley and its surroundings are located within an Earthquake Fault Zone as defined by the Alquist-Priolo Earthquake Fault Zoning Act of 1994 and shown in Figure 4.5-1. The increase in campus headcount anticipated under the 2020 LRDP could increase the number of people in proximity to the fault. However, given continuing campus compliance with regulation and policy (the Alquist-Priolo Earthquake Fault Zoning Act and the *University Policy on Seismic Safety*) the risk to people and structures from fault rupture-associated risks of 2020 LRDP development is considered less than significant. Additionally, the following Continuing Best Practices will be carried out:

Continuing Best Practice GEO-1-a: UC Berkeley will continue to comply with the CBC and the *University Policy on Seismic Safety*.

Continuing Best Practice GEO-1-b: Site-specific geotechnical studies will be conducted under the supervision of a California Registered Engineering Geologist or licensed geotechnical engineer and UC Berkeley will incorporate recommendations for geotechnical hazard prevention and abatement into project design.

GROUND SHAKING

UC Berkeley is located in a seismically active region. Ground shaking potentially damages buildings, infrastructure and other structures, and exposes people to risks associated with falling objects and potential structural collapse. Implementation of the 2020 LRDP would be expected to increase UC Berkeley's population, which would result in an increased number of people exposed to these risks.

In recognition of the prevailing earthquake hazard near UC Berkeley, the University of California has implemented a process for the design and retrofit of new and existing facilities that applies the best available engineering procedures to maximize safety and resiliency. The following Continuing Best Practices are part of this process:

Continuing Best Practice GEO-1-c: The Seismic Review Committee (SRC) shall continue to review all seismic and structural engineering design for new and renovated existing buildings on campus and ensure that it conforms to the California Building Code and the *University Policy on Seismic Safety*.

Continuing Best Practice GEO-1-d: UC Berkeley shall continue to use site-specific seismic ground motion specifications developed for analysis and design of campus projects. The information provides much greater detail than conventional codes and is used for performance-based analyses.

Continuing Best Practice GEO-1-e: UC Berkeley will continue to implement the SAFER Program. Through this program, UC Berkeley has already identified all existing buildings in need of upgrades and is currently performing seismic upgrades on several of these buildings.

Continuing Best Practice GEO-1-f: Through the Office of Emergency Preparedness, UC Berkeley will continue to implement programs and projects in emergency planning, training, response, and recovery. Each campus building housing Berkeley students, faculty and staff has a Building Coordinator who prepares building response plans and coordinates education and planning for all building occupants.⁶⁵

Continuing Best Practice GEO-1-g: As stipulated in the *University Policy on Seismic Safety*, the design parameters for specific site peak acceleration and structural reinforcement will be determined by the geotechnical and structural engineer for each new or rehabilitation project proposed under the 2020 LRDP. The acceptable level of actual damage that could be sustained by specific structures would be calculated based on geotechnical information obtained at the specific building site.⁶⁶

The best practices discussed above will continue to be implemented under the 2020 LRDP, as will ongoing compliance with existing UC seismic policies and campus procedures. Thus, impacts to people and property associated with seismic ground shaking are considered *less than significant* and no mitigation is required.

LIQUEFACTION

As noted above, the liquefaction potential in areas subject to new development under the 2020 LRDP is minimal. Thus no significant impact would occur in this regard. Moreover, as discussed above, all development under the 2020 LRDP would comply with the *University Policy on Seismic Safety* and be subject to a site-specific geotechnical investigation. Site development would be completed in accordance with the recommendations of the geotechnical investigation. Thus, impacts associated with liquefaction hazards are considered *less than significant* and no mitigation is required.

LANDSLIDES

Landslide risk in the 2020 LRDP area is restricted primarily to the hill areas. Under the 2020 LRDP, most new construction would not take place in hill areas. Therefore, there would be little risk of landslides affecting development under the 2020 LRDP.

Where development would occur in landslide-prone areas, the Continuing Best Practices described above would apply. Additionally, the following Continuing Best Practice would apply to Hill Campus development:

Continuing Best Practice GEO-1-h: Hill Campus dewatering would be carried out as needed and would be monitored and maintained by qualified engineers.⁶⁷

LRDP Impact GEO-2: Implementation of the 2020 LRDP, particularly in steep areas, could result in soil erosion. Given continuing campus best practices, however, a significant increase in erosion is not anticipated.

Although development under the 2020 LRDP would occur in a highly urbanized area, site erosion could occur during individual construction projects. This erosion could potentially impact the water quality of local creeks. The potential for soil erosion in the Hill Campus during construction is greatest because of the steep terrain.

As stated in Continuing Best Practice GEO-1-b above, on-site geotechnical investigations would be conducted by a qualified professional for each project under the 2020 LRDP and include recommendations for minimizing geotechnical hazards. As stated in Continuing Best Practice GEO-1-a, any construction under the 2020 LRDP would also have to adhere to the California Building Code and University seismic safety policy. Additionally, the following Continuing Best Practice would apply:

Continuing Best Practice GEO-2: Campus construction projects with potential to cause erosion or sediment loss, or discharge of other pollutants, would include the campus Stormwater Pollution Prevention Specification. This specification includes by reference the “Manual of Standards for Erosion and Sediment Control” of the Association of Bay Area Governments and requires that each large and exterior project develop an Erosion Control Plan.

With these Continuing Best Practices, no significant erosion impact is anticipated.

LRDP Impact GEO-3: Implementation of the 2020 LRDP would not result in a substantial loss of topsoil.

Since development under the 2020 LRDP would occur in an urbanized area that is highly built-up, and since no agricultural land exists within the 2020 LRDP area, development under the 2020 LRDP would not result in a substantial loss of topsoil. Topsoil loss impacts would be *less than significant*.

LRDP Impact GEO-4: Implementation of the 2020 LRDP could result in development located on a geologic unit or soil that is unstable and could potentially be subject to landslides, lateral spreading, subsidence, liquefaction or collapse. Given continuing campus best practices, however, a significant increase in risk to people or the environment is not anticipated.

As noted above, development under the 2020 LRDP could occur in a few areas where soils are unstable. However, continued compliance with the above Continuing Best Practices would reduce this impact to *less than significant* levels. No mitigation is required.

LRDP Impact GEO-5: Implementation of the 2020 LRDP could result in development located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code, creating substantial risks to life or property. Given continuing campus best practices, however, a significant increase in risk to people or the environment is not anticipated.

As noted above, there is some potential for the occurrence of expansive soils in areas subject to development under the 2020 LRDP. Thus, there is some potential for soils to expand and cause damage to buildings or other structures. However, since all construction under the 2020 LRDP would be subject to site-specific geotechnical investigations, as specified by Continuing Best Practice GEO-1-b, site-specific soil constraints and expansive soils would be identified and addressed prior to construction. Design measures to mitigate the impacts associated with expansive soils, such as soil replacement or expansion joints, would ensure that structures and foundations meet the requirements of the CBC, the UBC and *University Policy on Seismic Safety*. Thus, potential impacts related to expansive soils are considered *less than significant*. No mitigation is required.

4.5.8 TIEN CENTER IMPACTS

This section describes the potential geologic, seismicity and soils impacts of the Chang Lin Tien Center for East Asian Studies based on the Standards of Significance, whether they are significant or less than significant, and whether any significant impacts can be mitigated to less than significant levels.

The Tien Center will be located at the base of Observatory Hill and would be a four-story reinforced concrete structure. The Seismic Review Committee has reviewed the schematic design for Phase 1 of the Tien Center. The closest active fault to the proposed site is the Hayward fault, and the site is outside of the Alquist-Priolo Earthquake Hazard Zone. Subsurface materials at the site are not considered to be subject to liquefaction and have relatively low expansion potential.⁶⁸

EFFECTS FOUND NOT TO BE SIGNIFICANT

The Initial Study found that the Chang-Lin Tien Center for East Asian Studies would have no significant impacts in regard to the following thresholds:

Would the project expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving rupture of a known earthquake fault, or involving landslides?

The Initial Study determined that since the proposed location for the Tien Center is not on an earthquake fault, and not in an area subject to significant landslide risk, that further analysis is not required on these topics.⁶⁹

LESS THAN SIGNIFICANT IMPACTS

Tien Center Impact GEO-1: The Tien Center project would not expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving strong seismic ground shaking or seismic related ground failure, including liquefaction.

GROUND SHAKING

Like all Bay Area structures, the Tien Center would be located in a seismically active region. Thus it would be subject to ground shaking. However, it would not contribute to a substantial increase in the number of people exposed to risks associated with ground shaking since it would mostly house existing UC Berkeley staff and library services and could only house small incremental increases in staff. Ground shaking hazards would be reduced to less than significant levels through continued implementation of the Continuing Best Practices outlined in section 4.5.7, and continued compliance with the *University Policy on Seismic Safety*.

LIQUEFACTION

As previously identified, the Campus Park is not located in a liquefaction hazard area, except along riparian corridors. The geotechnical study for the proposed Tien Center site included exploratory borings at several site locations. These borings indicated that the subsurface materials at the site are generally high in clay content or in sufficiently dense condition that the soils are not subject to liquefaction.⁷⁰

Tien Center Impact GEO-2: The Tien Center project would not result in substantial soil erosion or the loss of topsoil.

Erosion can occur as a result of site preparation activities associated with development. Vegetation removal, hardscape removal, grading and excavation can result in erosion during construction activities. Site clearing at the proposed Tien Center site would generally consist of the removal of the existing asphalt pavement, retaining wall, landscaping features, utilities and other site structures.⁷¹ Earth-disturbing activities associated with construction would be temporary and the amount of erosion would be largely dependent on the length of time the soils would be exposed to erosional processes.

The Tien Center project would be required to comply with the UBC and the CBC, which would help minimize soil erosion. Additionally, the project would also be required to comply with Stormwater Pollution Prevention Specification developed by UC Berkeley. The Stormwater Specification requires that large or exterior projects develop an Erosion Control Plan. It is discussed in more detail in Chapter 4.7.

Tien Center Impact GEO-3: The Tien Center project would not be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project.

The proposed Tien Center site is located outside of liquefaction and landslide hazard zones as identified on the CDMG Seismic Hazard Zones maps. As stated above, the site-specific geotechnical investigation conducted pursuant to Continuing Best Practice GEO-1-b indicated that the site is not considered prone to liquefaction due to the dense subsurface materials. The site-specific geotechnical investigation also did not indicate that the site would be subject to lateral spreading or subsidence hazards. The investigation concluded that the anticipated foundation bearing pressures for a four-story structure can be readily sustained by the proposed foundation system bearing directly on bedrock, without excessive settlements.⁷²

Tien Center Impact GEO-4: The Tien Center project would not be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code.

The geotechnical study for the proposed Tien Center investigated the subsurface conditions at the site. The study found that the surficial layer is approximately one to five feet of alluvium and fill, which have relatively low expansion potential.⁷³ This impact is thus less than significant and requires no project-specific mitigation.

4.5.9 CUMULATIVE IMPACTS

This section evaluates whether the 2020 LRDP, in combination with other University and non-University projects which are reasonably foreseeable, would result in significant cumulative impacts in regard to geology, seismicity, and soils.

This analysis considers cumulative growth as represented by the implementation of municipal general plans, implementation of the proposed Lawrence Berkeley National Laboratory 2004 LRDP, the proposed redevelopment of University Village Albany, the draft Southside Plan, the AC Transit Major Investment Study, and implementation of the 2020 LRDP, as described in 4.0.5. The analysis also includes growth anticipated by the City of Berkeley General Plan EIR and by previously certified UC Berkeley EIRs, including EIRs for the Northeast Quadrant Science and Safety Projects (SCH 2001022038), Seismic Replacement Building 1 (SCH 99122065), and the Underhill Area Projects (SCH 99042051).

The geographic context for the analysis of cumulative geology, seismicity, and soils impacts includes the City of Berkeley and the areas of the City of Oakland within the scope of the 2020 LRDP. All the projects implemented under the 2020 LRDP or the Lawrence Berkeley National Laboratory 2004 LRDP would be located within this area. Given the localized nature of impacts under the Standards of Cumulative Significance, below, any potential cumulative geology, seismicity and soils impacts would occur within this geographic context.

The only effects that may occur outside these cities would be due to regional seismicity impacting new populations attributable to growth affiliated with the aforementioned projects. However, all development that might house such added population would be governed by state building codes, as well as local codes and ordinances, which are presumed to preclude significant adverse geology, seismicity and soils impacts.

The significance of the potential cumulative impacts was determined based on the following standards, which are identical to those presented in section 4.5.5.

Standard: *Would the project expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving:*

- *Rupture of a known earthquake fault?*
- *Strong seismic ground shaking?*
- *Seismic -related ground failure, including liquefaction?*
- *Landslides?*

Standard: *Would the project result in substantial soil erosion or the loss of topsoil?*

Standard: *Would the project 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 landslides, lateral spreading, subsidence, liquefaction or collapse?*

Standard: *Would the project be located on expansive soil, as defined in Table 18-1 of the Uniform Building Code, creating substantial risks to life or property?*

The analysis above in section 4.5.7 found impacts to be *less than significant* for the 2020 LRDP. The question posed in this section is twofold:

- Is the potential *cumulative* impact of the 2020 LRDP *and* other reasonably foreseeable projects under these standards significant?
- Is the contribution of the 2020 LRDP to these impacts cumulatively considerable?

Cumulative Impact GEO-1: The 2020 LRDP, in combination with other reasonably foreseeable projects, would not expose people or structures to substantial adverse impacts due to fault rupture, seismic ground shaking or ground failure, or landslides. The cumulative impact would be *less than significant*.

The Lawrence Berkeley National Laboratory 2004 LRDP would increase its on-site population by 1,200, or 28 percent, and on-site building space by 800,000 gsf, or 45 percent. Since the site is near the Hayward Fault, since a portion of the site is within the Alquist-Priolo Zone, and since the site includes steep slopes and retained areas, future development within the LBNL site could have the potential to expose people or structures to increased risk. These potential impacts are to be analyzed in the EIR for the Lawrence Berkeley National Laboratory 2004 LRDP; however, development at LBNL also complies with the *University Policy on Seismic Safety*.⁷⁴

Cumulative population growth in the Bay Area, and particularly in proximity to the Hayward Fault, would expand the number of people exposed to seismic risk and landslides. However, hazards would be mitigated to the extent practicable through implementation of local policies in the City of Berkeley General Plan, and through compliance with the California Building Code. In addition, the Alquist-Priolo Earthquake Fault Zoning Act restricts new development on the surface trace of active faults. While some structural damage may not be avoidable, building codes and local construction requirements have been established to protect against building collapse and major injury during a seismic event. UC Berkeley's extensive seismic improvement program, outlined in

Section 4.5.6, above, would continue to contribute to a cumulative reduction in risks associated with fault rupture, seismic ground shaking or ground failure, or landslides.

Cumulative Impact GEO-2: The 2020 LRDP, in combination with other reasonably foreseeable projects, would not result in substantial soil erosion. The cumulative impact would be *less than significant*.

Some limited development under the 2020 LRDP could occur in areas of the Hill Campus upland from Lawrence Berkeley National Laboratory. Erosion caused by this development could combine with erosion caused by future development on the Laboratory site, particularly if excavation or construction occurs in both areas simultaneously. However, projects in the Hill Campus would be subject to Continuing Best Practice GEO-2, as described in 4.5.7, and any Erosion Control Plans prepared for Hill Campus projects would include consideration of the potential impacts of simultaneous projects on the Laboratory site. Similarly, it is anticipated that LBNL would have or develop programs to reduce erosion and sedimentation in accordance with regulatory standards.

Cumulative Impact GEO-3: The 2020 LRDP, in combination with other reasonably foreseeable projects, would not result in substantial risks to property or life as a result of projects being located on expansive soils or unstable soils or geologic units. The cumulative impact would be *less than significant*.

Structures and foundations for projects implementing the 2020 LRDP would be subject to the CBC, the UBC, and the *University Policy on Seismic Safety*. In implementing the 2004 LBNL LRDP, Lawrence Berkeley National Laboratory would follow the same or similar construction standards; development in Berkeley and Oakland would also be subject to review and approval in accordance with similar standards.

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- ⁴⁹ Geomatrix Consultants, *Appendix One: Geologic Hazards Investigation, Central Campus, University of California at Berkeley*, January 2000, page S-5, prepared as part of *Economic Benefits of a Disaster Resistant University* by Dr. Mary Comerio, Institute of Urban and Regional Development, UC Berkeley, April 2000.

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- ⁵² City of Berkeley, *Planning Commission General Plan*, April 2002, Disaster Preparedness and Safety Element, page S-12.
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- ⁵⁴ Geomatrix Consultants, *Appendix One: Geologic Hazards Investigation, Central Campus, University of California at Berkeley*, January 2000, prepared as part of *Economic Benefits of a Disaster Resistant University* by Dr. Mary Comerio, Institute of Urban and Regional Development, UC Berkeley, April 2000.
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- ⁵⁷ Comartin, Craig, Structural Engineer, Comartin-Reis. Personal Communication with Jennifer Lawrence, UCB Facilities Services, November 15, 2003.
- ⁵⁸ Mann, David, Business Resumption Coordinator, UCB Office of Business Resumption. Personal communication with Janet Brewster, UCB Facilities Services, November 13, 2003.
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- ⁶⁵ UC Berkeley Office of Emergency Preparedness, <http://public-safety.berkeley.edu/oepweb/pages/about%20oep/whatwedo.html>, retrieved February 19, 2004.
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- ⁶⁷ UC Berkeley, *Long Range Development Plan Draft Environmental Impact Report*, January 1990, page 4.7-30.
- ⁶⁸ URS Corporation, *Geotechnical Engineering Study, UC Berkeley East Asian Library*, Draft Report, UC Berkeley Capital Projects, October 2003, page 4-1.

⁶⁹ UC Berkeley, *Notice of Preparation: Environmental Impact Report for the 2020 LRDP and Chang-Lin Tien Center for East Asian Studies*, August 29, 2003, pages 24-25.

⁷⁰ URS Corporation, *Geotechnical Engineering Study*, UC Berkeley East Asian Library, Draft Report, October 2003, page 4-1.

⁷¹ URS Corporation, *Geotechnical Engineering Study*, UC Berkeley East Asian Library, Draft Report, October 2003, page 5-6.

⁷² URS Corporation, *Geotechnical Engineering Study*, UC Berkeley East Asian Library, Draft Report, October 2003, page 5-1.

⁷³ URS Corporation, *Geotechnical Engineering Study*, UC Berkeley East Asian Library, Draft Report, October 2003, page 4-1.

⁷⁴ Lawrence Berkeley National Laboratory, *Revised Notice of Preparation, Draft Environmental Impact Report*, October 28, 2003, checklist pages 7 and 8.

4.6 HAZARDOUS MATERIALS

This chapter assesses the potential adverse impacts on human health and the environment due to exposure to hazards and hazardous materials that could be encountered as a result of implementation of the 2020 LRDP or the Chang-Lin Tien Center for East Asian Studies. A description of existing conditions regarding hazards and hazardous materials in the LRDP area is included to provide context for the analysis.

This section also addresses impacts related to the use of research materials that do not meet the standard criteria of hazardous materials but whose presence and use at UC Berkeley are a matter of concern to the surrounding community. These include laboratory research animals, transgenic materials and non-ionizing radiation. Existing contamination of soil and groundwater from previous activities is also discussed in this section. Potential hazards associated with wildland fires are addressed in Chapter 4.11, Public Services. The potential for impacts from toxic air emissions is considered in Chapter 4.2, Air Quality.

As described in the Initial Study and Notice of Preparation for the 2020 LRDP and Tien Center project,¹ the Tien Center would house office, classroom and library space, and would not significantly expand hazardous materials use on the campus, would not release hazardous materials in the event of upset or accident conditions, would not handle or emit hazardous materials within one-quarter mile of an existing or proposed school, and would not be located on a hazardous materials site.

During the scoping period for this EIR, comments were received regarding hazardous materials related primarily to activities at the Lawrence Berkeley National Laboratory (LBNL), which is outside the scope of this EIR, but is considered in the cumulative analysis. Additionally, commentors suggested mitigations for reducing potential environmental impacts related to hazardous materials. These suggestions were considered in preparing this chapter.

Commentors also sought information about environmental impacts of nanotechnology research. Nanotechnology is an emerging area of research aimed at the development of structures and devices at the atomic, molecular or macromolecular levels to produce materials with novel properties and perform functions at the molecular level. The U.S. Environmental Protection Agency (EPA) has listed nanotechnology as an area for future study under their “Futures Analysis” program, and only recently has the EPA begun funding research in this area. December 11, 2003 was the deadline for applications for grants under the EPA National Center for Environmental Research (NCER) for the “Impacts of Manufactured Nanomaterials on Human Health and the Environment”. Thus, nanotechnology is an emerging area of study at the EPA in terms of potential environmental impacts. No regulatory standards have been developed. The topic is therefore not addressed further in this document.

4.6.1 ANALYTICAL METHODS

The term **hazardous material** is defined in different ways for different regulatory programs. This EIR uses the definition given in California Health and Safety Code Section 25501(n) and (o), which defines hazardous material as:

...Any material that, because of its quantity, concentration, or physical or chemical characteristics, poses a significant present or potential hazard to human health and safety or to the environment if released into the workplace or the environment. "Hazardous materials" include, but are not limited to, hazardous substances, hazardous wastes, and any material which a handler or the administering agency has a reasonable basis for believing that it would be injurious to the health and safety of persons or harmful to the environment if released into the workplace or the environment.

By convention, most hazardous materials are thought to be hazardous chemicals, but certain radioactive materials and biohazardous materials, as defined here, are also hazardous. This EIR considers hazardous materials to include hazardous chemicals, radioactive materials, and biohazardous materials used at UC Berkeley. Some scientific materials do not meet the standard criteria for hazardous materials, but their presence and use on campus is a matter of concern to the surrounding community. These include laboratory research animals, transgenic materials, and non-ionizing radiation. A glossary of these and related terms is included in Chapter 9, Glossary.

This report was prepared using information gathered from available documentation, the Office of Environment, Health & Safety (EH&S) web site, and meetings and discussions with University personnel from EH&S, the Office of Laboratory Animal Care (OLAC) and the Radiation Safety team of EH&S. Data regarding hazardous materials, research materials of concern, and wastes used and generated at UC Berkeley were gathered by compiling available documentation such as program descriptions, monitoring reports, and compliance reports. Potential 2020 LRDP impacts concerning hazardous materials and materials of concern were then evaluated in light of existing programs and proposed LRDP policies intended to protect the environment from unintended consequences.

4.6.2 REGULATORY FRAMEWORK

Research, maintenance, facility operations, and construction activities involving hazardous materials at UC Berkeley are subject to numerous federal, state, and local laws and regulations. Appendix E provides an overview of the laws and regulations governing hazardous materials to which UC Berkeley must adhere.

Hazardous materials are regulated by numerous agencies whose jurisdictions and responsibilities sometimes overlap. At the federal level, the Environmental Protection Agency (EPA) is the principal regulatory agency. The Occupational Safety and Health Administration (Fed/OSHA) regulates the use of hazardous materials, including hazardous building materials, insofar as these affect worker safety through a delegated state program. The Department of Transportation (DOT) regulates transportation of hazardous materials. UC Berkeley laboratories using radioactive or biohazardous materials must comply with regulations of the Nuclear Regulatory Commission (NRC), the National Institutes of Health (NIH), and the US Department of Agriculture (USDA).

At the state level, agencies such as Cal/OSHA, the Office of Emergency Services (OES), and the Department of Health Services (DHS) have rules governing the use of hazardous materials that parallel federal regulations and are sometimes more stringent.

The Department of Toxic Substances Control (DTSC) is the primary state agency governing the storage, transportation and disposal of hazardous wastes. The DTSC may delegate enforcement authority to local jurisdictions that enter into agreements with the state agency under the Certified Unified Program Agency (CUPA) program, such as the City of Berkeley.

One key state law, which requires special assessment under CEQA, relates to the so-called Cortese List. The Hazardous Waste and Substance Sites (Cortese) List is a planning document used by the state, local agencies and developers to comply with CEQA requirements in providing information about the location of hazardous materials release sites. Government Code Section 65962.5 requires that an updated list be prepared at least annually by the California EPA. However, the list has not been updated since 2001 and further updates are not planned.

4.6.3 LOCAL PLANS AND POLICIES

Although the University is constitutionally exempt from local regulations when using its property in furtherance of its educational purposes, it is University policy to evaluate proposed projects for consistency with local plans and policies. Therefore, this section outlines the plans and policy goals of the cities of Berkeley and Oakland related to hazardous materials.

CITY OF BERKELEY

The City of Berkeley General Plan includes a number of policies intended to prevent and respond to hazardous materials incidents. These policies state the City's intention to establish truck routes, provide emergency access routes, control and regulate the use, storage and transport of hazardous materials. Several policies address reducing the risk of hazardous materials exposure through the use of environmental investigations, risk reduction practice and the use of warning systems. Additional policies in the General Plan are intended to encourage a reduction in the quantities of hazardous waste generated in the City.

FINDINGS OF THE BERKELEY GENERAL PLAN EIR

The City of Berkeley General Plan EIR found that no potentially significant hazardous materials impacts would occur with implementation of the General Plan.² The EIR further stated that population and employment increases would increase use of hazardous household, commercial and industrial materials, contributing cumulatively to the chance of accidental exposure to hazardous materials and hazardous material disposal sites. The increases "would be incremental, and would not be considered to cause a significant cumulative effect."³

CITY OF OAKLAND

As shown in Figure 3.1-1, much of the Hill Campus and a portion of the LRDP Housing Zone are within the City of Oakland city limits. The City of Oakland General Plan does not include any policies pertaining to hazardous materials.

4.6.4 EXISTING SETTING

During the course of daily operations UC Berkeley faculty, staff and students use many materials, some of which are considered hazardous. Such hazardous materials include many chemical reagents, solvents, fuels, paints, cleansers, and pesticides that are used in activities such as laboratory research, building and grounds maintenance, vehicle maintenance, and fine arts. Other hazardous materials, including radioactive and biohazardous materials, are also used in laboratory research. Hazardous materials use at UC Berkeley generates hazardous byproducts that must eventually be handled and disposed of as hazardous wastes.

Most activities involving the use of hazardous materials occur inside buildings. Therefore, once hazardous materials are delivered to UC Berkeley facilities, the sources of potential releases for hazardous materials to the immediate outside environment would be limited to inadvertent sewer disposals, accidents in outdoor areas, and air emissions from the fume hood and other building vents. The potential for impacts from toxic air emissions is considered in Chapter 4.2, Air Quality. The potential impacts from accidents in outdoor areas and impacts due to sewer disposal are discussed in Chapter 4.7, Hydrology and Water Quality. Hazardous materials could be released to the environment during their delivery to or removal from campus facilities; the potential for such a release is considered in this section.

In the following discussion, the six broad categories of hazardous materials and research materials of concern--non-radioactive hazardous chemicals, biohazardous materials, radioactive materials, laboratory animals, transgenic materials and non-ionizing radiation--are addressed in separate subsections. Each of these subsections follows the same outline, with subheadings on types and volumes used and UC Berkeley's safety record. The UC Berkeley emergency response program, existing contamination on campus, and the existing setting for the LRDP Housing Zone are also covered in separate subsections.

NON-RADIOACTIVE HAZARDOUS CHEMICALS

USE, TYPES AND VOLUMES

There are more than 1200 laboratories at UC Berkeley that use a wide variety of chemical substances for research and teaching, including solvents, reagents, organic compounds, and aromatic hydrocarbons. Hazardous materials are also used in vehicle, grounds, and building maintenance as well as in academic programs. Chemicals used in maintenance may include gasoline and diesel fuels, oils and lubricants, antifreeze, solvents and corrosives used as cleaners, paints, and paint thinners, and Freon refrigerants. UC Berkeley maintains a computerized inventory of chemical materials stored on campus and submits this inventory to the City of Berkeley Toxics Management Division (TMD) as part of its annual update to its Hazardous Materials Business Plan.

There are currently four underground storage tanks (USTs) on the Campus Park at UC Berkeley. All four contain diesel fuel for emergency generators. Three of the four USTs are permitted, and one is exempt. An exempt tank used to store hazardous materials must meet all requirements of a UST and have routine visual monitoring and secondary containment.

UC Berkeley currently owns and operates approximately 45 above-ground fuel storage tanks (ASTs) at multiple locations on the Campus Park, with a total shell storage capacity of 10,000 gallons.⁴ The ASTs were installed between 1970 and 2003. Most are used to store diesel fuel for emergency generators that are automatically engaged when power to a building is disrupted, to allow for evacuations of buildings and to ensure that critical lab equipment continues to operate. The ASTs managed by UC Berkeley Facilities Services department store diesel fuel for emergency generators needed to provide lighting for building evacuations and for maintaining critical equipment during an emergency power outage. The two tanks owned and operated by the Mechanical Engineering Department share a common manifold and are used to supply gasoline and diesel fuel for the engine laboratory, a research and teaching laboratory.

Hazardous waste is generated through laboratory operations as well as facilities maintenance and operations. UC Berkeley has prepared guidelines for proper disposal of hazardous wastes that are based on regulations established by the EPA and DTSC and that have been reviewed by both agencies. At UC Berkeley, EH&S is responsible for disposing of hazardous waste. Before EH&S picks up materials for disposal, they must be packaged and labeled properly, which includes placing them in appropriately closed containers, segregating incompatible materials, and identifying the contents.

Unwanted hazardous materials are picked up from campus generators. Waste is sorted, packaged and staged for shipment off-campus at the campus Hazardous Materials Facility. Reusable hazardous materials are sorted and held for redistribution to campus users. Low-level radioactive waste is also managed at this facility. The 20,000 GSF facility, which began operating in 1999, is designed to provide safe operations under both normal and upset conditions and to remain operational in the aftermath of a maximum credible earthquake. The building is constructed with noncombustible and fire resistive materials. A system of drains, sumps, and a holding tank is designed to contain potential spills and fire protection flow. The facility has capacity to process an estimated 375 tons of hazardous chemical waste per year.

In 2002, UC Berkeley⁵ generated approximately 137,700 pounds of routinely generated hazardous waste, a reduction of over 53 percent from 1990 levels (see Table 4.6-1). Hazardous waste streams at UC Berkeley fall into four major categories:

- **Solvents.** Many different halogenated (organic solvents containing chlorine, bromine, or another halogen element) and non-halogenated solvents (organic solvents that do not contain a halogen element such as hydrocarbon-only solvents, alcohols, non-halogenated aromatic compounds) are used in laboratory experimental processes. The largest quantities of halogenated solvents are used in chemical synthesis, extractions, and analysis in the chemistry and biochemistry laboratories. Various halogenated ignitable organic chemicals are used for cleaning and maintenance in facilities management. The largest quantities of non-halogenated solvents are used in chemical synthesis, extraction, and analysis in the chemistry and biochemistry laboratories, and some waste solvents are used for cleaning glassware. Various non-halogenated ignitable organic chemicals are used for cleaning and maintenance in facilities management.

TABLE 4.6-1

**MAJOR HAZARDOUS WASTE STREAMS,
 UC BERKELEY MAIN CAMPUS (1990–2002)**

	1990	1994	1998	2002
All Solvents	110,920	68,477	62,852	45,016
Lab Pack Chemicals	87,330	44,918	20,526	28,037 ^A
Dry Waste	47,820	95,508	32,623	48,437 ^A
Mixed Radioactive	19,085	11,200	2,891	57
Photo Waste (aqueous)	13,780	17,873	9,775	7,855
Bulk Liquid ^B	7,760	2,342	0 ^C	5,392
Motor/Pump oil	4,700	40	0 ^C	n/a ^D
Paint	2,620	6,765	1,812	2,006
Others	0	2,667	7,277	907
Total	294,015	249,790	137,756	137,707

Notes: all quantities reported in pounds.

n/a = category not in use.

^A The increases in the amounts of lab pack chemicals and dry waste are probably related to a number of lab cleanouts related to construction projects, particularly Stanley Hall, and increased attention to chemical management resulting from a U.S. EPA self audit in late 2001.

^B Reported as Heavy Metal Liquids for 1990-1998. The increase in 2002 is due to the inclusion of corrosive liquids, which were previously included in other categories.

^C In 1998, motor oil and heavy metal liquids were either included in “Others” or exempt from SB14 reporting.

^D Included in “Others.”

Source: Heather Randol, Hazardous Materials Specialist, UC Berkeley Office of Environment Health and Safety. Personal communication with Alisa Klaus, URS Corporation. October 10, 2003. The hazardous waste volumes reported in the table are from UC Berkeley’s SB14 reports.

- **Lab Pack Chemicals.** Thousands of different chemicals in quantities ranging from micrograms to several pounds are used in experimental research and teaching processes. Some hazardous chemical waste occurs due to expired shelf life or changes in research techniques. Most of the extremely hazardous waste comes from this category. Building maintenance and facility operations require many chemicals for a variety of purposes.
- **Dry Waste.** Dry waste consists of items contaminated with trace amounts of hazardous chemicals. It includes laboratory debris (such as gloves, wipes, and glassware) generated during experimental operations or cleanup of laboratory spills, as well as crushed empty chemical containers. Dry waste is disposed of as hazardous waste.
- **Photo Waste.** This category consists of fixer and developer generated from small photo labs located in research departments and in teaching studios and facility printing operations.

For each waste stream, Table 4.6-1 summarizes the volumes disposed of in 1990, 1994, 1998, and 2002. The volumes for 1990 and 1994 are included for purposes of comparison. Most of the chemical waste that leaves campus is incinerated at off site facilities licensed for this purpose.

UC Berkeley has also implemented programs and controls to detect inadvertent release of hazardous material to the sanitary sewer. Pouring hazardous wastes down drains and disposing of hazardous materials with ordinary solid waste are prohibited by law and by campus policy. UC Berkeley actively notifies faculty, staff, students and visitors about prohibitions against drain and garbage disposal of hazardous wastes through guidelines,

training and signage. EH&S publishes detailed guidelines for drain disposal of chemicals and best management practices for preventing slug discharges to sewers on its website.

UC BERKELEY SAFETY RECORD

EH&S's commitment to creating a safe workplace and carrying out safe work practices is exemplified by the number of safety programs that have been put in place to meet all federal, state and local regulations. Its safety record has demonstrated compliance on all fronts and a dedicated effort to improve programs to meet, and in some cases, exceed the standard of compliance set by regulatory agencies.

Measures have been put in place to avoid or mitigate potential accident scenarios. The Laboratory Operations and Safety Committee and the Hazardous Waste Management Committee have established guidelines and offer training courses and assistance in developing safety and environmental management programs. Specific topics for guidelines set forth by EH&S to protect the safety of workers and students and maintain safe workplaces include transportation of hazardous materials off campus, drain disposal of chemicals, fume hood maintenance, minimization of hazardous waste, material safety data sheets (MSDSs), chemical exchange programs, and eye protection.

The City of Berkeley TMD inspects USTs annually and periodically inspects locations where hazardous material or hazardous waste is stored at UC Berkeley. During recent City of Berkeley TMD inspections, violations noted were limited to a minor violation involving inaccurate chemical inventory in one lab and a violation for labeling errors in two labs.⁶ The City TMD also issued a UST violation notice for a failed secondary piping pressure test at a tank; a corrective action plan is being developed to bring the secondary piping into compliance⁸ Campus wastewater is monitored regularly by EBMUD, with the first violation in 4 years occurring in 2000.

EH&S analyzes chemical storage data annually to determine compliance with California Accidental Release Prevention Program (CalARP). A database of hazardous material incidents is maintained by EH&S as they occur. From 2001 to 2003, incidents were usually minor and included broken mercury thermometer cleanups, small chemical spills, sewage and fuel spills. EH&S works directly with departments where incidents occur and provides guidance on avoiding future occurrences when applicable.

BIOHAZARDOUS MATERIALS

USE, TYPES AND VOLUMES

The majority of biological research conducted at UC Berkeley involves the use of relatively low-level biohazardous materials. Nearly all biological research at UC Berkeley is conducted at Biosafety Levels 1 or 2, which are explained in Appendix E. Biosafety Level 3 agents are used at only two locations on the UC Berkeley campus.

All faculty whose research involves working with biohazardous agents in animals and/or the laboratory must apply for a Biohazard Use Authorization (BUA). As of 2004, there were 50 active BUAs on campus for 47 investigators, including three BUAs for Biosafety Level 3 work. The three BUAs issued for Biosafety Level 3 work involve tuberculosis, human immunodeficiency virus (HIV), and the pathogenic fungi *Histoplasma*.

UC BERKELEY SAFETY RECORD

EH&S oversees the handling of biohazardous materials, conducts annual inspections of facilities where these materials are used, and investigates all incidents. UC Berkeley has an excellent safety record with respect to biohazardous materials and wastes. There have been only minor incidents involving biohazardous materials, and no serious on- or off-site consequences have occurred to people or the environment as a result of these incidents.

The medical waste program at UC Berkeley was inspected by the California Department of Health Services on June 8, 2000. The inspector reviewed tracking records and inspected medical waste accumulation sites and laboratories that generate medical waste. No major violations of biohazardous waste regulations were identified. Minor violations identified during this inspection included procedural practices such as overfull sharps containers and inappropriate containers.⁷ EH&S worked directly with individual laboratories to address these problems.

RADIOACTIVE MATERIALS

Radioactive materials are used in certain types of research. Some of the research done at UC Berkeley would be extremely difficult or impossible to perform without the use of low-level radioactive materials. Radioactive materials contain atoms that spontaneously emit radiation in the process of trying to form a more stable atom; this radiation can be detected. Researchers take advantage of the ability to detect radiation to learn about biological, physical, and chemical processes. For example, in biological research, radioactive isotopes can be used to trace biological chemicals through metabolic pathways.

Each nuclear disintegration emits energy. The absorbed dose from radioactivity is measured in *rads* (Roentgen Absorbed Dose). The rad is a measure of the amount of energy absorbed per unit mass of a medium. The rad is not a very useful metric to express the dose to a human; therefore, the *rem* (Roentgen Equivalent Man) is used. The rem relates the risk from radiation exposures to the measurement unit (rad). That is, a measurement expressed in rads can not be used to express the human risk from a rad; therefore, the rad is converted to rem and the rem can be used to express risk.

Residents of the Bay Area receive about 250 to 300 mRem/yr (0.25 to 0.3 rem/yr) from background and medical sources. *Background sources* include solar and cosmic radiation, radon gas (from soil, rocks, and some building materials), and ingestion of potassium-40 (⁴⁰K) and other naturally radioactive materials present in the body or in food.⁸ *Medical sources* include medical and dental X-rays (on average about 70 mRem/yr).

USE, TYPES AND VOLUMES

UC Berkeley uses a variety of radionuclides typical of a large research-oriented university. Over the past 10 years, better laboratory technologies have reduced the use of radioactive materials on campus by over 50 percent.⁹

DISPOSAL OF RADIOACTIVE WASTES

Radioactive waste is segregated, packaged, and labeled by the generating user, who then contacts EH&S for pickup. EH&S removes radioactive materials from laboratories and centralized pickup units and then transports these materials to the Hazardous Materials Facility. The materials are managed and prepared for disposal.

Radioactive wastes are typically liquid or solid. Liquid radioactive wastes are disposed of in three ways:

- If decay time requirement for the specific isotope is allowed per regulations, the liquid waste is collected, held on site, and allowed to decay to background levels in accordance with the radioactive materials license and then shipped to a permitted treatment, storage and disposal facility.
- If it meets the criteria for disposal under the DHS and NRC regulations and the UC Berkeley Drain Disposal Guidelines, it is discharged to the sanitary sewer. The maximum permitted cumulative annual release allowed under the UC Berkeley radioactive materials license is one curie.
- If it cannot be decayed on-site or discharged to the sanitary sewer, it is shipped off-site to a permitted treatment, storage and disposal facility licensed for radioactive materials.

Short-lived solid radioactive wastes are collected and held for decay in the Decay-in-Storage Program where they decay to background levels. These wastes are then disposed of as non-radioactive waste. Long-lived solid waste is shipped off-site to a licensed facility for treatment and consolidation and then burial at a licensed low-level radioactive waste site. Currently there is no disposal capacity in California for low-level radioactive waste and UC Berkeley, like other generators in the state, utilizes out-of-state disposal options. Appendix E provides a detailed discussion of waste disposal.

UC BERKELEY RADIATION SAFETY RECORD

UC Berkeley has never exceeded the license possession limits for radioactive materials and has had good-to-excellent compliance by researchers with inventory and limits.¹⁰

EXISTING EXPOSURE LEVELS

The EPA provides methods to estimate the dose that humans located both near and far from the campus would receive from the release of radioactive materials to air. The most accurate (and most complex) of these models is the CAP88-PC model. The CAP88-PC model calculates the dose to the maximally exposed individual (MEI). The MEI is the hypothetical person who receives the greatest calculated exposure to radioactive releases from the campus use of radioactive materials. The CAP88-PC model is very conservative because it assumes doses as much as ten times greater than the actual dosage received by people in the area. The MEI dose calculation for academic year 1998-99 was 0.428 mRem for a person located 250 meters south of the campus center. The National Emissions Standards for Hazardous Air Pollutants (NESHAP) limit is 10 mRem/yr, so the calculated dose received by the MEI is less than 5 percent of the EPA limit. Due to the exceptionally conservative nature of the CAP88-PC model, the actual doses are more likely to be less than 1 percent of the calculated value.¹¹

NON-IONIZING RADIATION

Non-ionizing radiation (NIR) is radiative energy that is not created by radioactive materials and does not impart ionizing energy in a biological medium such as the body. Many devices throughout the modern world either directly or indirectly act as sources of NIR. Many sources of NIR are present at UC Berkeley in research applications or in ancillary equipment. These sources include lasers, large magnets, microwave generators, and radio-frequency radiation. In general, NIR tends to be less hazardous to humans

than ionizing radiation. However, depending on the wavelength/frequency and the irradiance (or power density) value, NIR sources may present a human health hazard. Most typically the hazard, if any, is to those in the lab and not members of the public.¹²

Regulations for laser hazards fall under the California Code of Regulation (CCR), Title 8, subchapter 7, section 3203 – “Illness and Injury Prevention Program.” At this time, Cal/OSHA does not have specific laser safety regulations, however Cal/OSHA inspectors may refer to the ANSI Z136.1 Standard in inspecting laser facilities.

The UC Berkeley Laser Safety Program, overseen by the Non-Ionizing Radiation Safety Committee (NIRSC), is based on the ANSI Z136.1 Standard for the Safe Use of Lasers. The Laser Safety Program provides control measures, medical surveillance, and safety training based on the ANSI Z136.1 standard.¹³

The ANSI Z136.1 standard classifies laser/laser systems into four classifications: Class 1, 2, 3(a & b), and 4. Higher numbers reflect an increase potential for injury/harm.

- Class 1 is a laser/laser system, which under normal operating conditions does not present a hazard.
- Class 2 is a laser/laser system that produces a visible wavelength but does not present a hazard due to the blink reflex of the eye.
- Class 3a is a laser/laser system that would normally not be hazardous is viewed momentarily but is a viewing hazard if viewed directly with an optical instrument.
- Class 3b is a laser/laser system that can be hazardous if viewed directly or from a specular reflection.
- Class 4 is a laser/laser system that can be hazardous if viewed from direct, specular or diffuse reflection. Also presents a skin hazard and fire hazard.

The UC Berkeley laser safety program covers some Class 3a, and all Class 3b and 4 lasers/laser systems. Control measures, safety training, and medical surveillance are required for higher Class lasers/laser systems (3b and 4).

LABORATORY ANIMALS

USE, TYPES AND VOLUMES

Twenty-seven academic departments and organized research units at UC Berkeley use vertebrate animals in research and instruction. Currently 183 faculty members have active animal use protocols. Examples of recent highly recognized research projects at UC Berkeley that involved the use of animals include studies designed to improve the resolution and significance of brain imaging techniques, new models for the treatment of prostate cancer, the impacts of pesticides on native animal species, use of DNA microarray analysis of gene expression to investigate patterns of gene expression in the central nervous system, and the role of diet in cancer.

Approximately 30,000 research animals are housed at UC Berkeley. Seventy percent of these are mice and 20 percent are cold-blooded animals, such as amphibians, fish and reptiles. Nine percent are other rodents (rats, hamsters, guinea pigs and wild rodents), while the remaining one percent is composed of rabbits, cats, non-human primates, coyotes, hyenas, birds, and invertebrates such as cockroaches.¹⁴

All of the research animals on campus are housed in four main animal facilities and two small satellite facilities designed to comply with federal standards for research animal facilities, including separation of animal rooms from personnel areas and other functional areas; provisions for cage washing and animal isolation and quarantine; and specific requirements for interior drainage, ventilation, temperature and humidity control, and other building features.

UC BERKELEY SAFETY RECORD

Animal care and use facilities are subject to regular inspections by multiple entities, as summarized in Table 4.6-2. As part of compliance with Animal Welfare Act regulations, the UC Animal Care and Use Committee (ACUC), which is responsible for animal care services, conducts twice-yearly inspections of the current animal care and use program and all UC Berkeley animal facilities. Additionally, they conduct annual reviews of animal care and use protocols for any proposed use of live vertebrate animals. This requirement applies to all uses of animals including nonfunded projects, internally funded projects, teaching and pilot studies.

UC Berkeley is also subject to random, unannounced inspections by USDA and DOD veterinarians. Failure to comply with animal welfare regulations could result in civil or criminal prosecution. No noncompliance items were identified during the most recent USDA inspections, conducted in September 2002 and September 2003. Finally, as part of its ongoing participation in the voluntary accreditation program run by Association for Assessment and Accreditation of Laboratory Animal Care (AAALAC) International, UC Berkeley is subject to inspections every three years by AAALAC International to ensure compliance with the National Research Council's Guide for the Care and Use of Laboratory Animals.¹⁵

UC Berkeley has maintained AAALAC International accreditation since 1994. Since the original accreditation, UC Berkeley has undergone and passed three additional inspections in 1997, 2000, and 2003. Overall, the most recent AAALAC International inspection report praised UC Berkeley laboratory animal care programs and staff for excellence.¹⁶

TABLE 4.6-2
EXTERNAL REVIEWS OF UC BERKELEY ANIMAL CARE AND USE PROGRAMS

Entity	Frequency	Notes
USDA	Twice yearly	Random, unannounced inspections by USDA veterinarians for compliance with Animal Welfare Act regulation
AAALAC	Once every 3 years	Quality control committee monitors compliance with Animal Welfare Act regulations and the National Research Council Guide for the Care and Use of Laboratory Animals
DoD	Random	Random inspections by DoD veterinarians to assess compliance with Animal Welfare Act regulations

TRANSGENIC MATERIALS

Combining DNA (which is the primary genetic material in all cells) from different existing organisms (plants, animals, insects, bacteria, etc.) results in modified organisms called “transgenic.” Transgenic materials include microorganisms, plants, and animals that have been genetically engineered or modified. Recombinant DNA techniques create new genetic combinations by changing, adding, or subtracting DNA genes, but this methodology does not necessarily mean that new organisms are created.

Transgenic cell lines and organisms are used as fundamental research tools in medical, biological, agricultural, and environmental research. Transgenic cell lines and organisms may also become products or be used to produce useful biochemicals such as medicines. Much research is performed using tissue cultures or benign bacteria grown under laboratory-controlled conditions. With the exception of transgenic bacteria that could be infectious, transgenic materials generally do not pose a threat to public health or the environment.

USE, TYPES AND VOLUMES

At UC Berkeley, recombinant DNA research is conducted on microorganisms and animals in laboratories, and on plants. Researchers at UC Berkeley use transgenic organisms and cell lines to investigate fundamental processes in biological metabolic and developmental pathways, to develop improved agricultural products, to investigate causes and cures for disease, and to chronicle and preserve genetic diversity. UC Berkeley researchers currently use recombinant DNA technology to identify the genes of the tuberculosis bacterium, to investigate nerve conduction, to study visual development, and to explore factors that cause diseases. Viral vectors are being created to treat human diseases such as cystic fibrosis and macular degeneration of the eye. Transgenic animals are currently used on campus to define the functions of particular enzymes and to test cancer treatments although in the future, they may be used for other types of research.

Recombinant DNA research on plants at UC Berkeley is conducted in controlled, segregated greenhouses. Some limited field research with transgenic plants is also undertaken on the Oxford Tract near the Campus Park, and at any of the nine UC field stations elsewhere in the state.¹⁷ Currently, one or two UC Berkeley investigators are conducting field-based transgenic research.¹⁸ The research projects use transgenic plants to analyze growth, stress reaction, and general plant development.

Potential environmental concerns associated with transgenic plants relate to genetic contamination of non-transgenic plants from cross-pollination and adverse impacts on biodiversity. Some transgenic plants are engineered to produce a pesticide, which could potentially harm non-target organisms or allow pests to develop immunity to the pesticide. No research at UC Berkeley is currently conducted with pesticidal plants. All research involving transgenic plants at UC Berkeley is conducted at the lowest biosafety levels, BL1-P and BL2-P, and most at BL1-P.¹⁹ With the exception of some types of research involving transgenic plants, research with transgenic materials is conducted in standard laboratories and does not require unique facilities.

UC BERKELEY SAFETY RECORD

Laboratories involving microorganisms and animal-based recombinant DNA research are subject to annual inspections by EH&S to verify compliance with federal law and guidelines. Animal facilities, including transgenic animal facilities, are inspected internally by the ACUC every six months and by AAALAC International every three years. At the frequency of about twice a year, USDA also conducts random, unannounced inspections of animal facilities for compliance with the Animal Welfare Act.

The greenhouses that contain transgenic plants have been inspected twice in the past ten years by the USDA Animal and Plant Health Inspection Service, accompanied by a representative of the California Department of Agriculture. The inspection results have been satisfactory.²⁰ The USDA has the authority to inspect field research involving transgenic plants. However, the agency does not conduct inspections on a regular basis. EH&S has no record of any fines or violations as a result of field inspections.²¹ UC Berkeley has had no recorded incidents of the unintentional release of transgenic organisms or of any harm caused by transgenics or recombinant DNA technologies. The one complaint to NIH in 1991 resulted in no factual finding of violation and served to strengthen the biosafety program by placing it under internal review.²²

SITES OF ENVIRONMENTAL CONCERN

CAMPUS PARK AND CITY ENVIRONS

Only one campus site, the UC Garage at 1952 Oxford Street, which is in the Adjacent Blocks West, is listed on the Cortese list of hazardous materials sites. The California Facility Inventory Database Underground Storage Tank (CA FID UST) and Historical Underground Tank Registered Database (HIST UST) lists show seven historic or existing USTs at the site. The USTs included a 1,000-gallon leaded gasoline tank, a 6,000-gallon and a 7,500-gallon unleaded gasoline tank, a 125-gallon and a 300-gallon waste oil tank, and a 1,000-gallon and a 5,000-gallon diesel tank. All of the USTs predated the leak detection system requirements. The tanks were removed and a diesel fuel release to soil and groundwater was reported in July 1988. Gasoline contamination of soil was also noted in the gasoline tank excavation. The extent of soil and groundwater contamination from the leaking tanks at the UC Garage site has been fully characterized. The soil and groundwater contamination has migrated beneath the garage building but not off-site. In March 1998, the City of Berkeley agreed that further active remediation of the petroleum hydrocarbons in soil at the site would not be required.²³

OTHER CAMPUS-OWNED BERKELEY PROPERTIES

The UC Berkeley-owned Physical Plant-Campus Services corporation yard site at 2000 Carleton Street is also on the Cortese list. Contamination of soil and groundwater by

gasoline released from a leaking UST at this site was discovered in July 1988, when the tank was removed.²⁴ By June 2001, concentrations of contaminants in soil had decreased through natural attenuation to levels below the Regional Water Quality Control Board's (RWQCB's) Risk-Based Screening Levels. UC Berkeley has obtained site closure from the RWQCB and is in the process of closing the remaining monitoring wells.

LRDP HOUSING ZONE

Land uses in the LRDP Housing Zone are predominantly commercial and residential. The largest hazardous materials users in the LRDP Housing Zone are medical facilities. Smaller hazardous materials users include commercial facilities serving the local community, such as automobile repair shops, gasoline service stations, printers and photo processors, dry cleaners, and dentists.²⁵ Abandoned home heating oil tanks are also found occasionally in some residential buildings.

A detailed assessment of past and current hazardous materials use in the rest of the LRDP Housing Zone has not been conducted, and contaminant sites are not indicated in the City of Berkeley General Plan EIR. At sites historically or currently occupied by gasoline service stations, auto repair facilities, dry cleaners, and other businesses that use hazardous materials, soil and/or groundwater may be contaminated as a result of these uses.

CONTAMINATION IN EXISTING BUILDINGS

Due to the age of UC Berkeley, lead paint, asbestos-containing materials, polychlorinated biphenyls (PCBs) and mercury are present in many campus buildings. In addition, in buildings currently or formerly used as laboratories, building materials such as floor and wall surfaces, sink traps, and drain piping, can be contaminated by spills, aerosol releases, or drain disposal of radioactive or chemical hazardous materials. PCBs may also be present in fluorescent light ballasts and some building materials. Workers can be exposed through inhalation or ingestion of lead dust, asbestos particles, mercury vapors or other contaminants when building materials are disturbed or made friable by drilling, sanding, or other destructive processes.

4.6.5 STANDARDS OF SIGNIFICANCE

The significance of the potential impacts of the 2020 LRDP related to hazardous materials was determined based on the following standards:

Standard: *Would the project create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?*

Standard: *Would the project result in development located on a hazardous materials site as listed on the "Cortese List" (compiled pursuant to Government Code Section 65962.5) and, therefore, create a significant hazard to the public or the environment?*

Standard: *Would the project 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?*

Standard: Would the project result in development that would emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?

4.6.6 POLICIES AND PROCEDURES GUIDING FUTURE PROJECTS

In addition to compliance with law and regulation, projects conducted under the 2020 LRDP would be planned, constructed and operated in accordance with the following policies, programs and procedures. Detailed descriptions of the policies, programs and procedures are provided in Appendix E.

2020 LRDP

The 2020 LRDP acknowledges that providing the space, technology, and infrastructure required to pursue new fields of inquiry and discovery, and integrate education and research, are paramount to the UC Berkeley mission. This chapter recognizes that there are hazards associated with this research, and while the 2020 LRDP does not contain specific policies about hazardous materials, it does present objectives and policies that indirectly support the safe use of these materials. Three Objectives are particularly relevant:

- **Plan every new project as a model of resource conservation and environmental stewardship.**
- **Provide the space, technology and infrastructure we require to excel in education, research, and public service.**
- **Plan every new project to represent the optimal investment of land and capital in the future of the campus.**

The Objective of ensuring every new project serves as a model of resource conservation and environmental stewardship supports the practice of responsible use of hazardous materials. The policies under the second and third Objectives to eliminate 'poor' and 'very poor' seismic ratings in campus buildings through renovation or replacement; to consider enhanced levels of seismic performance for critical buildings; and to design new campus laboratory buildings to a standard equivalent to LEED 2.1 certification and LABS 21 environmental performance criteria also support the safe use, production, and disposal of hazardous materials, and help to decrease the risk of releasing these materials into the environment.

CAMPUS POLICIES AND PROCEDURES

OFFICE OF ENVIRONMENT, HEALTH, AND SAFETY

The UC Berkeley Office of Environment, Health, and Safety (EH&S) has primary responsibility for coordinating the management of hazardous materials on campus in compliance with applicable laws, regulations, and standards. EH&S issues guidelines, evaluates departmental activities, and disseminates general information regarding the handling, storage, and disposal of hazardous materials and wastes. EH&S also provides training programs and annual refresher courses that are compulsory for individuals whose workplaces can potentially expose them to hazardous materials. Descriptions of specific EH&S programs are provided in Appendix E.

HAZARDOUS MATERIALS MANAGEMENT PLAN

In compliance with the Hazardous Materials Release Response Plans and Inventory Act of 1985, UC Berkeley has prepared a Hazardous Materials Management Plan (HMMP) that includes an inventory of hazardous materials handled on campus, an emergency response plan, and a training program in safety procedures and emergency response. The HMMP is updated and submitted to the City of Berkeley TMD annually.

CHEMICAL HYGIENE PLANS

Cal/OSHA (Title 8 CCR Section 5191) requires each laboratory to have a Chemical Hygiene Plan (CHP) containing Standard Operating Procedures (SOPs) relevant to safety and health considerations. EH&S periodically reviews lab-specific SOPs, verifies that proper training has been documented, and performs periodic laboratory inspections.

HAZARDOUS WASTE MANAGEMENT, HANDLING, AND MINIMIZATION

EH&S provides guidelines for proper packaging and labeling of unwanted hazardous materials. EH&S also picks up hazardous materials for proper disposal after users properly package and label unwanted items. EH&S staff members trained and certified by the Department of Transportation oversee all off-campus shipment of hazardous waste and assist in preparing hazardous materials for off-campus shipment. In compliance with the state Hazardous Waste Source Reduction and Management Review Act of 1989, UC Berkeley has implemented a comprehensive waste minimization program since 1991.

TOXIC USE REDUCTION PROGRAMS FOR CAMPUS ACTIVITIES

UC Berkeley has taken proactive voluntary steps that reduce the use of toxic substances in both academic research activities and campus maintenance operations. These programs are responsible in a large part for the reduction of the volume of chemicals used on campus and have made a significant impact in hazardous materials waste reduction. Programs to reduce chemical use in academic and research activities include the chemical exchange program, which promotes efficient use of chemical inventories, and the mercury free labs program which encourages the elimination of mercury containing equipment in laboratories.

In 1996 Cal/EPA honored UC Berkeley for its leadership in promoting reduced-risk methods of urban pest management on campus. The Integrated Pest Management Program, which has been in place since the early 1970s emphasizes the use of parasites, trapping, habitat modification and education over the use of pesticides. This program has resulted in the reduction in use of chemical pesticides by 100 percent in campus housing and research facilities, and by 95 percent in campus kitchens.²⁶ All new building designs are reviewed by Physical Plant Campus Services EH&S specialists for their ability to structurally resist pests. Campus custodial operations have also switched to environmentally-friendly cleaning products.

BIOHAZARD SAFETY

UC Berkeley has implemented the following programs to ensure that all work involving biohazardous materials and medical waste is conducted in compliance with federal and state regulations:

- All faculty whose research involves working with biohazardous agents, including recombinant DNA, in animals and/or the laboratory must apply for a Biohazard Use Authorization (BUA).
- The Chancellor's Advisory Committee on Laboratory and Environmental Biosafety (CLEB) is charged with the responsibility of formulating campus policies to ensure the safe conduct of research involving biohazardous agents and materials, in accordance with guidelines set forth by the National Institutes of Health and the Centers for Disease Control. CLEB also reviews and approves BUA applications.
- EH&S assists campus users in implementing the OSHA Bloodborne Pathogen Standard and in complying with NSF Standard 49 and Cal/OSHA ventilation requirements for biosafety cabinets. As part of these programs, hepatitis vaccinations are offered free of charge to all employees and students who work with human blood. Exposure Control Plans also provide for worker training and prescribe safety measures such as engineering controls (e.g. splash guards) and personnel protective equipment (e.g. face shields and gloves). All blood is to be handled as if it is contaminated by an infectious agent, whether or not its status is known.
- To minimize workers' exposure to biohazards, UC Berkeley has established a Biosafety Program. In accordance with applicable UC Berkeley policy, protective measures are used and protective clothing is worn when working with biohazardous material to prevent exposure by skin contact. The potential for ingestion of hazardous biological agents is minimized by following the UC Berkeley policy banning eating in laboratories and requiring proper washing. Also in accordance with campus policy aimed at reducing the chance of ingestive exposure, mouth pipetting is not allowed.
- Engineering controls provide a degree of containment of biological agents and minimize personal contact with these agents. These safety features are built into facility and equipment design and operation. The most significant engineering control that can be implemented is observation of the correct BSL criteria of laboratory and equipment design.
- UC Berkeley employees could be exposed to biological agents via contact with open wounds from skin punctures due to animal bites, and scratches or cuts and lacerations with contaminated cages or sharp edges. This risk is minimized by protective clothing and training in animal handling. UC Berkeley staff are also required to wear respiratory protection when research protocols involve readily aerosolized agents, such as tuberculosis.
- An EH&S staff member provides training for those who plan to conduct work with biological materials, including recombinant DNA, and assists researchers in meeting applicable standards. CLEB reviews and approves biological research at UC Berkeley. The committee evaluates the potential risks and the adequacy of the safety measures to be implemented prior to beginning research projects involving biohazardous materials.

RADIATION SAFETY

The UC Berkeley Radiation Safety team (RST) ensures that work with radioactive materials and radiation-producing machines is conducted in accordance with policies and standards set forth by the Radiation Safety Committee. The campus Radiation Safety Officer administers the Radiation Safety Program so as to provide adequate protective measures against exposure for visitors, faculty, staff and the community at large. The oversight and policy setting group (the Radiation Safety Committee or RSC)

is composed of faculty representatives with significant experience in the safe use of radiation and radioactive materials. The RSC reviews the work of the Radiation Safety team and sets its policy.

Before obtaining radioactive materials or machines that produce radiation, each principal investigator must apply for a Radiation Use Authorization (RUA). The campus Radiation Safety Officer reviews and approves all initial RUAs and renewals, and verifies that other required approvals are in place before radioactive materials are delivered or work commences. EH&S is responsible for the UC Berkeley radioactive waste program in conformance with applicable policies and regulations.

UC Berkeley is required to maintain an inventory of the radioactive materials on campus and to periodically assure that it does not exceed the prescribed limits in the Radioactive Materials License. Under this license, UC Berkeley has agreed to follow the regulations in CCR Title 17. Periodically this license is amended or renewed by the state based on changes in state law or approved requests from the University. The state license issued to UC Berkeley stipulates specific limits and conditions as follows:

- The maximum amount of radioactivity acquired under the license that may be possessed at any one time,
- The locations where licensed materials may be used,
- Purpose and conditions of use,
- Monitoring of radiation exposure to personnel by use of radiation dosimetry, and
- Methods of transportation of radioactive materials to and from the use location.

Several regulatory dose limits apply to radioactive releases from UC Berkeley activities. For exposures to the general public due to airborne releases of radionuclides, the EPA National Emission Standards for Hazardous Air Pollutants (NESHAP) limit is 10 mRem/yr.

EH&S holds responsibility for implementing the non-ionizing radiation safety policies established by the Non-Ionizing Radiation Safety Committee (NIRSC), including the Laser Safety Program and the Non-Ionizing Radiation Safety Program.

ANIMAL USE AND CARE

At UC Berkeley, the Director of the Office of Laboratory Animal Care (OLAC) under the Vice Chancellor for Research is responsible for animal care services. The UC Berkeley Animal Care and Use Committee (ACUC) provides oversight for faculty research protocols and functions as the institutional animal care and use committee mandated by the U.S. Animal Welfare Act, the U.S. Public Health Service, and UC policy. OLAC is responsible for managing and administering a centralized program of laboratory animal care and use that complies with the U.S. Animal Welfare Regulations, the National Research Council Guide for the Care and Use of Laboratory Animals (the Guide), and the Public Health Service Policy on the Humane Care and Use of Laboratory Animals (the Policy).

The Committee on Animal Research Space Assignment (CARSA) has been charged by the Vice Chancellor for Research with the responsibility of reviewing requests, assessing needs, and establishing priorities for the use of animal research space. The committee

also reviews animal care per diem rates and requests for capital improvements to existing animal facilities, and advises the OLAC Director on various aspects of the management of animal research space. The committee is composed of at least five representatives from the academic units whose faculty members have animal use protocols, the OLAC Director, and the ACUC Chair.

EMERGENCY RESPONSE

EH&S maintains a Dedicated Spill Response Team (DSRT) that consists of health and safety professionals, hazardous materials technicians, and appropriately licensed hazardous materials drivers. The team is trained to respond to most incidents on campus and arranges for appropriate outside assistance when necessary. New buildings are automatically included in the campus-wide emergency response plan.

HAZARDOUS BUILDING MATERIALS

UC Berkeley procedures require that, before beginning any construction or renovation project, the Physical Plant-Campus Services Asbestos Control Office must perform a survey to determine whether asbestos-containing materials might be disturbed by the project. Any asbestos that might be damaged is removed or encapsulated under specifications developed in collaboration with EH&S and under the oversight of an independent industrial hygiene firm. Suspect paints and other surface coatings are sampled and analyzed for lead content prior to demolition or renovation work that might generate airborne lead hazards. During construction, EH&S oversees worker activities to confirm compliance with Cal/OSHA lead regulations and ensure the safety of nearby faculty, staff and students.

Hazardous materials surveys are conducted by UC Berkeley prior to any capital project in a laboratory building. All abandoned chemicals and other hazardous materials are removed from the building and surfaces are decontaminated. EH&S performs a final evaluation of the decontamination work before releasing the lab to the campus department performing the construction work.

Prior to any demolition or renovation work in a laboratory, all hazardous materials are removed, and EH&S then performs a confirmation survey for contamination resulting from the use of hazardous materials. If there are radioactive materials present, EH&S conducts the survey in coordination with the DHS. Labs are checked for mercury contamination using a portable analyzer and for other contaminants by visual observation. Lab benches and most other surfaces are cleaned using a surfactant regardless of whether contamination is observed. Sink traps, drain piping, and other individual building components are also evaluated as potential hazardous materials based on a review of past site uses and/or sampling, and are handled as hazardous waste if appropriate.

State law requires that contractors and workers be notified of the presence of asbestos in buildings constructed before 1979. The DHS requires the certification of employees and supervisors performing lead-related construction activities in residential and public buildings. Standard specifications included in all UC Berkeley construction contracts require that contractors who disturb or potentially disturb asbestos or lead must comply with all federal, state, and local rules and regulations regarding hazardous materials. Contractors are also required to stop work and inform the University if they encounter material believed to be asbestos, PCB or lead, or other hazardous materials.

4.6.7 2020 LRDP IMPACTS

This section describes the potential hazardous materials impacts of the 2020 LRDP based on the Standards of Significance, whether they are significant or less than significant, and whether any significant impacts can be mitigated to less than significant levels.

LESS THAN SIGNIFICANT IMPACTS

LRDP Impact HAZ-1: Implementation of the 2020 LRDP would increase the routine transport, use, disposal and storage of hazardous materials and waste (including chemical, radioactive, and biohazardous materials and waste), but given continuing campus best practices, this would not increase hazards to the public or the environment.

Development under the 2020 LRDP would increase the amount of laboratory space at UC Berkeley by up to 700,000 gross square feet. Based on current ratios of wet lab space to total lab and lab support space at UC Berkeley, up to 50% of this figure, or up to 350,000 GSF, is anticipated to consist of wet lab space. All of the new laboratory space would be in the Campus Park or Adjacent Blocks West land use zones. Concurrent with this increase in laboratory space there would be an increase in the use of hazardous materials and chemicals, biohazardous materials, radioactive materials, and production of wastes associated with laboratory research activities.

Ancillary services that use hazardous materials, such as printing and maintenance services, would continue to increase incrementally; however, no new facilities of this nature are planned. Management and oversight activities compliant with federal and state law, as well as all UCB procedures for handling of hazardous, biohazardous and radioactive materials and wastes would be extended to all new facilities developed under the 2020 LRDP.

Given continuing campus compliance with regulations and policy, the hazards to the public or the environment resulting from the increase in the use of hazardous materials under routine conditions would continue to be minimal. Additionally, campus programs further reduce risks associated with hazardous materials and waste management. Implementation of Continuing Best Practice HAZ-1 would ensure that this impact would remain less than significant. Impacts associated with the use of hazardous materials under upset and accident conditions are addressed under LRDP Impact HAZ-6.

NON-RADIOACTIVE HAZARDOUS CHEMICALS

The chemicals that would be used in new laboratories and support space developed under the 2020 LRDP would be similar to those currently used at UC Berkeley. The level and the nature of the hazards posed by these chemicals and wastes vary widely and are unique to the individual materials, although they often can be grouped by chemical types. Substances can possess one or more common hazard characteristics such as corrosivity (acids and bases), flammability (solvents such as acetone), toxicity (cyanides, mercuric chloride) and reactivity. Some nonradioactive chemicals have the potential for causing cancer or acute and chronic illnesses, while some substances may present little hazard.

Because most handling of hazardous materials on campus takes place indoors, potential pathways for exposure to non-radioactive hazardous chemicals under routine conditions include direct contact or injection during research or through accidental spills, or inhalation. In spite of the increase in the use of hazardous chemicals on campus under the 2020 LRDP, the risk to the public or the environment would be less than significant, for the reasons discussed below.

WORKER AND STUDENT EXPOSURE. Workers and students might be exposed to hazardous chemicals through inhalation, skin absorption (contact), ingestion, and injection (cuts). To address this potential impact, laboratories and other facilities constructed under the 2020 LRDP would continue to comply with all applicable hazardous materials standards. Fume hoods and other engineering controls would be required to meet Cal/OSHA requirements, and fume hood ventilation rates would continue to be checked annually by Facilities Services. Proper use of the fume hoods and other engineering controls would keep indoor laboratory air toxics concentrations below the American Conference of Governmental Industrial Hygienist Threshold Limit Values and the legal limits of the OSHA Permissible Exposure Levels.

To prevent exposure through skin contact, UC Berkeley policies and procedures require that protective clothing such as laboratory coats, gloves, and safety glasses be worn while handling hazardous materials and wastes. Proper washing after handling chemicals is also required. Also, in accordance with state laws and campus policy, eating, drinking, applying cosmetics, and chewing gum or tobacco are not allowed in laboratories using carcinogenic chemicals materials; these restrictions are imposed to prevent the potential ingestion of chemicals. Continued implementation of these UC Berkeley policies and procedures, and continued compliance with existing laws and regulations would minimize the risk to workers and students from exposure to non-radioactive hazardous chemicals and the impact would be *less than significant*.

PUBLIC EXPOSURE. The potential for exposure to the public, including nearby homes and schools, from hazardous materials used at UC Berkeley under routine conditions would be limited, because most hazardous materials use and storage on campus takes place indoors. The most probable potential pathway for public exposure would be air emissions from accidental releases either on campus or during transportation and routine operations. Exposure to air emissions from routine operations are analyzed in Chapter 4.2 Air Quality and were determined to be less than significant. The potential for public exposure under upset or accident conditions, both from handling of hazardous materials on campus and during transportation, is discussed under LRDP Impact HAZ-6, below.

Hazardous chemical use under routine conditions could result in impacts to the environment if hazardous materials were improperly disposed of (for example, in the sanitary sewer). Hazardous chemical releases to the environment could also occur if the chemicals are not adequately contained, as in the case of leaking underground storage tanks, which can contaminate soil and groundwater. Disposal of chemicals into the sanitary sewer is regulated by state, federal, and local laws and regulations. UC Berkeley is subject to requirements specified in the East Bay Municipal Utility District (EBMUD) Wastewater Discharge Permit issued to UC Berkeley. Federal and California clean water

laws permit laboratories to drain-dispose of some chemicals in small quantities that do not pose a hazard to human health or the environment.

Continued compliance with federal, state, and local regulations governing the storage of hazardous materials, City of Berkeley TMD and EH&S inspections of campus laboratories and support facilities using hazardous materials, campus monitoring of underground storage tanks, and the UC Berkeley Aboveground Storage Tank Spill Prevention Control and Countermeasure Plan all minimize the risk that increased hazardous materials use on campus under routine conditions would result in releases to the environment. The impact of hazardous chemical use on the public would be *less than significant*.

HAZARDOUS WASTE

Development under the 2020 LRDP would continue to follow regulations that limit the potential impacts from hazardous wastes. Compliance with hazardous waste storage and transportation regulations, and continuation of the programs and controls currently in place to reduce and manage hazardous wastes and to prevent inadvertent releases of hazardous materials to the sanitary sewer would minimize the hazards to workers, the public, and the environment. Treatment, storage, and disposal facilities are currently available with adequate capacity to accept and safely manage UC Berkeley chemical waste. A systemwide UC audit program in place for nearly a decade inspects treatment, storage and disposal facilities to help ensure that all waste generated by UC Berkeley is properly disposed.

Conservatively assuming that campus hazardous waste generation would increase in proportion with the increase in laboratory space, under the 2020 LRDP hazardous waste generation could increase by about 70 percent over the current level.²⁷ The UC Berkeley Hazardous Materials Facility, where campus hazardous waste is held temporarily before it is hauled off site for disposal, is currently operating at approximately 40 percent of capacity and would be adequate to handle this increase. UC Berkeley's current hazardous waste stream represents about 0.026 percent of the capacity owned by the vendor with which UC Berkeley contracts for disposal of hazardous waste.²⁸ The increase in campus hazardous waste generation would be insignificant in relation to the vendor's disposal capacity. Therefore, the impacts related to the potential increased generation of hazardous chemical wastes would be *less than significant*.

BIOHAZARDOUS MATERIALS

Implementation of the 2020 LRDP would increase laboratory space, which could include increased use of biohazardous materials. As discussed in Section 4.6.4, almost all biological research at UC Berkeley is conducted at Biosafety Levels 1 or 2. Only three BUAs have been issued for Biosafety Level 3 work. The types of biological agents used in the future would likely remain largely the same as those currently used, although new research could create a need for new and different biological agents and there could be an increase in the number of laboratories using organisms requiring Biosafety Level 3.

An increase in use of biohazardous materials could potentially affect workers and the public through air (inhalation of aerosols), water (release to the sewer), waste disposal, and accidents. However, all of these potential effects would be minimized through compliance with stringent building code requirements for such facilities, and through existing UC Berkeley policies and procedures, including the Biosafety Program,

engineering controls and training programs described in Section 4.6.6. Although some of these programs are designed primarily for worker safety, they also control releases to the environment and exposure to the public at large by preventing releases to the air and the sanitary sewer.

These programs are continuously monitored and updated as necessary. Such programs include the Cal/OSHA Bloodborne Pathogen Standard, the Centers for Disease Control guidelines for work in laboratory and animal facilities, Guidelines for Animal Transport and Quarantine, and National Institutes of Health guidelines for work with recombinant DNA. EH&S would continue to inspect all laboratories, ensuring that the policies and procedures are followed and that violations of the policies are identified and corrected. In compliance with the Cal/OSHA's Bloodborne Pathogen Standard all incidents of exposure to bloodborne pathogens, and sharps injuries in laboratories using bloodborne pathogens, would be documented and medically evaluated.

Most biohazardous materials pose no significant hazard to the public due to their limited viability in the environment; however, others could pose a potential hazard if accidentally released or improperly handled. Particulate-borne air emissions of bacteria and viruses would be controlled by HEPA filtration at a very high degree of efficiency, minimizing the potential for public exposure.

In compliance with CDC guidelines, the new laboratories conducting Biosafety Level 3 research, like the existing laboratories operating at Biosafety Level 3, would be provided with special air filtration systems and access would be limited to trained workers. Review of the proposed procedures and authorization by campus and agency officials would be required prior to startup of these laboratories.

Because of continued campus compliance with regulatory requirements and current campus guidelines for controlling employee exposures to biohazardous materials, the potential impact of increasing the use of biohazardous materials on employee health, the environment, and the public would be *less than significant*.

BIOHAZARDOUS WASTE

Research laboratories using biohazardous materials and animal care activities at UC Berkeley produce biohazardous waste. Most laboratory tissues, fluids, and cultures are considered to be potentially infectious waste. Potentially infected animal care wastes can include animal excreta, bedding and uneaten food, cage washing solutions, animal carcasses and tissues, workers' disposable protective clothing and sharp objects such as needles, scalpels, and broken glass. At UC Berkeley, non-medical sharps waste and animal carcasses not contaminated with infectious agents known to cause human illness are also handled as medical waste to protect custodial workers and to reduce public concern. Implementation of the 2020 LRDP would increase campus biohazardous waste generation because use of biohazardous materials and research animals would increase. Also see LRDP Impact HAZ-2 which addresses impacts related to increased laboratory animal use on campus under the 2020 LRDP.

Under the 2020 LRDP UC Berkeley would, as required, temporarily store biohazardous wastes at its Hazardous Materials Facility on the central campus. While this is a change from a previous EIR for the Hazardous Materials Facility, which stated that biohazard-

ous wastes would be picked up only from Central Pickup locations on campus, this change in management method would improve safety and would provide for more secure waste transportation and pick up.²⁹

Existing UC Berkeley health and safety practices and compliance with federal and state regulations minimize the potential for adverse health effects related to biohazardous waste. New projects and waste management methods implemented under the 2020 LRDP would comply with these practices. Therefore, the impact of increased generation of biohazardous waste on campus would be *less than significant*.

RADIOACTIVE MATERIALS

As discussed in Section 4.6.4, the quantities of radioactive materials used at UC Berkeley have decreased by over 50 percent over the past ten years, as laboratory technologies requiring the use of radioactive materials have been replaced by other methods. Furthermore, the increasing cost of disposal encourages researchers to find methods that do not require the use of radioactive materials. Nonetheless, radioactive materials are highly useful in research and continue to be used on campus. The increase in laboratory space under the 2020 LRDP could result in an increase in radioactive material use over current levels, although the increase would be less than directly proportional to the increase in laboratory space because use of radioactive materials in research is decreasing and alternate research methods that do not involve radioactive materials are being increasingly employed.

Continued implementation of the existing campus Radiation Safety Program would occur under the 2020 LRDP. Given that adequate safety controls, plans, and procedures are in place to limit exposure to radiation from radioisotopes, radiation-producing machines, and radioactive waste, the potential for 2020 LRDP development to expose campus occupants or the public to significant health or safety risks is low. UC Berkeley projects implemented under the 2020 LRDP would comply with these controls. Similar to current practices with respect to disposal of radioactive waste, under the 2020 LRDP UC Berkeley would continue to use in-state and out-of-state storage and disposal options; no capacity issues are anticipated over the span of the 2020 LRDP.³⁰ The impact would be *less than significant*.

HAZARDOUS MATERIALS TRANSPORTATION

As discussed above, implementation of the 2020 LRDP would increase hazardous materials use and hazardous waste generation at UC Berkeley. Consequently the transport of hazardous materials to and from UC Berkeley would also increase. UC Berkeley policy requires that packaging of chemicals to be transported on public roads conform with requirements of the U.S. Department of Transportation (DOT). Hazardous materials delivered to the campus would also be required to conform with DOT requirements. All hazardous waste is picked up from generators by EH&S or a licensed hazardous waste contractor, and generators must properly package and label all unwanted hazardous materials. Under the 2020 LRDP, UC Berkeley would continue to require compliance with these safety regulations, guidelines, and policies. Therefore, the impact of the increased transport of hazardous materials to and from UC Berkeley would be *less than significant*.

Continuing Best Practice HAZ-1: UC Berkeley shall continue to implement the same (or equivalent) health and safety plans, programs, practices and procedures related to the use, storage, disposal, or transportation of hazardous materials and wastes (including chemical, radioactive, and bio-hazardous materials and waste) during the 2020 LRDP planning horizon. These include, but are not necessarily limited to, requirements for safe transportation of hazardous materials, EH&S training programs, the Hazard Communication Program, publication and promulgation of drain disposal guidelines, the requirement that laboratories have Chemical Hygiene Plans, the Chemical Inventory Database, the Toxic Use Reduction Program, the Aboveground Storage Tank Spill Prevention Control and Countermeasure Plan, monitoring of underground storage tanks, hazardous waste disposal policies, the Chemical Exchange Program, the Hazardous Waste Minimization Program, the Biosafety Program, the Medical Waste Management Program, and the Radiation Safety Program. These programs may be subject to modification as more stringent standards are developed or if the programs become obsolete through replacement by other programs that incorporate similar health and safety protection measures.

LRDP Impact HAZ-2: Implementation of the 2020 LRDP would increase the routine use of laboratory animals on campus by UC Berkeley laboratories, but given continuing campus best practices, this would not increase hazards to the public or the environment.

The laboratory space program anticipated under the 2020 LRDP would include an increase in the number of laboratory animals at UC Berkeley. The increased number of animals at UC Berkeley could pose potential hazards to workers, building occupants, and the neighboring community if contacts between humans and animals were not properly managed.

In accordance with the U.S. Public Health Service regulations, the ACUC oversees all aspects of animal care in campus facilities. Before any research involving live vertebrate animals can be initiated, a protocol for the activity must be prepared by the principal investigator and approved by the ACUC. Laboratory animal care practices must comply with federal and state requirements as well as the National Research Council Guide for the Care and Use of Laboratory Animals, and the U.S. Public Health Service Policy on the Humane Care and Use of Laboratory Animals.

UC Berkeley has achieved a high level of compliance with regulatory guidelines concerning care and treatment of laboratory animals. No non-compliant items were identified during the USDA's most recent inspection, in September 2003.³¹ New laboratories where animals would be involved in research, and new animal care facilities constructed under the 2020 LRDP would be designed and constructed to control the release of laboratory animals to the environment, and would be operated in compliance with existing programs and controls to reduce the impacts resulting from the increase in the number of laboratory animals at UC Berkeley. Therefore, with implementation of Continuing Best Practice HAZ-2, the impact of increased use of laboratory animals on campus would be *less than significant*.

Continuing Best Practice HAZ-2: UC Berkeley shall continue to implement the same (or equivalent) programs related to laboratory animal use during the 2020 LRDP planning horizon, including, but not necessarily limited to, compliance with U.S. Public Health Service Regulations, the National Research Council Guide for the Care and Use of Laboratory Animals, and Animal Welfare Act regulations. These programs may be subject to modification as more stringent standards are developed or if the programs become obsolete through replacement by other programs that incorporate similar health and safety protection measures.

LRDP Impact HAZ-3: Implementation of the 2020 LRDP would increase the use of transgenic organisms on campus by UC Berkeley laboratories, but given continuing campus best practices, this would not increase hazards to the public or the environment.

Implementation of the 2020 LRDP would increase lab space on the campus which in turn could increase research using transgenic organisms. Transgenic organisms include microorganisms, plants, and animals that have been genetically engineered or modified using recombinant DNA techniques. As discussed in Section 4.6.4, with the exception of transgenic bacteria that could be infectious, transgenic microorganisms do not pose a threat to public health or the environment. If not properly segregated from the surrounding environment, transgenic plants could genetically contaminate non-transgenic plants in the surrounding area or adversely impact biodiversity, through cross-pollination.

All research involving transgenic organisms on campus is required to comply with the NIH Guidelines for Research Involving Recombinant DNA Molecules. The Guidelines specify containment practices for plants, microorganisms, and animals, depending on the potential hazard posed by the organism. The potential for exposure of campus workers or the public to infectious transgenic organisms is minimized by compliance with CDC and NIH guidelines for research involving biohazardous materials, as detailed in the discussion of biohazardous materials, above. Research involving transgenic animals is subject to the same control programs that are discussed above with respect to laboratory animal use and care. All research involving transgenic plants must register with EH&S and a permit from the USDA is required for open field-based research involving transgenic plants. Most research involving transgenic plants on campus is conducted at the lowest plant biosafety level, BLP-1, with organisms that pose no risk. Controls such as segregated and screened greenhouses limit the potential for impact on plants in the surrounding area.

The USDA has inspected campus greenhouses twice in the last ten years. The results have been satisfactory.³² New facilities constructed under the 2020 LRDP that involve research using transgenic organisms would comply with existing programs and controls that minimize potential impacts of research involving transgenic organisms. Therefore, with implementation of Continuing Best Practice HAZ-3, the impact of increased use of transgenic organisms on campus would be *less than significant*.

Continuing Best Practice HAZ-3: UC Berkeley shall continue to implement the same (or equivalent) programs related to transgenic materials use during the 2020 LRDP planning horizon, including, but not necessarily

limited to, compliance with the NIH Guidelines for Research Involving Recombinant DNA Molecules, USDA requirements for open field-based research involving transgenic plants, and requiring registration with EH&S for all research involving transgenic plants. These programs may be subject to modification as more stringent standards are developed or if the programs become obsolete through replacement by other programs that incorporate similar health and safety protection measures.

LRDP Impact HAZ-4: Implementation of the 2020 LRDP could locate development on a hazardous materials site, exposing construction workers and campus occupants or the general public to contaminated soil or groundwater. Given campus continuing best practices, however, this would not increase the risks to workers, campus occupants or the general public.

Properties owned or acquired since the campus was founded in 1868 have the potential to contain soil and/or groundwater contamination from historic activities by UC Berkeley or previous owners. Known contamination of soil and/or groundwater as a result of leaking underground petroleum storage tanks is present at a number of sites, including the UC Garage at 1952 Oxford Street and the Physical Plant-Campus Services Corporation Yard at 2000 Carleton Street. Known soil contamination believed to have originated from historic disposal of chemicals into a sanitary sewer sump is present under the parking lot at the Plant Conservation Research Center (former Canyon Chemical Facility). The contamination at these sites has been or is in the process of being fully characterized and remediated with local and regional agency oversight. Residual contamination at these sites is believed to pose no threat to human health and the environment if not disturbed by construction or other activities.

Although no specific plans for these sites have yet been formulated, should UC Berkeley develop such plans, it would conduct further tests at the sites and appropriately remediate any contamination that could be encountered during construction.

With respect to other on-campus sites where contamination may be present, UC Berkeley adheres to the following procedures. EH&S maintains files for each university building, with information on site use involving hazardous materials, regulatory actions, and known contamination. To minimize the risk that construction would take place on a site with unknown contamination, EH&S conducts historical reviews of past site uses and regulatory actions for major construction projects on the Campus Park, to assess the potential for hazardous materials releases.³³

UC Berkeley requires that “due diligence” assessments (Preliminary Phase I Environmental Site Assessments) be performed for all new ground-disturbing construction projects off the Campus Park. If the Preliminary Phase I Environmental Site Assessment reveals activities or practices that may have resulted in releases of hazardous materials to the soil or groundwater, such as underground storage of fuel, samples of the surface and subsurface materials are collected and tested for potential contaminants. If contaminants are found, UC Berkeley reports the findings to the appropriate regulatory agency. Construction would not proceed until after the contamination has been addressed.

Soil and groundwater at Lawrence Berkeley National Laboratory (LBNL) is contaminated with volatile organic compounds and radionuclides.³⁴ The groundwater contaminant plumes have not migrated off-site.^{35,36,37} Although there is a potential for groundwater contaminated with radionuclides to reach Chicken Creek, which flows onto the campus, the concentrations of radionuclides in the vicinity of Chicken Creek are well below the maximum contaminant levels for drinking water. Therefore, development on campus property adjoining the LBNL site would not be significantly affected by contamination on the LBNL site.

Implementation of the 2020 LRDP would involve construction on sites within the LRDP Housing Zone. It is likely that commercial uses in the LRDP Housing Zone have included facilities that use hazardous materials, such as gasoline service stations, auto repair stations, dry cleaners, and printing shops. Soil or groundwater contamination may be present in the vicinity of these sites as a result of accidental spills or releases of hazardous materials or from abandoned home heating oil tanks. If unexpected contamination is encountered during construction of campus housing projects within the LRDP Housing Zone, workers could be exposed through inhalation or ingestion. Implementation of Continuing Best Practice HAZ-4 would minimize the potential that unexpected contamination would be encountered and would reduce the significance of the impact to a *less than significant* level.

Continuing Best Practice HAZ-4: UC Berkeley shall continue to perform site histories and due diligence assessments of all sites where ground-disturbing construction is proposed, to assess the potential for soil and groundwater contamination resulting from past or current site land uses at the site or in the vicinity. The investigation will include review of regulatory records, historical maps and other historical documents, and inspection of current site conditions. UC Berkeley would act to protect the health and safety of workers or others potentially exposed should hazardous site conditions be found.

LRDP Impact HAZ-5: Implementation of the 2020 LRDP could result in exposure to hazardous emissions or handling of contaminated building materials. This is a *less than significant* impact.

Due to the age of the campus, lead paint is present in many campus buildings. Through the combination of large-scale abatement projects and a continuing asbestos maintenance program, all significant asbestos exposure hazards have been eliminated from campus. However, at some locations on campus, asbestos building materials are still in place. In addition, in buildings currently or formerly used as laboratories, building materials such as floor and wall surfaces, sink traps, and drain piping, can be contaminated by spills, aerosol releases, or drain disposal of hazardous materials. Polychlorinated biphenyls (PCBs) may also be present in fluorescent light ballasts and some building materials. If proper procedures are not followed, workers can be exposed through inhalation or ingestion of lead dust, asbestos particles, PCBs, mercury vapor or other contaminants when building materials are disturbed or made friable by drilling, sanding, or other destructive processes.

Current campus practices and federal and state regulations minimize the exposure of construction workers to contaminated building materials during construction on campus sites. Throughout the 2020 LRDP planning horizon, UC Berkeley will continue to perform surveys for hazardous building materials and will comply with laws and regulations governing the handling of such materials. Thus, with implementation of Continuing Best Practice HAZ-5, the impact would be *less than significant*.

Continuing Best Practice HAZ-5: UC Berkeley shall continue to perform hazardous materials surveys prior to capital projects in existing campus buildings. The campus shall continue to comply with federal, state, and local regulations governing the abatement and handling of hazardous building materials and each project shall address this requirement in all construction.

LRDP Impact HAZ-6: Implementation of the 2020 LRDP would increase the handling and transportation of hazardous materials. Given continuing campus best practices, this would not increase the risk of hazardous materials release into the environment through upset and accident conditions.

Under current practice at UC Berkeley, all hazardous waste held on campus must comply with all applicable regulations, including suitable containers that are closed at all times (when not adding or removing waste) and secondary containment. The U.S. Department of Transportation Office of Hazardous Materials Safety prescribes strict regulations for the transportation of hazardous materials, as described in Title 49 CFR. Transportation along state roadways within or near UC Berkeley is also subject to all hazardous materials transportation regulations established by the California Highway Patrol pursuant to the California Vehicle Code. As detailed in the discussion of the previous threshold, campus policy requires that all hazardous materials to be shipped on public roads be packaged in compliance with U.S. Department of Transportation requirements. Compliance with these regulations minimizes the potential for accidental release of hazardous materials being transported to or from UC Berkeley.

New projects constructed under the 2020 LRDP would comply with the California Building Code (CBC), which identifies the minimum standards for structural design and construction in California, including specific requirements for seismic safety. In addition, the projects would comply with the University of California Seismic Safety Policy, which requires design provisions for new structures not included in the CBC, including adequate anchorage of nonstructural building elements such as equipment and material storage facilities. Construction according to these standards would minimize the potential for accidental releases of hazardous materials during an earthquake.

New campus construction would conform to the adopted California Fire Code, which establishes standards for the storage of hazardous materials. Both the City of Berkeley Fire Department and the Alameda County Fire Department, which provide fire protection to the campus, have hazardous materials response capabilities, enabling them to respond effectively to fires in facilities that store hazardous materials. (See also Chapter 4.11, Public Services, for additional information about emergency response.)

The UC Berkeley Business Plan describes procedures to follow in the event of an accidental release of hazardous materials. The EH&S Emergency Response team is capable of responding to most incidents at UC Berkeley and, if necessary, may arrange for appropriate assistance from the City of Berkeley Fire Department, the LBNL Fire Department, and outside emergency response contractors.

One state law governing the storage of hazardous materials is the California Accidental Release Program (CalARP). This law addresses facilities that contain specified hazardous materials or “regulated substances” that, if involved in an accidental release, could result in adverse off-site consequences. Detailed chemical inventories maintained by UC Berkeley to comply with the UC Berkeley Business Plan show the use or storage of regulated substances at any current campus location is not large enough to trigger CalARP requirements. Thus, although the UC Berkeley Business Plan requires UC Berkeley to define emergency response procedures, a risk management plan under CalARP does not need to be submitted, which means maximum storage quantities are below levels that would potentially cause an off-site consequence. Campus best practices will continue to inventory campus hazardous materials in future locations. Given past experience, quantities above CalARP thresholds are not anticipated. Should that occur, UC Berkeley would comply with all applicable CalARP reporting requirements.

Compliance with all applicable federal and state laws, as well as campus programs, practices and procedures related to the transportation, storage and use of hazardous materials would continue under the 2020 LRDP, minimizing the potential for a release and providing for prompt and effective cleanup if an accidental release occurs. Therefore, the impacts related to accidental release due to the increased transportation, storage or use of hazardous materials under the 2020 LRDP would be *less than significant*. Implementation of safety plans, programs, practices and procedures, as defined in the discussion of LRDP Impact HAZ-1 through HAZ-3, would ensure these impacts remain *less than significant*.

LRDP Impact HAZ-7: Implementation of the 2020 LRDP could result in hazardous emissions and the handling of hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school. Given continuing campus best practices, however, such emissions or handling practices would not pose a health or safety hazard to students or employees at such schools. This is a *less than significant* impact.

Existing schools and day care centers within ¼ mile of UC Berkeley include the Montessori Family School adjacent to the north side of the Campus Park at the corner of Scenic Drive and Hearst, the Berkeley Montessori School at 1581 Leroy Avenue (at Cedar), the Berkeley Montessori Pre-School at Francisco at Shattuck Street and Shattuck Avenue, the East Bay School for the Arts at Milvia and Francisco Streets, Berkeley Arts Magnet School at Milvia and Virginia Streets, Woolly Mammoth Day Care Center on Bancroft, and campus child care facilities at 2340 Durant Avenue, 2537 Haste Street, and in Girton Hall.³⁸ As a result of the implementation of the 2020 LRDP, hazardous materials could be handled within ¼ mile of these existing schools and day care centers.

Potential health risks for occupants of these schools resulting from routine air emissions of hazardous chemicals under existing conditions and with the implementation of the 2020 LRDP are analyzed in Chapter 4.2, Air Quality. With respect to storage and handling of hazardous substances on campus, these materials would not exist in quantities sufficient to pose a risk to occupants of the nearby schools in case of an accidental release. Hazardous materials in laboratories are typically handled in small quantities, so the potential consequences of accidental releases would be limited to a single building and people outside the buildings would not be exposed. Historically, most spills at UC Berkeley have been limited to the individual laboratory where the spill occurred.³⁹

Furthermore, on a quarterly basis, EH&S compares quantities of chemicals stored in each campus location to the CalARP thresholds. Under CalARP, if the quantities of a particular chemical exceed the threshold for that chemical, UC Berkeley is required to prepare a Risk Management Plan (RMP) to prevent off site consequences from accidental releases of the hazardous materials stored in quantities above the threshold. The quantities of chemicals currently stored in laboratories and other locations on campus do not meet the CalARP thresholds so a risk management plan is not required. If under the 2020 LRDP, a facility is proposed that stores or handles specific hazardous chemicals in quantities that exceed CalARP thresholds, a RMP would be prepared for that facility to prevent offsite consequences from accidental releases.

Also Section 21151.4 of the Public Resources Code (PRC) requires that when a project located within one-quarter mile of a school involves the construction or alteration of a facility that might reasonably be anticipated to emit hazardous or acutely hazardous air emissions or handle acutely hazardous materials or a mixture containing acutely hazardous materials in a quantity equal to or greater than that specified in Section 25536(a) of the Health and Safety Code, the Lead Agency must (1) consult with the affected school district regarding the potential impact of the project when circulating the environmental document and (2) notify the affected school district in writing prior to approval and certification of the environmental document. UC Berkeley would continue to comply with the provisions of Section 15186 of the CEQA Guidelines (that respond to PRC Section 21151.4), requiring disclosure of potential health impacts associated with any projects near schools, throughout implementation of the 2020 LRDP.

The risks associated with routine toxic air contaminant emissions to sensitive receptors, including schools and day care centers, are analyzed in Chapter 4.2, Air Quality, and were determined to be less than significant. Because the quantities of chemicals stored in labs are typically small and UC Berkeley would continue to evaluate chemical storage in existing and proposed laboratories on campus relative to CalARP thresholds and comply with CalARP regulations, the impact to those attending existing or proposed schools or child care centers near the laboratories would be *less than significant*.

LRDP Impact HAZ-8: Implementation of the 2020 LRDP could expand research uses of non-ionizing radiation sources. This is a *less than significant* impact.

Implementation of the 2020 LRDP would increase lab space on the campus which in turn could increase research involving non-ionizing radiation such as lasers on campus. The only hazards posed by non-ionizing radiation devices used in research on campus are health and safety hazards to those who work in laboratories where such devices are

used and, in the case of Class 4 lasers, laboratory fire hazards. As discussed in Section 4.6.4 and Appendix E, existing campus policies and procedures are in place to minimize the risks, including those associated with fire. Implementation of these policies and procedures would continue under the 2020 LRDP. Therefore, the impact would be *less than significant*.

4.6.8 TIEN CENTER IMPACTS

EFFECTS NOT FOUND TO BE SIGNIFICANT

The Initial Study found that the Chang-Lin Tien Center for East Asian Studies would have no significant impacts in regard to the following thresholds:

Would the project create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?

Would the project result in development located on a hazardous materials site as listed on the "Cortese List" (compiled pursuant to Government Code Section 65962.5) and, therefore, create a significant hazard to the public or the environment?

Would the project 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?

Would the project result in development that would emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?

As described in the Initial Study and Notice of Preparation for the 2020 LRDP and Tien Center project,⁴⁰ the Tien Center would house office, classroom and library space, and would not significantly expand hazardous materials use on the campus, would not release hazardous materials in the event of upset or accident conditions, would not handle or emit hazardous materials within one-quarter mile of an existing or proposed school, and would not be located on a hazardous materials site.

4.6.9 CUMULATIVE IMPACTS

This section evaluates whether development under the 2020 LRDP, in combination with reasonably foreseeable non-UC Berkeley projects, would result in significant cumulative impacts. Such impacts could occur if hazardous material use and generation associated with development under the 2020 LRDP could combine with hazardous material use and generation from other reasonably foreseeable projects to create hazards that would be cumulatively considerable.

The analysis considers cumulative growth as represented by the implementation of municipal general plans, implementation of the Lawrence Berkeley National Laboratory 2004 LRDP, the draft Southside Plan, the AC Transit Major Investment Study, and implementation of the 2020 LRDP, as described in 4.0.5. The analysis also includes

growth anticipated by the City of Berkeley General Plan EIR, and by previously certified UC Berkeley EIRs, including the Northeast Quadrant Science and Safety Projects (SCH 2001022038), Seismic Replacement Building 1 (SCH 99122065), and the Underhill Area Projects (SCH 99042051). The analysis below also considers the transport of materials to and from these areas.

The geographical context for much of the analysis of cumulative hazardous materials impacts from increased hazardous materials use and disposal is limited to the Campus Park, Adjacent Blocks West, and the Lawrence Berkeley National Laboratory site. All future projects involving an increase in the use or generation of hazardous materials are anticipated to be located within these areas. Analysis of cumulative hazardous materials transport would include routes to and from materials handling areas in the broader roadway systems of the Bay Area, including Berkeley, Oakland and regional systems.

The significance of the potential cumulative impacts was determined based on the following standards:

Standard: *Would the project create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials.*

Standard: *Would the project 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.*

Standard: *Would the project result in development that would emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school.*

Standard: *Would the project result in development located on a hazardous materials site as listed on the "Cortese List" (compiled pursuant to Government Code Section 65962.5) and, therefore, create a significant hazard to the public or the environment.*

The question posed in this section is twofold:

- Is the potential *cumulative* impact of the 2020 LRDP *and* other reasonably foreseeable projects under these standards significant?
- Is the contribution of the 2020 LRDP to these impacts cumulatively considerable?

Cumulative Impact HAZ-1: The 2020 LRDP, in combination with other reasonably foreseeable projects, would result in increased use and transportation of hazardous materials, but would not significantly increase hazards to the public or the environment associated with the use and transport of hazardous materials and the generation of hazardous wastes.

As documented in Section 4.6.7, the use, storage, and transport of hazardous materials and the generation of hazardous waste on campus would increase under the 2020 LRDP. The Land Use Element of the City of Berkeley General Plan does not anticipate

any significant growth in industrial development.⁴¹ The EIR for the City of Berkeley General Plan concluded that no potentially significant hazardous materials impacts would occur with implementation of the plan.⁴² The Southside Plan and the AC Transit Berkeley/Oakland/San Leandro corridor project would not result in a significant increase in the use of hazardous materials. The only other project in the area involving significant hazardous materials use is the Lawrence Berkeley National Laboratory 2004 LRDP. This plan would result in the growth of the laboratory's operations and activities, including those that involve use of hazardous materials. However, no major new sources of on-site hazardous materials are anticipated at the LBNL site.⁴³

The hazards to the public and the environment resulting from the increased use and storage of hazardous materials on campus and at LBNL would be minimal because UC Berkeley and LBNL would continue to comply with all applicable laws, regulations and campus policies governing hazardous materials and hazardous waste management. As discussed under LRDP Impact HAZ-1, the campus hazardous waste stream represents an insignificant percentage of available non-radioactive chemical hazardous waste disposal capacity, so UC Berkeley would not contribute to a cumulative impact related to increased generation of hazardous waste. Although currently there is no capacity in California for low-level radioactive waste disposal, UC Berkeley and other generators in the state utilize in-state and out-of-state storage and disposal options. It is anticipated that this practice will continue under the 2020 LRDP. Therefore, the cumulative impact associated with the increase in routine use, storage, transport and disposal of hazardous materials and generation of hazardous waste would be *less than significant*.

As discussed under LRDP Impact HAZ-2, the use of laboratory animals on campus would increase under the 2020 LRDP. However, this would not significantly increase the risk to campus occupants and the neighboring community from animal bites, escapes, and disease transmission because UC Berkeley would continue to comply with applicable regulatory guidelines. The increase in laboratory space at LBNL may include an increase in the use of laboratory animals. Because research activities involving laboratory animals are unique to UC Berkeley and LBNL, other development in the surrounding area is not expected to contribute to an increase in laboratory animal use. Like UC Berkeley, LBNL complies with applicable laws, regulations, and guidelines governing the housing and handling of laboratory animals and would continue to do so under the 2004 LBNL LRDP. Therefore, the potential risk associated with the cumulative increase in laboratory animal use would be a *less than significant* impact.

As discussed under LRDP Impact HAZ-3, the use of transgenic materials on campus would increase under the 2020 LRDP. However, this would not result in significant risks to campus occupants and the neighboring community because UC Berkeley would continue to comply with applicable laws, regulations, and policies governing research involving infectious organisms and transgenic plants and the housing and handling of laboratory animals.

The increase in laboratory space at LBNL may also result in an increase in the use of transgenic organisms. Because research activities involving transgenic materials are unique to UC Berkeley and LBNL, other development in the surrounding area is not expected to involve the use of transgenic materials. Like UC Berkeley, LBNL complies with applicable laws, regulations, and guidelines governing the handling of infectious

organisms, transgenic plants, and laboratory animals. Therefore, the potential risk associated with the cumulative increase in the use of transgenic materials would be a *less than significant* impact.

As discussed under LRDP Impacts HAZ-4 and HAZ-5, implementation of the 2020 LRDP could result in exposure to hazardous waste in soil or groundwater or to contaminated building materials, including asbestos, lead, PCBs, and laboratory chemicals or radioactive materials deposited as fumes or aerosols or as a result of chemical spills. These hazards would have only local impacts and would not contribute to a cumulative impact. Furthermore, UC Berkeley, LBNL, and other agencies involved in development in the surrounding area, would comply with existing federal and state regulations and with standard due diligence practices. Therefore, the cumulative impact would be *less than significant*.

As discussed under LRDP Impact HAZ-6, the increase in hazardous materials use on campus under the 2020 LRDP would not significantly increase the risk of a hazardous materials release under upset or accident conditions. The potential risk of a release would be minimized through campus compliance with regulations governing hazardous materials storage, handling, and transportation, and structural design and construction standards and policies. As described in Chapter 4.5, Geology, UC Berkeley programs also reduce risks of upset through bracing of non-structural seismic hazards. Furthermore, available emergency response capacity is adequate to handle hazardous materials releases that may occur on campus.

The cumulative impact on sensitive receptors from toxic air emissions under routine conditions is analyzed in Chapter 4.2, Air Quality. As discussed under LRDP Impact HAZ-7, the potential hazards associated with accidental releases of hazardous materials from campus laboratories within ¼ mile of existing or proposed schools or child care centers under the 2020 LRDP would be a less than significant impact. In addition, this would be a local impact that would affect only particular schools or child care centers. The existing schools or child care centers within ¼ mile of campus laboratories are not within ¼ mile of the LBNL, and other development in the vicinity of these schools is not expected to result in significant hazardous materials use. Therefore, the cumulative impact would be *less than significant*.

4.6.10 REFERENCES

- ¹ UC Berkeley, *Notice of Preparation: Environmental Impact Report for the 2020 LRDP and Chang-Lin Tien Center for East Asian Studies*, August 29, 2003, pages 25-26.
- ² *City of Berkeley Draft General Plan EIR*, February 2001, page 297.
- ³ *City of Berkeley Draft General Plan EIR*, February 2001, page 314.
- ⁴ Hans, Karl, EH&S Specialist, UCB Office of Environment, Health and Safety. Written communication with Jennifer Lawrence, Principal Planner, UCB Facilities Services, February 5, 2004.
- ⁵ This includes the Campus Park and other UC Berkeley facilities in the Hill Campus and City Environs, but excludes off-site facilities such as Richmond Field Station.
- ⁶ City of Berkeley Toxics Management Division, *Inspection Report*, April 4, 2002.
- ⁸ Hans, Karl, EH&S Specialist, UCB Office of Environment, Health and Safety. Written communication with Jennifer Lawrence, Principal Planner, UCB Facilities Services, February 5, 2004.
- ⁷ California Department of Health Services, *Inspection Report*, UC Berkeley, June 8, 2000.
- ⁸ Altitude above sea level and the location and materials used to build homes influences the background dose. For example, in Denver, the background dose from cosmic radiation due to altitude is about twice that of San Francisco.
- ⁹ Lavelly, Paul, Associate Director, UCB Office of Environment, Health and Safety. Personal communication with John Koehler, URS Corporation, March 14 and October 1, 2002.
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- ¹⁵ Drlica, Steven, USDA Animal and Plant Health Inspection Service, *Inspection Report, University of California-Berkeley, Site 01, Main Campus*, September 26, 2002; Steven Drlica, USDA Animal and Plant Health Inspection Service, *Inspection Report, University of California-Berkeley, Site 001*, August 10, 2001.
- ¹⁶ Klein, Hilton, President, AAALAC International. Written correspondence to Beth Burnside, Vice Chancellor for Research, UCB, March 2, 2001.
- ¹⁷ Lindow, Steven, Chair, UCB Department of Plant & Microbial Biology. Personal communication with Shabnam Barati, URS Corporation, May 2002.
- ¹⁸ Lindow, Steven, Chair, UCB Department of Plant & Microbial Biology. Personal communication with Shabnam Barati, URS Corporation, May 2002.
- ¹⁹ Lindow, Steven, Chair, UCB Department of Plant & Microbial Biology. Personal communication with Shabnam Barati, URS Corporation, May 2002.
- ²⁰ Carlson, C., Biosafety Officer, UCB Office of Environment, Health and Safety. Personal communication with Shabnam Barati, URS Corporation, May 6 and 7, 2002.
- ²¹ Carlson, C., Biosafety Officer, UCB Office of Environment, Health and Safety. Personal communication with Shabnam Barati, URS Corporation, May 6 and 7, 2002.
- ²² Haet, Greg, Associate Director, UCB Office of Environment, Health and Safety. Personal communication with Alisa Klaus, URS Corporation, November 21, 2003.
- ²³ UC Berkeley Office of Environment Health and Safety, *Underground Storage Tank Closure Report, 1952 (Central Garage) and 1990 Oxford Street, Berkeley, CA*, August 2, 2002.
- ²⁴ UC Berkeley Office of Environment Health and Safety, *Underground Storage Tank Closure Report, 2000 Carleton Street, Berkeley, CA*, April 22, 2002.

- ²⁵ *City of Berkeley Draft General Plan EIR*, February 2001, pages 287-288.
- ²⁶ Hurlbert, Margaret, EH&S Specialist, UCB Physical Plant-Campus Services. Personal communication with Shabnam Barati, URS Corporation, February 25, 2004.
- ²⁷ This estimate includes lab space that is currently under construction as well as labs that would be developed under the 2020 LRDP. The estimate is conservative because the increase under the 2020 LRDP includes both “wet” and “dry” lab space, while in fact only “wet” labs would generate hazardous waste.
- ²⁸ Haet, Greg, Associate Director, UCB Office of Environment, Health, and Safety. Personal communication with Jennifer Lawrence, Principal Planner, UCB Facilities Services.
- ²⁹ Haet, Greg, Associate Director, UCB Office of Environment, Health, and Safety. Personal communication with Jennifer Lawrence, Principal Planner, UCB Facilities Services, March 2, 2004.
- ³⁰ Hans, Karl, EH&S Specialist, UCB Office of Environment, Health, and Safety. Personal communication with Jennifer Lawrence, Principal Planner, UCB Facilities Services, February 5, 2004.
- ³¹ U.S. Department of Agriculture (USDA), Animal and Plant Health Inspection Service, *Inspection Report*, UC Berkeley, September 2003.
- ³² Carlson, C., Biosafety Officer, UCB Office of Environment, Health and Safety. Personal communication with Shabnam Barati, URS Corporation, May 6 and 7, 2002.
- ³³ Haet, Greg, Associate Director, UCB Office of Environment, Health, and Safety. Personal communication with Alisa Klaus, URS Corporation, June 18, 2003.
- ³⁴ Rochette, M., Engineering Geologist, Regional Water Quality Control Board, San Francisco Bay Region. Personal communication with Alisa Klaus, URS Corporation, November 6, 2002; Javandel, Iraj, Group Leader, Environmental Restoration, Lawrence Berkeley National Laboratory. Personal communication with Alisa Klaus, URS Corporation, November 7, 2003.
- ³⁵ Barrett, L. Public Participation Specialist. California Department of Toxic Substances Control. Permit communication with Alisa Klaus, URS Corporation, Nov. 2003.
- ³⁶ Rochette, M., California Regional Water Quality Control Board, San Francisco Bay Region. Personal communication with Alisa Klaus, URS Corporation, November 2003.
- ³⁷ Javanel, Iraj, Lawrence Berkeley National Laboratory. Personal communication with Alisa Klaus, URS Corporation, November 2003.
- ³⁸ Environmental Data Resources, *Off-site Receptor Report*, Inquiry No. 039641.1r, July 30, 1999.
- ³⁹ Environmental Data Resources, *Off-site Receptor Report*, Inquiry No. 039641.1r, July 30, 1999.
- ⁴⁰ UC Berkeley, *Notice of Preparation: Environmental Impact Report for the 2020 LRDP and Chang-Lin Tien Center for East Asian Studies*, August 29, 2003, pages 25-26.
- ⁴¹ City of Berkeley, *Planning Commission General Plan*, April 2002, Land Use Element, page LU-7.
- ⁴² *City of Berkeley Draft General Plan EIR*, February 2001, pages 296-297.
- ⁴³ Lawrence Berkeley National Laboratory, *Revised Notice of Preparation, Draft Environmental Impact Report*, October 28, 2003, page 9 of the Checklist.

4.7 HYDROLOGY AND WATER QUALITY

This chapter evaluates potential impacts associated with the development proposed under the 2020 LRDP and the Tien Center on drainage, flooding, and groundwater and surface water quality of the Campus Park, City Environs and the LRDP Housing Zone. Issues related to water supply and storm sewer capacity are addressed in Chapter 4.13, Utilities and Service Systems.

During the scoping period for this EIR, several concerns related to hydrology and water quality were raised. Key issues raised included potential impacts of the 2020 LRDP to Strawberry Creek and other water courses, impacts associated with potential increases in impervious surfaces, and potential groundwater and surface water contamination. These issues are addressed in this chapter.

4.7.1 ANALYTICAL METHOD

2020 LRDP

The description of existing conditions and the impact analysis derives from a review of background reports, including the City of Berkeley and the City of Oakland general plan documents, the UC Berkeley 1990 LRDP EIR, and online resources. The current and foreseeable regulatory environment was also reviewed. 2020 LRDP impacts and the adequacy of existing programs and proposed 2020 LRDP policies intended to reduce hydrological impacts were then evaluated. The hydrology and water quality impacts of projected cumulative growth were also analyzed.

TIEN CENTER

The impacts related to the Chang-Lin Tien Center for East Asian Studies were analyzed separately. The construction of both phases 1 and 2 of the Tien Center would result in an approximate net increase of 15,155 square feet of impervious area. This information, in conjunction with the proposed location on campus and the proximity to Strawberry Creek and North Fork Strawberry Creek, was considered in determining potential impacts.

4.7.2 REGULATORY FRAMEWORK

Federal and State water quality regulations apply to development projects that may adversely affect the quality of surface waters or groundwater through the discharge of wastewater and storm water. Section 303 of the federal Clean Water Act and the State's Porter-Cologne Water Quality Control Act establish water quality objectives for all waters in the State. These objectives are implemented locally through Water Quality Control Plans and the National Pollutant Discharge Elimination System, (NPDES) permitting program.

UC Berkeley is currently required to adhere to requirements set forth in the Clean Water Act and San Francisco Bay Region Water Quality Control Plan (also called the Basin Plan), has applied for a Phase II municipal separate storm sewer system (MS4) NPDES Permit, and is awaiting designation as a Phase II permittee by the San Francisco Bay Regional Water Quality Control Board (RWQCB).¹

The RWQCB views ephemeral drainages as creeks for CWA regulatory purposes. Because hydrology is inextricably linked to ecosystem and wildlife health, the California

Department of Fish and Game (CDFG) also has regulatory oversight over projects in lakes, streambeds, and adjacent riparian zones. CDFG broadly defines “riparian zone” as limited only by the distance to the furthest riparian species of vegetation in the immediate drainage. UC Berkeley therefore reviews stream channel improvements, fire fuel mitigation efforts around creeks, and any other near-stream projects with the RWQBCDFG, and the Army Corps of Engineers, which has regulatory oversight of fill and channel alterations to the high water line under Section 404 of the Clean Water Act and Section 10 of the Rivers and Harbors Act. Campus creeks have been, to varying degrees, historically subject to wildfires and the fire-associated changes in vegetation, food chains, and erosion.²

Over the past five years, UC Berkeley has received three Notices of Violation (NOVs) in the areas of surface water, ground water, and waste water:

- December 29, 1999 – UC Berkeley was issued a NOV by the Regional Water Quality Control Board expressing concerns that UC Berkeley may not have acted adequately to protect water quality in Strawberry Creek. Concerns included construction site erosion and sediment control, sewage spill response, illicit discharges, employee training, and proper spill reporting.
- April 12, 2000 – UC Berkeley was issued a NOV by EBMUD for exceeding the wastewater concentration limit for chlorinated hydrocarbons.
- February 9, 2001 – UC Berkeley was issued a NOV from the City of Berkeley for the discharge of hot steam condensate to the city storm drain system.

UC Berkeley responded to the NOVs in a prompt and thorough manner and all deficiencies noted in the NOVs have been corrected.

SPILL PREVENTION CONTROL AND COUNTERMEASURE PLAN

In California owners and operators of aboveground petroleum storage tanks must comply with regulations of the Federal Oil Pollution Prevention Act and the State Aboveground Petroleum Storage Act. Federal regulations in Title 40 Code of Federal Regulations Part 112 et. seq. present requirements applying to owners and operators of aboveground petroleum storage tanks (ASTs) with a facility aggregate storage capacity in excess of 1,320 gallons and includes the development of a Spill Prevention Control and Countermeasure Plan (SPCC Plan). UC Berkeley owns and operates around 45 ASTs with a total storage capacity of approximately 10,000 gallons and has prepared an SPCC Plan to meet regulatory requirements.

The purpose of the SPCC Plan is to establish procedures, methods, equipment and other preventative measures to prevent the discharge of oil into or upon the navigable waters of the United States, or their tributaries, per 40 CFR Part 112. The SPCC Plan also addresses ways of minimizing environmental impacts if a spill does occur.

WATER QUALITY CONTROL PLANS

The CWA and State Porter-Cologne Water Quality Control Act provide for the restoration and maintenance of the physical, chemical, and biological integrity of the nation’s waters. Discharges of wastewaters and stormwaters to Strawberry Creek and the San Francisco Bay are regulated by these laws under a number of programs administered by

the State Water Resources Control Board (SWRCB) via the San Francisco Regional Water Quality Control Board (Regional Board). To administer these programs, the Porter-Cologne Water Quality Control Act also requires each Regional Board to develop a Water Quality Control Plan, usually called a Basin Plan. The San Francisco Regional Board's Basin Plan was approved in 1995. The Plan is the master policy document that contains descriptions of the legal, technical, and programmatic bases of water quality regulation in the San Francisco Bay region. It includes statements of beneficial water uses to be protected, water quality objectives and strategies and time schedules for achieving the water quality objectives.

The beneficial uses associated with surface water and groundwater resources in East Bay watersheds are summarized in the 1995 San Francisco Bay Basin Water Quality Control Plan compiled by the San Francisco RWQCB. The beneficial uses for surface water, which serve as a basis for establishing water quality standards, include:

- Non-contact water recreation
- Cold freshwater habitat
- Warm freshwater habitat
- Fish spawning, reproduction, and/or early development.
- Wildlife habitat

The beneficial uses designated for groundwater in the East Bay Plain Basin include:

- Municipal and domestic water supply
- Industrial process and service water supply
- Agricultural water supply.

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM

The National Pollutant Discharge Elimination System (NPDES) program was initially established to regulate the quality of effluent discharge from wastewater treatment plants. Through the NPDES Waste Discharge Requirements, the RWQCB sets limits on the levels of pollutants that may be discharged into navigable waters of the United States, which include the waters draining from Strawberry Creek into San Francisco Bay. The limits are designed to meet the water quality objectives established in the Basin Plan.

The 1972 amendments to the CWA prohibit the discharge of pollutants to navigable waters from a point source (a discharge from a single conveyance such as a pipe) unless the discharge is authorized by an NPDES permit. In 1987, in recognition that diffuse, or non-point, sources were significantly impairing surface water quality, Congress amended the CWA to address non-point source stormwater runoff pollution in a phased program requiring NPDES permits for operators of municipal separate storm sewer systems (MS4s), construction projects and industrial facilities. Phase I, promulgated in 1990, required permits for MS4s generally serving populations over 100,000, construction permits for projects five acres or greater and industrial permits for industries determined by Standard Industrial Classification (SIC) code.

The Phase II program expands on the Phase I program by requiring additional operators of small MS4s in urbanized areas and operators of small construction sites, through

the use of NPDES permits, to implement programs and practices to control polluted storm water runoff. Stormwater discharges from MS4s can contain a high concentration of pollutants if left uncontrolled. Uncontrolled runoff from construction sites can have negative effects such as increasing sedimentation on creeks and streams. Phase II is intended to reduce these adverse impacts to water quality and aquatic habitat by instituting the use of controls on the unregulated sources of storm water discharges.³

Under Phase II of the NPDES program, the State Water Resources Control Board has issued 2 general permits: 1) Municipal permits – required for operators of small MS4s, including universities, and 2) Construction permits – required for projects involving one acre or more of construction activity. The municipal permit requires development and implementation of a Stormwater Management Plan (SWMP). The purpose of the SWMP is:

- To identify pollutant sources potentially affecting the quality and quantity of stormwater discharges,
- To provide Best Management Practices (BMPs) for municipal and small construction activities implemented by UC Berkeley staff and contractors, and
- To provide measurable goals for implementation of the SWMP to reduce discharge of identified pollutants into the storm drain system and associated waterways.

The goal of the SWMP is to reduce the discharge of pollutants to the Maximum Extent Practicable (MEP), as defined by the EPA, and to identify activities or structural improvements that help reduce the quantity and improve the quality of the stormwater runoff. Best Management Practices (BMPs) are developed for EPA's identified Minimum Control Measures for the SWMP to reduce the discharge of pollutants to the storm drain system to the MEP. "Minimum Control Measures" is the term used by the EPA for the six MS4 program elements aimed at achieving improved water quality through NPDES Phase II requirements listed below:

- Public Education and Outreach on Stormwater Impacts
- Public Involvement / Participation
- Illicit Discharge Detection and Elimination
- Pollution Prevention / Good Housekeeping for Facilities Operation and Maintenance
- Construction Site Stormwater Runoff Control
- Post-construction Stormwater Management in New Development and Redevelopment

The construction permit requires projects that disturb more than one acre of soil to develop and implement a Stormwater Pollution Prevention Plan (SWPPP), identifying potential sources of pollution and describing runoff controls both during construction and after the building is complete. Discharges originating from UC Berkeley's drainage area to surface waters are subject to the water quality objectives and discharge prohibitions stipulated in the Basin Plan, and are regulated by the San Francisco Bay Regional Board. Similarly, UC Berkeley has developed a specification which is included in construction projects of any size where soil is disturbed, including projects disturbing less than one acre of soil. This specification is consistent with the RWQCB's General Construction Permit SWPPP requirements, but does not require filing a Notice of Intent with the RWQCB.

Each project developed under the 2020 LRDP would be required to comply with construction-site requirements outlined in the project-specific SWPPP. SWPPP requirements for site description and control measures to prevent or minimize pollutants in stormwater and non-stormwater discharges are specified in bid documents and would be included in construction contracts. UC Berkeley is responsible for contractor oversight and enforcement. UC Berkeley's current construction specifications require each construction project, regardless of size, to be reviewed to verify that the project meets the SWPPP requirements. However, the specifications are currently being revised to specifically outline requirements for projects over one acre. Additional requirements will include submission of a Notice of Intent, as well as post-construction control requirements.

Since the NPDES permit targets a diverse array of nonpoint source controls, the program is based on implementation of Best Management Practices (BMPs). Construction-related BMPs are a set of specific guidelines for reducing pollutants in stormwater discharges and runoff both during construction and post-construction. There are a number of resources for BMPs including:

- *Erosion and Sediment Control Field Manual* published by RWQCB
- *Start at the Source: Design Guidance Manual for Stormwater Quality Protection* published by the Bay Area Stormwater Management Agencies Association.
- *California Storm Water Best Management Practices Handbook* published by the California Stormwater Quality Task Force
- *Manual of Standards for Erosion and Sediment Control* published by ABAG.

4.7.3 LOCAL PLANS AND POLICIES

Although the University is constitutionally exempt from local regulations when using its property in furtherance of the its educational purposes, it is University policy to evaluate proposed projects for consistency with local plans and policies. Therefore, this section outlines the plans and policy goals of the City of Berkeley and Oakland related to hydrology and water quality.

CITY OF BERKELEY

BERKELEY GENERAL PLAN

The Berkeley General Plan contains a number of policies that encourage coordinated efforts to improve water quality in the San Francisco Bay; coordination of storm sewer improvements and creek restoration projects, public education regarding watershed health, reduction of flood hazards, creek daylighting, flood insurance and consideration of flood hazards in the development approval process.⁴

FINDINGS OF THE BERKELEY GENERAL PLAN EIR

At the time of adoption the City of Berkeley General Plan EIR assumed: a net increase in Berkeley households of 3,176 (approximately 3,340 housing units); an increase in population of 6,955 people;⁵ an increase of 10,895 jobs⁶; and a city-wide increase in automobile trips of approximately 5.1 percent.⁷ The Berkeley General Plan EIR assumed an increase of 5,635 new jobs within the area bounded by Hearst, Shattuck, Dwight, and the eastern city limits.⁸

The EIR found that construction of new medium and high density housing, and additional student housing at UC Berkeley, could result in localized flooding problems by increasing impervious surfaces. However, given that most development would occur on previously developed sites, and that City policies require planning to reduce runoff volumes, these impacts were determined to be less than significant.⁹ The EIR also found a potentially significant impact of increased flooding and erosion hazards due to the possible removal of culverts and underground pipes in the course of creek restoration projects, and prioritized implementation of policies to reduce flood hazards, ensure development review, and reduce the cost of flood insurance to reduce potential impacts. Further, a mitigation measure requiring the Department of Public Works to review and approve the hydraulic design and proposed maintenance program of creek restoration projects that include significant alterations to the stormwater conveyance system, reduces the potential impact to less than significant.

As City releases combine with other cities that release stormwater runoff and treated wastewater into the San Francisco Bay, the EIR found a significant cumulative effect from the combination of the City's release of stormwater runoff and treated wastewater, and the release from other cities, into San Francisco Bay. Implementation of city policies for the improvement of water quality contributes to the continuing mitigation and alleviation of the cumulative water quality impact.¹⁰

CITY OF BERKELEY WATER COURSES ORDINANCE

In 1989, the City of Berkeley passed the Preservation and Restoration of Natural Watercourses Ordinance. The purpose of this ordinance is to regulate any future culverting of or construction in open creeks, to encourage rehabilitation and restoration of natural waterways, and to promote responsible management of the watersheds.¹¹

CITY OF OAKLAND

OAKLAND GENERAL PLAN

The Oakland General Plan contains policies that reinforce protection of groundwater resources; support improvements to groundwater quality; control urban runoff; discourage development in reservoir watersheds; protect creek ecology; implement public education programs on creek ecology; protect Bay and estuary waters; manage Oakland's lakes to enhance recreational and ecological function; and restrict Bay fill.¹²

The Environmental Hazards and Safety Element of the Oakland General Plan also contains policies with respect to hydrology. These policies require the City to: support the Alameda County Flood Control District's policy of balancing the costs of new projects against the potential damage from flooding; support the Flood Insurance Program; and create flood control designs that preserve the natural character of the creeks. The City also has a Creek Protection, Stormwater Management and Discharge Control Ordinance to reduce or eliminate non-storm water discharges and to direct development and construction projects taking place on a creekside property.¹³

4.7.4 EXISTING SETTING

This section describes hydrologic characteristics, drainage, runoff, flooding, and surface and groundwater quality in the Campus Park, the Hill Campus, and surrounding areas.

HYDROLOGY AND DRAINAGE

UC Berkeley is located at the edge of the Berkeley Hills, near the western edge of the Coast Range physiographic province. The hills are roughly parallel to the northwest-southeast trend of the major mountain ridges in the province with spur ridges and canyons oriented perpendicular to main ridges. A ridge of relatively heavy rainfall -- up to 28 inches in an average year -- follows the trend of the hills along their north-south axis. In the local area, including the Campus Park, Hill Campus, Adjacent Blocks, and LRDP Housing Zone, rainfall is between 24 and 26 inches during an average year.¹⁴

In undeveloped, natural conditions (where human activity has a negligible effect on runoff), runoff quantities in the Berkeley vicinity tend to be relatively low (estimated to be between 4.5 and 5.5 inches per year or about 20 percent of the precipitation), despite the existence of some steep local topography.

Runoff from a specific site is affected by slope gradient, soil depth and permeability, urbanization, impervious cover, land use, amount and type of vegetation and/or mulch, antecedent moisture conditions, and rainfall amount, intensity and duration. Intense and/or prolonged rainfall and steep slopes generally result in high runoff; an undisturbed vegetative cover tends to capture and detain runoff, resulting in lower runoff volumes. Coarse-grained, sandy soils absorb more runoff than fine-grained silty or clayey soils. Deep soils generally have a greater retention capacity than shallow soils of similar composition.

Runoff coefficients devised by the Natural Resources Conservation Service compare the estimated amounts of rainfall that become surface runoff. The higher the number, the greater the runoff for a given amount of rainfall. For undeveloped areas, runoff coefficients commonly range from 0.10 to 0.40, depending on the relationship of the factors noted above. In developed suburban areas, runoff coefficients commonly range from 0.30 to 0.75 (single-family residential areas and multi-family areas). Industrial, commercial and urban residential areas have runoff coefficients ranging from 0.50 to 0.90.¹⁵

The following sections provide more detailed information on hydrology and drainage for the 2020 LRDP land use zones.

CAMPUS PARK

The Campus Park drains primarily into Strawberry Creek, which acts as both a stream and as part of the storm drain and flood control system for the Campus Park, Adjacent Blocks, Southside and most of the Hill Campus. Storm drains from Lawrence Berkeley National Laboratory (LBNL), the Campus Park and the City of Berkeley discharge into the creek.¹⁶ The drainage patterns on the Campus Park and entire LRDP area are shown in Figure 4.7-1.

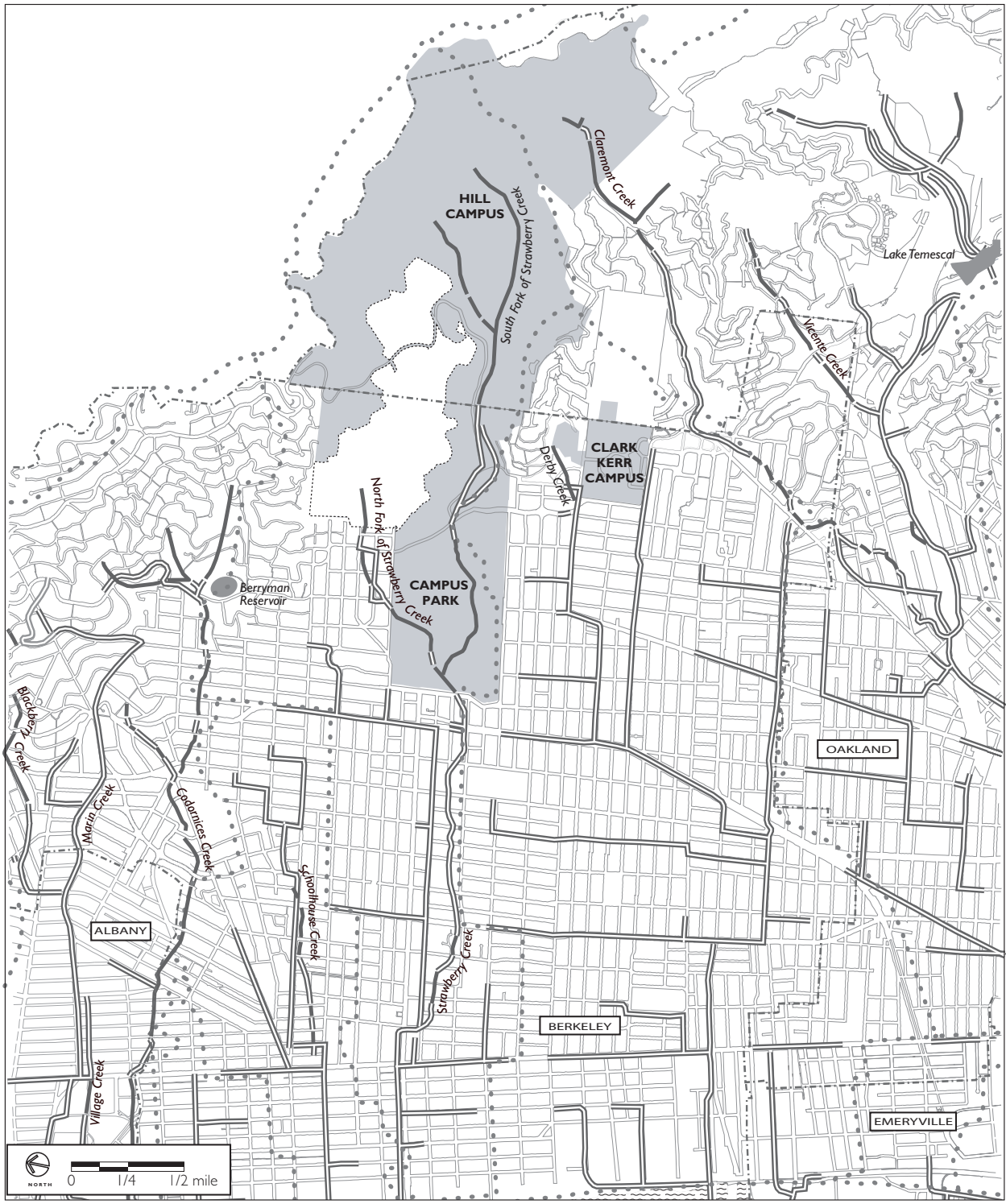
The Strawberry Creek watershed comprises approximately 1,163 acres. The most notable drainage channels are the north and south forks of Strawberry Creek, which meet in the western portion of the Campus Park. The North Fork in the Hill Campus has also historically been known as Blackberry Creek, but because another historically-named Blackberry Creek runs through the North Berkeley portion of the LRDP Housing Zone, the North Fork Strawberry Creek will hereinafter be referred to only as the North Fork.

The runoff from the watershed reaches the City of Berkeley culvert at Oxford Street, and flows in an underground conduit along Allston and Center streets to Curtis Street before being diverted to University Avenue and west into San Francisco Bay.¹⁷ To address flooding concerns, bypass culverts have been installed on both the north and south forks of Strawberry Creek to carry extreme storm flows under developed areas. An earthen dam in the lower Hill Campus above and east of the Campus Park defines the South Fork earthen retention basin that controls downstream flooding. The retention basin has a flood storage capacity of 1.5 million cubic feet (11 million gallons).

The dam outlet – just west of the Lower Jordan Fire Trail access -- controls flow into the Big Inch and Little Inch bypass culverts by means of a 48-inch by 42-inch hydraulically operated slide gate controlled from a station at the fire trail entrance. Gate operation is supervised by UC Berkeley's Facilities Services Utilities Manager.¹⁸ The Big Inch and Little Inch culverts pass under the Strawberry Canyon Recreation Area, California Memorial Stadium, Maxwell Family Field, Gayley Road, Girton Hall, and South Drive before the South Fork again daylight just north of the Women's Faculty Club on the Campus Park.

The City's storm drain system at Oxford Street has been identified as deficient under existing conditions for a 25-year storm. The City of Berkeley reports that the capacity of the City storm drain at Oxford Street (where Strawberry Creek leaves the Campus) would be exceeded by 25 percent during a 25-year design storm event under existing conditions. Therefore, any new development on the Campus Park or Hill Campus that might increase stormwater runoff may cause flooding problems within the City's drain system and along lower Campus Park elevations near the channel.¹⁹

Less than 60 percent of the Campus Park is impervious, including buildings, walkways, roads, and parking lots.²⁰ This results in an existing runoff coefficient for the Campus Park of about 0.80, based on the degree of impervious surfaces, and the amount of vegetative ground cover. Most of the landscaped areas are auto-irrigated; one-third of the landscaped areas are monitored by a system that tracks soil moisture and weather to improve irrigation efficiency and decrease excess runoff.²¹



Source: San Francisco Estuary Institute, GIS Data, 1998; TOPO! ©1998 Wildflower Productions, www.topo.com.









-  **Aquatic Park**
-  **Reservoir**
-  **UC Berkeley Property**
-  **Watershed Boundary**
-  **Lawrence Berkeley National Laboratory Boundary**
-  **City Limit Line**
-  **Creeks**
-  **Culverts and Storm Drains**

FIGURE 4.7-1
HYDROLOGY OF THE 2020 LRDP AREA

ADJACENT BLOCKS WEST AND NORTH

The Adjacent Blocks West drains through culverts into lower Strawberry Creek in locations west of the Campus Park. In this portion of the watershed, all overland flow is collected by curb-and-gutter systems and delivered through side inlets to the storm drainage culverts beneath local streets.²² The north fork of the creek is culverted in the Adjacent Blocks North, and daylights at the north campus edge.²³

ADJACENT BLOCKS SOUTH AND SOUTHSIDE

The Southside drains to the Derby Creek watershed. Overland flow in this area is collected by curbs-and-gutters, side inlets and subsurface culverts for delivery to the San Francisco Bay.²⁴ Derby Creek runs thru UC property at the north edge of the Smyth-Fernwald Housing. The creek then veers first northward, then southwesterly, running open and unculverted thru private backyards, then under a bridge on Hillside Avenue before dropping into a culvert inlet between Hillside and Prospect Avenues; the channel is culverted from there all the way to San Francisco Bay.

In this area small parks interrupt the impervious surfaces of roads, walks, parking lots, playgrounds and structures, with the few exceptions being larger open space areas at Smyth-Fernwald, the Clark Kerr Campus, and Willard Junior High School. None of these contains daylit portions of Derby Creek.²⁵

HILL CAMPUS

The Hill Campus drains overland in natural drainage patterns along the western front of the Berkeley Hills. The eastern portions of the Hill Campus are characterized by numerous ephemeral channels. The western portions of the Hill Campus, like the Campus Park, contain both ephemeral tributaries and perennial streams flowing in well-defined, and – in some cases – partially improved channels such as the Hamilton and Chicken Creek tributaries to South Fork Strawberry Creek.

Drainage from the northern part of the Hill Campus and LBNL is routed into both the north and south forks of Strawberry Creek, which lead eventually to the Oxford Street culvert.²⁶ The southern part of the Hill Campus drains to Derby Creek, and also to Claremont Creek, sometimes known as North Fork Temescal Creek or Harwood Creek.²⁷ For the Hill Campus, the existing runoff coefficient is estimated to be about 0.60 due to steep slopes, relatively shallow soil cover and partially developed hillsides.²⁸

LRDP HOUSING ZONE

Generally, all of the 2020 LRDP Housing Zone is drained by a set of naturally occurring creeks flowing from the hills to the San Francisco Bay. Runoff is conveyed by street gutters to underground conduits, which drain into the creeks. Most of the creeks have been culverted; a few creek segments still flow above ground or have been daylit.

BERKELEY. The portion of the 2020 LRDP Housing Zone located in Berkeley drains to Blackberry (aka Middle) Creek, Codornices Creek, Lincoln Creek, Schoolhouse Creek, Marin Creek, Strawberry Creek, Potter Creek and Derby Creek. West of the toe of East Bay Hills, Berkeley's creeks are contained within underground drain culverts – with the exception of Blackberry Creek, Strawberry Creek and Codornices Creek, each of which has naturally open or daylit reaches. Open creek reaches are typically armored against course changes to protect adjacent development both on- and off-campus.

OAKLAND. Surface drainage in the Oakland portion of the 2020 LRDP Housing Zone is controlled by a combination of natural creeks and human-made stormwater drainage facilities. The portion of the 2020 LRDP Housing Zone located in Oakland drains to Claremont Creek and Temescal Creek. Temescal Creek, which is channelized and largely culverted, drains Lake Temescal in the Oakland foothills and flows to the San Francisco Bay.²⁹

FLOODING

This section describes existing flooding potential in the Campus Park, Adjacent Blocks, Southside, Hill Campus and the 2020 LRDP Housing Zone. Figure 4.7-2 shows the areas which are subject to 100-year flood events according to the Federal Emergency Management Agency (FEMA).

CAMPUS PARK

According to the FEMA, most of the Campus Park lies within areas of minimal flooding potential. Areas lying within the 100-year flood zone are adjacent to Strawberry Creek, as shown in Figure 4.7-2. Higher peak flood stages are caused by an increase in impervious surface area, stormwater routing and channel confinement. Overtopping of confined creek banks normally occurs in several areas where low rock walls border curb areas. There is potential for this to occur in the areas near the Valley Life Sciences Building, Life Sciences Addition, and Dwinelle Hall Annex.³⁰

Strawberry Creek severely flooded in 1962, after which UC Berkeley implemented flood control measures. Since then, there has been little flooding on Strawberry Creek except in very high flow years. The creek reportedly did overtop its banks near the Oxford Street culvert in 1995, causing water to flow onto Oxford Street. The 1995 flooding event was caused by obstruction upstream, and was not directly related to the size of the Oxford Street culvert, but resulted from the creek overflowing its banks toward Oxford Street.³¹

ADJACENT BLOCKS, SOUTHSIDE AND HILL CAMPUS

Neither the Adjacent Blocks, Southside, nor the Hill Campus are within any 100-year flood zone. However, in 1996, the earthen detention dam in Strawberry Canyon overflowed, flooding Hearst Memorial Stadium and the Haas Clubhouse pool with mud. It is believed that this overflow could be attributed to a debris blockage in the dam outlet, rather than the dam being overwhelmed.³²

LRDP HOUSING ZONE

BERKELEY. Flooding hazards in the portion of the 2020 LRDP Housing Zone located in Berkeley are principally due to the potential for Strawberry Creek and Codornices Creek to overtop their banks, and to the potential failure of the Berryman and Summit Reservoirs. Strawberry Creek poses a flood hazard for downtown Berkeley, immediately west of Oxford Street. In a heavy rainfall event, if runoff volumes cannot be adequately conveyed by the existing storm drainage facilities, flooding may occur.³³ Codornices Creek poses a flood hazard for North Berkeley along Hopkins Street, which is in the creek's 100-year flood zone.

Additionally, the areas west of the Berryman and Summit Reservoirs could be affected by inundation. The Summit Reservoir, located on the border of Kensington and Berke-

ley, would affect areas along Berkeley's border between Grizzly Peak Boulevard and The Alameda. This includes a portion of the LRDP area. The Berryman Reservoir in eastern Berkeley could potentially inundate a large portion of Berkeley, including neighborhoods along Hopkins Street, in north Berkeley in an area which is located in the LRDP Housing Zone. Rain overflow is not an issue at either the Berryman or Summit Reservoirs because rain does not enter reservoir since both have roofs.³⁴

A seismic analysis of the Summit Reservoir performed by EBMUD in 1985, and approved by the California Division of Safety of Dams, concludes that the dam will perform satisfactorily in the event of a maximum credible earthquake on either the Hayward Fault (Magnitude 7.5) or the San Andreas Fault (Magnitude 8.5).³⁵

The possibility of inundation from the Berryman Reservoir will be reduced by the approved EBMUD project to replace the Berryman Reservoir with one 4.6 million gallon steel tank or alternatively two smaller tanks depending on geotechnical conditions encountered once the reservoir is drained.³⁶ EBMUD plans to start draining the reservoir in early 2004.³⁷

OAKLAND. Flood hazards near the 2020 LRDP Housing Zone in Oakland are associated with overbank flooding of Temescal Creek. As shown in Figure 4.7-2, the LRDP Housing Zone located in Oakland would not be subject to a 100-year flood hazard from Temescal Creek.³⁸



Source: Federal Emergency Management Agency, Q3 Flood Data, ARC/INFO Coverage, Washington, DC, 1996.

- 100-Year Flood Zones**
- City Limit Line**
- UC Berkeley Property**
- Lawrence Berkeley National Laboratory Boundary**

**FIGURE 4.7-2
100-YEAR FLOOD ZONES**

WATER QUALITY

This section provides a discussion of surface water and groundwater quality and erosion and sedimentation. In this section, the entire 2020 LRDP area is discussed.

The majority of the land in the 2020 LRDP area is urbanized, and the quality of water resources has been and continues to be affected by the diverse range of urban uses. Major sources of nonpoint water pollution include stormwater runoff from roads and private lawns, infiltration/inflow from sewage pipes, accidentals spills or leaching of hazardous materials and construction activities. As described above these sources are subject to federal, State, and local water quality regulations and water quality implementation programs.

Additionally, water quality is affected by industrial point sources. Although none of the industries in 2020 LRDP areas are considered major dischargers, past industrial activities have contributed to groundwater contamination.

SURFACE WATER QUALITY

The primary surface water resources in the 2020 LRDP area are Strawberry Creek, with smaller contributions from a small portion of Codornices Creek, Derby Creek, and Claremont Creek. These resources are discussed in this section and shown on Figure 4.7-1. As further discussed below, most East Bay Creeks are entirely or almost entirely culverted west of the toes of the East Bay Hills, as shown on Figure 4.7-1.

STRAWBERRY CREEK. The overall quality of the water discharged to Strawberry Creek through the campus storm drain system reflects the contaminant load generated by adjacent land uses that are transported to the creek in stormwater runoff, irrigation runoff and direct discharges. Currently, Strawberry Creek receives water from the following sources:

- Stormwater
- Groundwater, including natural springs in the Berkeley Hills, building perimeter and utility vault dewatering systems, and slope stability dewatering wells
- Irrigation runoff
- Air conditioning and steam condensate
- Accidental or illicit discharges, such as water main breaks or surface washing.

Strawberry Creek's water quality on the Campus Park is good at most times, with few obvious signs of degradation. Strawberry Creek supports three or four locally native fish species. The most recent rapid bioassessment of macroinvertebrates showed that water quality on campus was "fair" to "good". Because most leaks and improper pipe connections on the campus have been eliminated, the main sources of water pollutants in Strawberry Creek today are non-point source runoff, spills and illicit dumping. These sources result in a perceptible "shock loading" of chloraminated water, sediment, nutrients, bacteria, soap, and other pollutants during spills. During rain events the "first flush" of soap, metals, oils and atmospheric deposition leads to visibly polluted water as well as measurable increases in pollutants such as heavy metals and bacteria. Sewers in City residential areas occasionally overflow from inflow and infiltration during heavy rain events, which can contribute additional pollutants to the creek during wet weather.

The Strawberry Creek Environmental Quality Committee provides guidance to UC Berkeley in projects for Strawberry Creek including water pollution, erosion-control measures and restoration. Guidance for project relationships to other campus creeks comes from regulatory frameworks, including mitigations, BMPs, and permitting conditions. Future guidance for all campus waterways will be provided by the SWMP to be implemented as part of the campus MS4 NPDES Permit when issued.

CODORNICES CREEK, DERBY CREEK AND CLAREMONT CREEK. As Codornices, Derby and Claremont Creeks flow from the East Bay hills to San Francisco Bay, they receive non-point source runoff from the areas of Berkeley, Oakland and Albany that drain to the creeks. The major mechanism for control of urban runoff is the implementation of the MS4 NPDES permit issued to participating agencies of the Alameda County Clean Water Program, including the Cities of Albany, Berkeley and Oakland. The Alameda County Phase I Municipal Stormwater NPDES Permit was re-issued by the Regional Water Quality Control Board in February 2003. The Permit requires the Cities to develop and implement Stormwater Quality Management Plans, New and Re-development Performance Standards and Hydrograph Modification Management Plans to manage pollutant discharges, including flow, from commercial, industrial, residential and development activities. The Alameda County permit does not apply to UC Berkeley property. As described above, the University will be required to obtain a small MS4 Phase II NPDES permit.

All three creeks may be subject to contamination from non-point source runoff, spills and illicit dumping that can result in a perceptible "shock loading" of chloraminated water, sediment, nutrients, bacteria, soap, and other pollutants during spills. During rain events the "first flush" of soap, metals, oils and atmospheric deposition can lead to polluted water as well as measurable increases in pollutants such as heavy metals and bacteria. Sewers in residential areas have also been known to overflow from inflow and infiltration during heavy rain events, which can contribute additional pollutants to the creek during wet weather.

GROUNDWATER QUALITY

As shown in Figure 4.7-3, the Campus Park, Hill Campus, Adjacent Blocks, Southside and 2020 LRDP Housing Zone all fall within the groundwater basin identified by the San Francisco Regional Water Quality Control Board (RWQCB) as the East Bay Plain. The 2020 LRDP area contains some groundwater resources, but since they are not considered groundwater recharge areas for domestic supply, they are not extensively monitored for water quality. The depth to water table in the 2020 LRDP area can be within ten feet from ground surface, with the higher groundwater levels located in selected areas in the Hill Campus.³⁹

The groundwater level on the Campus Park is a direct result of water percolation from both the north and south forks of Strawberry Creek, but predominantly from the south fork. Previous hydrologic studies of the area indicate that groundwater occurs at a shallow depth below the Campus Park. Because of the relatively slow permeability of some of the alluvial soils, perched conditions could occur during periods of heavy rain.⁴⁰

Abundant amounts of groundwater occur on the Hill Campus because of the Hayward fault, which acts as a dam between the Hill Campus hydrologic systems and the Campus Park and the Hill Campus. However, movement along the Hayward fault has cut off westward percolation of the groundwater. Groundwater depths vary and are influenced by time of the year and geologic factors such as seepage barriers, faults, and formational contacts previously mentioned. Spring is generally a time when groundwater levels are high in the shallow, “perched” aquifers, whereas the water table is lower in summer and autumn.⁴¹

One portion of interconnected groundwater sources beneath the East Bay plain is known to underlay the northwestern Hill Campus.⁴² The Hill Campus lenses of Moraga soils do not absorb water loading well, and tend towards instability when overly wet. Such instabilities were first noted in the late 1960s. In 1975, the Campus installed Shively Well #1 and a pump near the Silver Space Sciences Lab. Moisture overburdening of the soils can result in soil movements, leading in turn to increased sediment contamination of surface waters.⁴³

MONITORING CONTAMINANTS IN CAMPUS GROUNDWATER. The Office of Environment, Health and Safety (EH&S) is the campus administrative unit responsible for coordinating monitoring and remediation of contaminants in soil and groundwater. Known or suspect areas of soil and groundwater contamination are sampled by hand-auger or drill-rig drilled borings. Where necessary, groundwater monitoring wells are installed to monitor the stability of any groundwater contamination over time.

Currently, three campus locations have monitoring wells installed: 1952-1990 Oxford Street, 2000 Carleton, and the former Canyon Chemical Facility (currently the Plant Conservation Research Center). In addition, groundwater containing low-level tritium contamination may be migrating from within the LBNL site through some groundwater lenses and in some cases discharging into local surface waters. Results of supplemental surface water sampling performed by LBNL for tritium in 2001 and 2002 found that tritium was well below the drinking water maximum contaminant level (MCL) for tritium which is 740 Bq/L (20,000 pCi/L). Tritium was found above the reporting limit of 7.4 Bq/Liter (L) (200 pCi/L) in most of the surface water samples collected from upper and lower Chicken Creek and in three monthly samples collected from the North Fork of Strawberry Creek between October 2001 and April 2002.

Tritium was below the reporting limit at all other surface water sampling locations, including the two background locations; Strawberry Creek on the UC Berkeley campus; and the outfall of Strawberry Creek to San Francisco Bay. Following the completion of the supplemental sampling, the US/EPA announced in July 2002 that the environmental sampling at the Berkeley Lab found tritium levels well below federal health standards, and it decided that no further action was required under the Superfund program⁴⁴. The most recent sampling of groundwater from the CCF site found no chemical contamination and tritium at background levels. Residual petroleum contamination is present at 1952-1990 Oxford St. and 2000 Carleton, both former petroleum fueling locations. A request for no further action has been approved by the Regional Board for UC Berkeley’s 2000 Carleton Facility and is currently under regulatory review for 1952-1990 Oxford Street.

EROSION AND SEDIMENTATION

Erosion and sedimentation occur naturally or have been exacerbated by near-by development along non-culverted sections of creeks in the 2020 LRDP area, including Codornices, Strawberry, Derby, and Claremont Creeks and their tributaries. There is limited or no data on the effects of erosion in Codornices, Derby, and Claremont Creeks, particularly in the LRDP area, but there is extensive data on erosion issues for Strawberry Creek, which is described below.

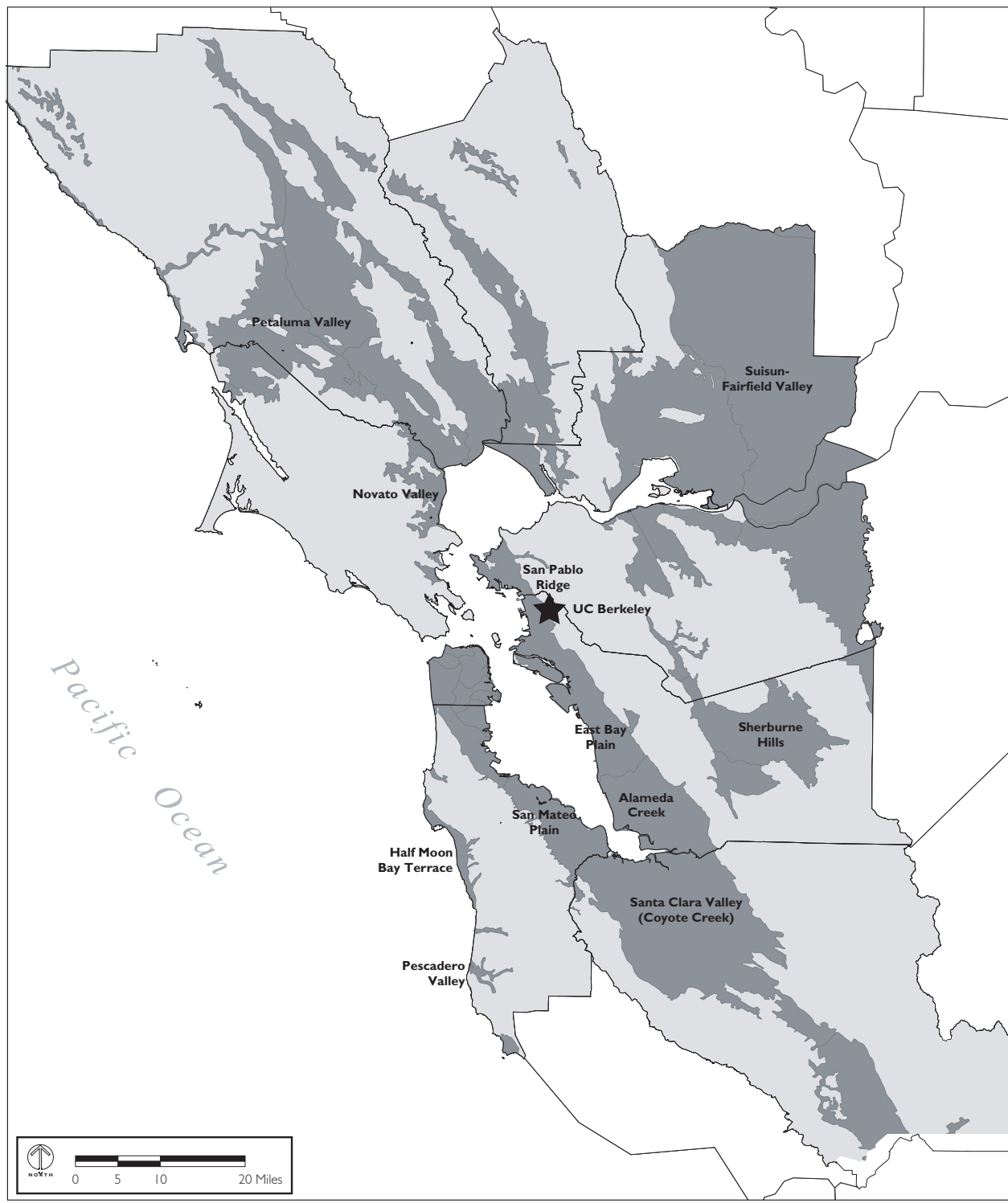
Erosion has been a problem for Strawberry Creek due to extensive undercutting of streambanks at the footings for bridges, utility overcrossings, and retaining walls. This erosion threatens bank collapse and possible structural failure. The undercutting and erosion of streambanks led to efforts to channelize and confine Strawberry Creek. The increase in impervious surface area associated with urbanization resulted in increased storm runoff and shorter time of concentration for peak flows. Lag times between precipitation and runoff are estimated to have been reduced by half over natural conditions, while peak runoff has increased significantly. These changes resulted in significant channel downcutting (vertical erosion) by the early 1900s.

In response, in order to stop downcutting, small reaches of the creek were lined with concrete as long ago as 1907, and various channel stabilization/alteration projects continued into the 1960s, with repairs continuing to the present.⁴⁵ The check dams have been effective in preventing major channel incision, and without the check dams the unstable channels would rapidly deepen. Repairs of these erosion control structures are reviewed by the Strawberry Creek Environmental Quality Committee which continues to implement water quality, restoration, and improvement programs through the Strawberry Creek Management Plan in order to address the erosion and bank stabilization issue of the creek. The Strawberry Creek Management Plan is discussed in more detail later in this chapter.

WASTEWATER DISCHARGE

As discussed in the Utilities section of this document, campus wastewater (i.e. sanitary sewer flows) is treated by EBMUD's wastewater treatment plant in Oakland. Treated effluent from this plant is discharged one mile off the East Bay shoreline through a deepwater outfall in the San Francisco Bay. Limitations on the wastewater discharges are regulated under EBMUD's Ordinance 311 and the campus wastewater discharge permit.

UC Berkeley has implemented a number of programs to assure compliance with wastewater discharge requirements, including a coordinated response to sanitary sewer spills, inspecting chemical use areas, drain disposal guidelines and training for photo and research laboratories, shops, physical plant maintenance and construction activities. EBMUD regularly samples wastewater for metals and volatile chemical analysis.



Source: California Department of Water Resources, 2004.

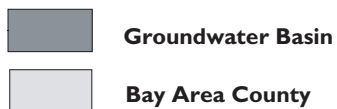


FIGURE 4.7-3
GROUNDWATER BASINS IN THE
SAN FRANCISCO BAY REGION

UC BERKELEY POLLUTION PREVENTION RECORD. EBMUD samples effluent flows and inspects research and photo laboratories. There have been no violations found by EBMUD at UC Berkeley since 2000. Prior to that time, campus wastewater occasionally had chlorinated hydrocarbon concentrations that were over the effluent limits for total identifiable chlorinated hydrocarbons, but these discharges have been significantly reduced and now fall well below the limit. In 2004 UC Berkeley received a “Certificate of Merit for Outstanding Achievement” from the California Water Environment Association for its efforts to protect water quality.⁴⁶ In 2003, the campus was one of two honorees to be awarded EBMUD’s Pollution Prevention Award for “exemplary performance in complying with discharge requirements.”⁴⁷

HYDROLOGIC SETTING OF THE TIEN CENTER SITE

The proposed Tien Center would be located on a moderately sloped portion of the Campus Park uphill east of the Campus Park’s unculverted North Fork reaches. At its closest point, the Tien Center’s Phase 1 structure would be approximately 200 feet from the creek bank. The closest corner of the proposed Phase 2 structure would be approximately 100 feet from the nearest creek point. Both buildings would be sufficiently upslope to be well out of the North Fork floodplain; no historical record exists of flooding in the Northside area. Runoff in the site area is typical of Campus developed sites, and the site is accordingly generally well-served by extant storm drainage systems.

4.7.5 STANDARDS OF SIGNIFICANCE

The significance of the potential impacts of the 2020 LRDP and Tien Center on hydrology and water quality was determined based on the following standards:

Standard: Would the project violate any water quality standards or waste discharge requirements?

Standard: Would the project 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?

Standard: Would the project substantially deplete groundwater supplies or quality, 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)?

Standard: Would the project substantially alter existing drainage patterns 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 substantial erosion, siltation or flooding on- or off- site?

Standard: Would the project otherwise substantially degrade water quality?

Standard: Would the project 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?

Standard: Would the project place within a 100-year flood hazard area structures which would impede or redirect flood flows?

Standard: Would the project 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?

Standard: Would the project create development subject to inundations by seiches, tsunamis, or mudflows?

4.7.6 POLICIES AND PROCEDURES GUIDING FUTURE PROJECTS

This section describes existing policies and procedures that would help to minimize hydrology impacts of development under the 2020 LRDP. It discusses both the policies in the 2020 LRDP itself and other University policies and practices relevant to hydrology.

2020 LRDP

Hydrology and water quality impacts of projects proposed under the 2020 LRDP would be reduced by policies guiding the location, scale, form and design of new University projects. While several of the LRDP Objectives described in Chapter 3.1 bear directly or indirectly on hydrology and water quality, three are particularly relevant.

- **Plan every new project to serve as a model of resource conservation and environmental stewardship.**
- **Maintain and enhance the image and experience of the campus, and preserve our historic legacy of landscape and architecture.**
- **Maintain the Hill Campus as a natural resource for research, education, and recreation, with focused development on suitable sites.**

The 2020 LRDP includes a number of policies and procedures for individual project review to support these Objectives. For each new project to serve as a model of resource conservation and environmental stewardship, the 2020 LRDP envisions developing a campus standard for sustainable design specific to its site, climate, and facility inventory. The Campus Park Framework and Guidelines in the 2020 LRDP include policies to preserve and protect significant Campus Park natural areas and open spaces, including the riparian habitats along Strawberry Creek.

To maintain the Hill Campus as a natural resource, the 2020 LRDP envisions: establishing a management authority for the Ecological Study Area; ensuring the future management of, and investments in, the Ecological Study Area and the Botanical Garden are integrated and synergetic; maintaining the visual primacy of the natural landscape in the Hill Campus; and managing the Hill Campus landscape to reduce fire risk and restore native vegetation patterns.

STRAWBERRY CREEK MANAGEMENT PLAN

The Strawberry Creek Restoration Program began in 1987, in response to campus and community concerns over the deteriorated environmental quality of Strawberry Creek. The campus Office of Environmental Health and Safety (EH&S) sponsored a comprehensive study of the creek with the results of the study, completed by Robert Charbonneau, published in December 1987 as the "Strawberry Creek Management Plan" (SCMP).

The SCMP study began as a water quality management plan but ultimately expanded into a comprehensive study of the watershed with a focus on overall urban creek and riparian habitat preservation and restoration.⁴⁸ The Plan provides recommendations for implementation of management strategies for point and non-point source pollution control, channel stabilization, aquatic and riparian habitat restoration and watershed management. An advisory committee, the Strawberry Creek Environmental Quality Committee (SCEQC), consisting of faculty, staff from campus planning and operations departments, and students, was created to help direct restoration activities including erosion control and bank stabilization, sanitary engineering and point source investigations, public outreach and other activities

Implementation of the SCMP from 1987 through the present successfully led to substantially improved overall water quality conditions, enhanced ecological integrity as measured by biological criteria (macroinvertebrates and fish), increased environmental education for students and the campus public, and stabilization of the most critical central campus and upper canyon erosion sites.

Implementation of the SCMP continues and the SCEQC meets regularly. The SCMP is currently being updated to reflect substantial changes in water quality and changes in applicable regulatory law since 1987 and to revise restoration goals and objectives.. While the plan still specifically excludes other campus creeks (i.e., Derby and Claremont), it has been developed cooperatively with input from faculty, EH&S scientists, a fire management planner, an environmental planner, and a grounds maintenance supervisor to provide holistic and comprehensive approaches to creek and watershed management.

The SCMP is being updated concurrent with the 2020 Hill Area Fire Fuel Management Plan (HAFFMP) and the 2020 LRDP to ensure a coordinated long-range approach to watershed management. Thus, all projects that may occur under the 2020 LRDP will be informed by three integrated policy and management tools to protect resources and beneficial uses, as well as by adjacent jurisdictions' creek and watershed programs and codes.

CAMPUS POLICIES AND PROCEDURES

STORMWATER BEST MANAGEMENT PRACTICES

Although not yet regulated under NPDES Phase II requirements, UC Berkeley has implemented a number of practices to protect water quality, including many practices recommended in the Strawberry Creek Management Plan. Waterways are regularly monitored, illicit discharges are rerouted to the sanitary sewer and a number of agency standard and innovative BMPs for minimizing the amount of pollutants entering downstream receiving waters have been implemented, such as training for maintenance and operations staff, development and implementation of the Sewage Spill Response Plan, point source investigation, regular street sweeping, 24-hour spill reporting hotline and a

prohibition of discharging wastewater from exterior building washing operations into the storm drain.

In compliance with the recently implemented Clean Water Act National Pollutant Discharge Elimination System Phase II requirements, UC Berkeley developed a Stormwater Management Plan and submitted the requisite permit application for municipal separate storm sewer system (MS4) discharges but is awaiting designation as a permittee and approval of the SWMP by the RWQCB. The SWMP was developed under the guidance of a SWMP committee which included members of the campus community, neighboring residents, and stormwater experts and outlines a 5-year plan to address water quality and water quantity issues from day to day operations as well as construction activities disturbing less than one acre of soil.

EH&S also facilitates the Strawberry Creek Environmental Quality Committee, a formally-constituted and faculty-led multi-unit campus committee. Since 1987, the SCEQC has guided creek restoration efforts, graduate and undergraduate research activities associated with the creek, and campus policy and program development in the interest of protecting Strawberry Creek's beneficial uses and hydrologic and habitat viability. While this committee is focused solely on Strawberry Creek, its policies, recommendations, and data resources often inform campus practices regarding other campus hydrology.

The many campus academic and administrative units represented on the SCEQC often cooperate to improve the resources upon which hydrologic policies and guidelines are based. A recent survey by three campus administrative units produced the first Campus Park riparian zone vegetation map in many decades; that map is now being imported into the Campus geographic information system (GIS) by faculty and students, to be available to the entire campus community as a reliable data source. The use of modern digital technology is an example of an innovative BMP, in that GIS reduces the time and labor costs of updating data and allows extensive or universal sharing to enhance and improve hydrologic management.

Construction projects that disturb more than one acre of soil must comply with the General Construction Permit issued by the State Water Resources Control Board which requires the development and implementation of a site specific Stormwater Pollution Prevention Plan (SWPPP). To capture smaller project impacts, EH&S requires all construction projects that disturb less than one acre of soil but that have the potential to impact surface water quality to develop a site specific SWPPP. These SWPPPs contain BMPs to reduce or eliminate polluted discharges from the construction site such as frequent street sweeping, surface washing wastewater discharge prohibition, berm and sump systems to contain dirty wash-water and rainwater, and frequent inspections by EH&S to verify implementation of the SWPPP.

UC Berkeley has created Stormwater Pollution Prevention Specification 02210, which includes by reference the federal Clean Water Act, the California Porter-Cologne Clean Water Act, the San Francisco Bay Basin (Region 2) Water Quality Control Plan 1995 Edition, the "Manual of Standards for Erosion and Sediment Control" of the Association of Bay Area Governments, and all other relevant regulatory codes. Section 02201 is typically included in all large or outdoor UC Berkeley construction contracts. Section 02210 requires that each such project develop a Stormwater Pollution Prevention Plan

(SWPPP). Small and interior projects are reviewed for their potential to discharge pollutants to surface water and only include Section 02210 in their contracts if the potential exists (such as exterior surface cleaning).

UC Berkeley finds education to be a highly effective BMP. Under the leadership of EH&S, staff training, creek tours, creek clean-up volunteer events, similar events and tours of bay shorelines, and undergraduate seminars are offered both to students and to the general public. EH&S cooperates with local hydrology-focused non-governmental organizations (NGOs) in teaching, clean-up, and restoration efforts, working with those NGOs to secure grants and volunteer support for such efforts.

PLAN CHECK REVIEW FOR WATER QUALITY PROTECTION

UC Berkeley EH&S and Facilities Services consider a variety of potential impacts to surface water, groundwater, and wastewater as a standard part of its construction project development and plan check review process. As appropriate to the project, the review process may include checks on dewatering activities, possible project related pollutants, and general compliance with SWMP/SWPPP requirements.

WASTEWATER DISCHARGES BEST PRACTICES

In the early 1990s, the University of California, Berkeley established a Wastewater Quality Program to manage discharges to the sanitary sewers using innovative educational outreach and waste minimization incentives that has served as a model for the Colleges and Universities Sector. In 1990 the Campus instituted the Drain Disposal Policy that prohibits use of the drains for disposal of hazardous chemicals. In support of the policy, the Campus Drain Disposal Guidelines were created by the Hazardous Waste Management Committee that included faculty experts in wastewater treatment, in consultation with EBMUD Source Control staff. The Guidelines provide campus researchers with a framework to design experiments to minimize the generation of hazardous wastes that need to be shipped off-site while at the same time presenting prohibitions for discharge of priority pollutants and information on environment fate and impacts of improper hazardous waste disposal.

The Wastewater Quality Program also includes educational outreach to staff and students, labeling of sinks and has awarded waste minimization grants to support efforts of hazardous waste reduction and pollution prevention. The program's success at preventing pollution was recognized in 2003 when the campus was one of two honorees to be awarded EBMUD's Pollution Prevention Award for "exemplary performance in complying with discharge requirements".

In order to eliminate mercury spills into sinks on campus, in 2003 UC Berkeley, in cooperation with EBMUD, developed the Mercury Free UCB program, a mercury reduction pilot study for educational institutions, funded by a Pollution Prevention Grant from the US EPA. The program is designed to reduce the use of mercury containing devices on campus through the free exchange and disposal of mercury containing devices, as well as other outreach tools on mercury pollution prevention.

4.7.7 2020 LRDP IMPACTS

This section describes the potential hydrologic and water quality impacts of the 2020 LRDP, based on the Standards of Significance, whether they are significant or less than significant, and whether any significant impacts can be mitigated to less than significant levels.

EFFECTS FOUND NOT TO BE SIGNIFICANT

The Initial Study found the 2020 LRDP would have no significant impact in regard to the following thresholds:

Would the project 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?

Would the project 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?

Would the project create development subject to inundations by seiches, tsunamis, or mudflows?

As described in the Initial Study and Notice of Preparation for the 2020 LRDP and Tien Center project, the 2020 LRDP would not construct housing within a 100- or 500- year flood zone. The Tien Center and the implementation area of the 2020 LRDP are outside the inundation hazard area for Berryman Reservoir and would thus not expose people or structures to risk of loss, injury or death involving failure of a levee or dam. Risk of inundation by seiches, tsunamis or mudflows was also found to be low, given the elevation of the Campus Park and the Hill Campus. Therefore, these topics were found not to warrant additional analysis in this EIR.⁴⁹

LESS THAN SIGNIFICANT IMPACTS

LRDP Impact HYD-1: Implementation of the 2020 LRDP would not violate existing water quality standards or wastewater discharge requirements, given the provisions of the 2020 LRDP and campus best practices.

Development proposed in the 2020 LRDP, including additional academic, research, support, and residential uses, will be similar to existing campus land uses. Therefore discharges associated with these land uses and the characterization of both stormwater and wastewater is not expected to change. UC Berkeley will continue to enforce the drain disposal guidelines and all NPDES regulations.

The development proposed in the 2020 LRDP could increase the amount of wastewater generated by the campus. Since the campus does not directly discharge wastewater into a water body, it does not have an NPDES permit for wastewater discharge. EBMUD regulates UC Berkeley's wastewater discharge to their treatment plant through a source control program designed to insure compliance with their NPDES permit conditions. UC Berkeley is required to comply with conditions of EBMUD's Ordinance 311 and the

Main Campus Wastewater Discharge Permit issued by EBMUD's Source Control Division and applicable to all campus laboratory, construction and municipal operations.

As mentioned above, UC Berkeley has submitted a draft Stormwater Management Plan (SWMP) to the RWQCB in compliance with the NPDES Phase II municipal permit requirements but is awaiting designation as a permittee and approval of the SWMP by the RWQCB. Given continuing campus compliance with all water quality and wastewater discharge regulatory requirements, and given continuing implementation and improvement of innovative campus programs to protect water quality, this would be a *less than significant impact*.

Continuing Best Practice HYD-1-a: During the plan check review process and construction phase monitoring, UC Berkeley (EH&S) will verify that the proposed project complies with all applicable requirements and BMPs.

Continuing Best Practice HYD-1-b: UC Berkeley shall continue implementing an urban runoff management program containing BMPs as published in the Strawberry Creek Management Plan,⁵⁰ and as developed through the campus municipal Stormwater Management Plan completed for its pending Phase II MS4 NPDES permit. UC Berkeley will continue to comply with the NPDES stormwater permitting requirements by implementing construction and post construction control measures and BMPs required by project-specific SWPPPs and, upon its approval, by the Phase II SWMP to control pollution. Stormwater Pollution Prevention Plans would be prepared as required by the appropriate regulatory agencies including the Regional Water Quality Control Board and where applicable, according to the UC Berkeley Stormwater Pollution Prevention Specification to prevent discharge of pollutants and to minimize sedimentation resulting from construction and the transport of soils by construction vehicles.

Continuing Best Practice HYD-1-c: UC Berkeley shall maintain a campus-wide educational program regarding safe use and disposal of facilities maintenance chemicals and laboratory chemicals, to prevent discharge of these pollutants to Strawberry Creek and the campus storm drains.⁵¹

Continuing Best Practice HYD-1-d: UC Berkeley shall continue to implement the campus Drain Disposal Policy and Drain Disposal Guidelines which provide inspection, training, and oversight on use of the drains for chemical disposal for academic and research laboratories as well as shops and physical plant operations, to prevent harm to the sanitary sewer system.

LRDP Impact HYD-2: Implementation of the 2020 LRDP, including associated construction activities, would not contribute substantial sedimentation or other pollutants in stormwater runoff that could cause sedimentation in local storm drains, and degrade the quality of receiving waters, given continuing campus best practices.

Development under the 2020 LRDP would require a variety of construction activities such as grading and excavation, which could potentially cause temporary increases in erosion during storm events. As required by the State General Construction Stormwater Permit, each development of one acre or more will be required to submit a Notice of Intent to be covered under the permit and have a Stormwater Pollution Prevention Plan completed prior to project construction. Additionally, UC Berkeley will continue implementation of the Strawberry Creek Management Plan,⁵² which contains policies to reduce temporary water quality impacts due to construction.

Furthermore, as previously described, UC Berkeley is currently implementing Stormwater Management Plan Best Management Practices while the campus Phase II MS4 NPDES permit is pending: construction projects disturbing less than one acre of earth are generally covered under the UC Berkeley construction specification, which requires construction as well as operation-related BMPs to prevent pollution of storm water runoff. Included BMPs of the Construction Activity Best Management Practice Handbook (California Stormwater Quality Task Force (SQTF, 2003)), address good housekeeping during construction, waste containment, minimizing disturbed areas, stabilizing disturbed areas, protecting slopes and channels, controlling the site perimeter to divert runoff, and controlling internal erosion on the construction site. These measures enable the project to comply with NPDES requirements. All of these actions would ensure that the implementation of the 2020 LRDP would not substantially degrade water quality. Thus the impacts would be *less than significant*.

Continuing Best Practice HYD-2-a: In addition to Hydrology Continuing Best Practices 1-a and 1-b above, UC Berkeley will continue to review each development project, to determine whether project runoff would increase pollutant loading. If it is determined that pollutant loading could lead to a violation of the Basin Plan, UC Berkeley would design and implement the necessary improvements to treat stormwater. Such improvements could include grassy swales, detention ponds, continuous centrifugal system units, catch basin oil filters, disconnected downspouts and stormwater planter boxes.⁵³

Continuing Best Practice HYD-2-b: Where feasible, parking would be built in covered parking structures and not exposed to rain to address potential stormwater runoff pollutant loads. See also HYD-2-a.

Continuing Best Practice HYD-2-c: Landscaped areas of development sites shall be designed to absorb runoff from rooftops and walkways. The Campus Landscape Architect shall ensure that open or porous paving systems be included in project designs wherever feasible, to minimize impervious surfaces and absorb runoff.⁵⁴

Continuing Best Practice HYD-2-d: UC Berkeley shall continue to develop and implement the recommendations of the Strawberry Creek Management Plan and its updates, and construct improvements as appropriate. These recommendations include, but shall not be limited to, minimization of the amount of land exposed at any one time during construction as feasible; use of temporary vegetation or mulch to stabilize critical areas where

construction staging activities must be carried out prior to permanent cover of exposed lands; installation of permanent vegetation and erosion control structures as soon as practical; protection and retention of natural vegetation; and implementation of post-construction structural and non-structural water quality control techniques.^{55 56}

LRDP Impact HYD-3: Implementation of the 2020 LRDP would not interfere with groundwater recharge or contribute to lowering of the local groundwater table, given the provisions of the 2020 LRDP and campus best practices.

As mentioned above, the Campus Park, Adjacent Blocks, Southside, Hill Campus, and the LRDP Housing Zone are located in the groundwater basin identified by the San Francisco Regional Water Quality Control Board (RWQCB) as the East Bay Plain. While the RWQCB identifies a beneficial use of the basin as municipal and domestic drinking water supply, the groundwater basin is not currently the local water supply and does not serve local or planned land uses. In addition, UC Berkeley does not draw upon groundwater resources and EBMUD does not currently draw upon local groundwater resources to supply water to customers in its service area.⁵⁷ Due to limited natural recharge, groundwater volumes are believed to be suitable for single family homes and small industrial uses, but there is no historical evidence to suggest that groundwater supplies may be sufficient for municipal use.⁵⁸

Development of increased impervious surface areas in the watershed can reduce infiltration of rainwater into the ground to recharge water levels and could lead to lowering of the baseflow of Strawberry Creek.⁵⁹ However, most development under the 2020 LRDP would occur in areas that are currently mostly impervious, and implementation of SWMP post-construction design measures are expected to increase rainwater infiltration. Therefore, development under the 2020 LRDP would not deplete groundwater supplies, or substantially interfere with groundwater recharge, nor substantially contribute to lowering of the local groundwater table. Thus the impact would be *less than significant*.

Continuing Best Practice HYD-3: In addition to Hydrology Continuing Best Practices 1-a, 1-b and 2-a and 2-c above, UC Berkeley will continue to review each development project, to determine whether rainwater infiltration to groundwater is affected. If it is determined that existing infiltration rates would be adversely affected, UC Berkeley would design and implement the necessary improvements to retain and infiltrate stormwater. Such improvements could include retention basins to collect and retain runoff, grassy swales, infiltration galleries, planter boxes, permeable pavement, or other retention methods. The goal of the improvement should be to ensure that there is no net decrease in the amount of water recharged to groundwater that serves as freshwater replenishment to Strawberry Creek.⁶⁰ The improvement should maintain the volume of flows and times of concentration from any given site at pre-development conditions.

LRDP Impact HYD-4: At all sites outside the Hill Campus, implementation of the 2020 LRDP could alter drainage patterns in the project area and increase impervious surfaces, but would not exceed the capacity of stormwater drainage systems, result in localized flooding, contribute to off-site flooding, nor result in substantial siltation or erosion, given the provisions of the 2020 LRDP and campus best practices.

The combined flows from the North and South Forks of Strawberry Creek enter the City of Berkeley's storm drain system at Oxford Street near Allston Way. Flooding has been predicted to occur at this location following a 25-year design storm event under existing conditions. The storm drain culvert capacity is 426 cubic feet per second (cfs) and the projected 25-year flow is 534 cfs.⁶¹ Therefore, any additional storm water discharge as a result of projects implementing the 2020 LRDP would be considered a significant adverse impact.

For the most part, 2020 LRDP projects would occur on already urbanized lands, including existing surface parking lots, and will not substantially reduce the area of pervious surfaces.⁶² Therefore, development will not generate significant amounts of additional runoff that would transport pollutants to local waterways. Furthermore, any additional runoff from impervious surfaces would be offset through implementation of source controls to detain water in new development and redevelopment as required by the State General Construction Stormwater Permit or through new campus design standards developed as part of the SWMP.

The 2020 LRDP itself includes policies to minimize increased stormwater runoff through the selection of pervious paving materials (Campus Park Guidelines G.13) and through conscientious design (see Sustainable Campus policies). Therefore, development under the 2020 LRDP is not anticipated to substantially increase the rate or amount of surface runoff, and all of these actions would ensure that the implementation of the 2020 LRDP would not exceed stormwater drainage capacity and result in flooding or substantial siltation or erosion.

Continuing Best Practice HYD-4-a: In addition to Hydrology Continuing Best Practices 1-a, 1-b and 2-c, the campus storm drain system would be maintained and cleaned to accommodate existing runoff.⁶³

Continuing Best Practice HYD-4-b: For 2020 LRDP projects in the City Environs (excluding the Campus Park or Hill Campus) improvements would be coordinated with the City Public Works Department.⁶⁴

Continuing Best Practice HYD-4-c: Development that encroaches on creek channels and riparian zones would be prohibited. Creek channels would be preserved and enhanced, especially in the Campus Park area. An undisturbed buffer zone would be maintained between proposed 2020 LRDP projects and creek channels.⁶⁵

Continuing Best Practice HYD-4-d: UC Berkeley shall continue to develop and implement a maintenance program for Strawberry Creek, as described in the Strawberry Creek Management Plan and its updates. Actions shall include but not be limited to: clear trash racks, catch basins, channels,

ponds, bridges and over-crossing structures of debris that could block flows and increase flooding potential in all campus creeks. Cleaning of debris shall be done during storm events and prior to the start of the rainy season as part of routine campus grounds maintenance.⁶⁶

Continuing Best Practice HYD-4-e: UC Berkeley shall continue to manage runoff into storm drain systems such that the aggregate effect of projects implementing the 2020 LRDP is no net increase in runoff over existing conditions.⁶⁷

SIGNIFICANT IMPACTS AND MITIGATION MEASURES

LRDP Impact HYD-5: Projects implemented in the Hill Campus under the 2020 LRDP could alter drainage patterns and increase impervious surfaces, which could exceed the capacity of stormwater drainage systems, result in localized flooding, contribute to off-site flooding, and result in substantial siltation or erosion, but the mitigation described below would ensure this impact is *less than significant*.

Given the steeper slopes and upstream position, projects in the Hill Campus that are substantial enough to alter drainage patterns would have an impact on the amount of runoff contributed to the storm drain system. For this reason, projects with potential to alter drainage patterns in this area would be accompanied by a hydrologic modification analysis, and would implement a plan to prevent increases of flow from the newly developed site, preventing downstream flooding. In addition to Hydrology Continuing Best Practices 1-a, 1-b, 2-c, 4-a, 4-c and 4-e, the above actions would ensure the implementation of the 2020 LRDP would not exceed stormwater drainage capacity and result in flooding or substantial siltation or erosion. Thus the impact would be reduced to *less than significant*.

LRDP Mitigation Measure HYD-5: In addition to Hydrology Continuing Best Practices 1-a, 1-b, 2-c, 4-a, 4-c and 4-e, projects proposed with potential to alter drainage patterns in the Hill Campus would be accompanied by a hydrologic modification analysis, and would incorporate a plan to prevent increases of flow from the newly developed site, preventing downstream flooding and substantial siltation and erosion.

LRDP Impact HYD-6: Implementation of the 2020 LRDP could place structures which would impede or redirect flood flows within the 100-year flood hazard area, but the mitigation described below would ensure this impact is *less than significant*.

As shown in Figure 4.7-2, the areas adjacent to Strawberry Creek on the Campus Park are located in the 100-year flood zone. There are no 100-year flood zones located in the City Environs or in the portions of the LRDP Housing Zone in Oakland. If structures were placed in the 100-year flood zones, they could alter flood characteristics and impede or redirect flood flows. The exact locations of development to occur under the 2020 LRDP are not yet known, so it is not possible to know the extent to which this impact could occur. However, with implementation of the 2020 LRDP Mitigation Measures described below, this impact would be reduced to *less than significant*.

Development of the Hill Campus could possibly increase the amount of runoff downstream to Strawberry Creek and North Fork Strawberry Creek. If the amount of runoff were to increase, the 100-year flood elevations could also be increased. Implementation of actions to detain and re-release runoff at less than or equal to current levels, and hydrologic modification analysis for any proposed projects for this area, would reduce this impact to *less than significant*.

LRDP Mitigation Measure HYD-6: In addition to implementation of LRDP Mitigation Measure HYD-5, prior to final design, UC Berkeley will review the plans for all structures to be constructed in the 100-year floodplain for compliance with FEMA requirements for nonresidential structures. This review will include a hydrologic study and recommendations to eliminate any potential impacts to the 100-year floodplain. For structures placed within the 100-year floodplain, flood control devices will be utilized in each development to direct flows toward areas where flood hazards will be minimal. These actions would ensure that the implementation of the 2020 LRDP would not impede or redirect flows in a manner that results in flooding.

4.7.8 TIEN CENTER IMPACTS

This section specifically analyzes the Chang-Lin Tien Center for East Asian Studies project. The Initial Study found that the 2020 LRDP EIR should analyze impacts of the Chang-Lin Tien Center on hydrology with respect to the aforementioned standards of significance that were relevant to potential 2020 LRDP hydrology impacts.

The proposed two-phase project will be built at the base of Observatory Hill facing the Central Glades and Haviland Hall, an area that is currently undeveloped. The center consists of two buildings, with the phase I building developing 67,500 GSF and the phase II building developing 43,000 GSF. The proposed Center would be located on a moderately sloped portion of the Campus Park uphill and variously east and south of the Campus Park's unculverted North Fork reaches.

At its closest point, the Tien Center's Phase 1 structure would be approximately 200 feet from the closest creek bank; the closest corner of the proposed format for the Tien Center's Phase 2 structure would be approximately 100 feet from the nearest creek point. Both buildings would be sufficiently upslope to be well out of the North Fork floodplain; no historical record exists of flooding in the Northside area. Runoff in the site area is typical of Campus developed sites, and the site is accordingly generally well-served by extant storm drainage systems.

LESS THAN SIGNIFICANT IMPACTS

Tien Center Impact HYD-1: Development of the Tien Center would not violate existing surface water quality standards or wastewater discharge requirements.

Tien Center Impact HYD-2: Development of the Tien Center could increase impervious surfaces but would not provide additional sources of polluted stormwater runoff. Also, construction activities associated with development of the Tien Center would not substantially contribute sediments or other pollutants in stormwater runoff.

Tien Center Impact HYD-3: Development of the Tien Center would not interfere with groundwater recharge or contribute to lowering of the local groundwater table.

Tien Center Impact HYD-4: Development of the Tien Center could alter drainage patterns in the project area and increase impervious surfaces, but would not exceed the capacity of stormwater drainage systems and result in localized flooding, contribute to off-site flooding, nor result in substantial siltation or erosion.

Analysis of the entire 2020 LRDP program indicates no significant hydrology or water quality impacts would occur. As a project implementing the 2020 LRDP, the Tien Center project would be shaped by all the Hydrology Continuing Best Practices described above.

Tien Center Impact HYD-5: The Tien Center would not be constructed in a FEMA-designated flood zone.

The proposed Tien Center structures are near a FEMA-designated flood zone, but will not be in the flood zone. Therefore, the structures will have a less than significant impact on the flood zone and no mitigation efforts will be necessary. As a project under the 2020 LRDP, the Tien Center project would incorporate all the Hydrology Continuing Best Practices described above.

4.7.9 CUMULATIVE IMPACTS

This section evaluates whether the 2020 LRDP, in combination with other UC Berkeley and non-UC Berkeley projects which are reasonably foreseeable, would result in significant cumulative impacts on hydrology or water quality.

This analysis considers cumulative growth as represented by the implementation of municipal general plans, implementation of the proposed Lawrence Berkeley National Laboratory 2004 LRDP, the proposed redevelopment of University Village Albany, the draft Southside Plan, the AC Transit Major Investment Study, and implementation of the 2020 LRDP, as described in 4.0.5. The analysis also includes growth anticipated by the City of Berkeley General Plan EIR and by previously certified UC Berkeley EIRs, including the Northeast Quadrant Science and Safety Projects (SCH #2001022038), Seismic Replacement Building 1 (SCH #99122065), and the Underhill Area Projects (SCH #99042051).

The geographic context for the analysis of cumulative impacts on hydrology and water quality is the local watershed, which includes the City of Berkeley and the areas of the City of Oakland within the scope of the 2020 LRDP. All the projects implemented under the 2020 LRDP or the Lawrence Berkeley National Laboratory 2004 LRDP would be located within this area.

The only effects that may occur outside these cities would result from residential or other projects indirectly induced by the aforementioned projects: for example, housing to accommodate new employees at UC Berkeley or Lawrence Berkeley National Laboratory. However, any such projects would be governed by local codes and ordinances, which are presumed to preclude significant adverse impacts to hydrology or water quality.

The significance of potential cumulative hydrology or water quality impacts was determined based on the following standards:

Standard: *Would the project violate any water quality standards or waste discharge requirements?*

Standard: *Would the project substantially deplete groundwater supplies or quality, 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?*

Standard: *Would the project substantially alter existing drainage patterns 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 substantial erosion, siltation or flooding on- or off- site?*

Standard: *Would the project 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?*

Standard: *Would the project otherwise substantially degrade water quality?*

Standard: *Would the project place within a 100-year flood hazard area structures which would impede or redirect flood flows?*

The other three standards listed in 4.7.5 are determined to be adequately mitigated by project-specific measures to avoid cumulatively considerable impacts, and are not considered further in this section.

The question posed in this section is twofold:

- Is the potential *cumulative* impact of the 2020 LRDP *and* other reasonably foreseeable projects below these standards?
- Is the contribution of the 2020 LRDP to these impacts cumulatively considerable?

Cumulative Impact HYD-1: The 2020 LRDP would not contribute to a cumulative increase in surface runoff and wastewater discharges, in combination with other reasonably foreseeable projects, and would not violate existing surface water quality standards or wastewater discharge requirements.

According to the City of Berkeley's General Plan EIR, a significant cumulative effect occurs as cities release runoff into the San Francisco Bay. The City's discharges into the Bay are regulated by RWQCB through an NPDES permit to ensure compliance with water quality standards. In addition, the City of Berkeley General Plan includes a number of policies and programs designed to address these regional water quality issues, the implementation of which would mitigate the cumulative water quality impact.⁶⁸ Similarly, campus programs and policies outlined above serve to continuously mitigate and alleviate any campus contribution to cumulative deterioration in water quality.

Development in Oakland is regulated by RWQCB through the same Phase I NPDES permit as Berkeley, to ensure compliance with water quality standards.⁶⁹ In addition, Oakland has a number of ordinances for future development with respect to erosion control and creek protection and stormwater management, the implementation of which would mitigate the cumulative water quality impact.⁷⁰ AC Transit's proposed BRT program would be developed in accordance with regulations protecting water quality.

Other UC Berkeley projects would be developed in accordance with policies, procedures, mitigation measures and best practices outlined in this 2020 LRDP EIR and in previously certified documents completed in accordance with CEQA. No individual or cumulative hydrology or water quality impacts are anticipated in those documents.

Development under the Lawrence Berkeley National Laboratory 2004 LRDP is presumed to comply with regulatory requirements.

Cumulative Impact HYD-2: The 2020 LRDP, in combination with other reasonably foreseeable projects, could interfere with groundwater recharge or contribute to lowering of the local groundwater table, but would not be expected to have a substantial impact on these resources.

As described above, implementation of the 2020 LRDP is not expected to lower, or interfere with recharge of, the local groundwater table. The groundwater table is not currently the local water supply and does not serve local or planned land uses. Post-construction design measures are expected to increase rainwater infiltration. Similarly, the City of Berkeley General Plan EIR found that most anticipated development would occur on previously developed sites, and include measures to reduce runoff volumes. Oakland General Plan policies reinforce protection of groundwater resources. Other UC Berkeley projects and development of AC Transit's BRT would also largely occur on sites dominated by existing impervious surfaces.

Cumulative Impact HYD-3: The 2020 LRDP, in combination with other reasonably foreseeable projects, could increase impervious surfaces, contributing additional sources of polluted stormwater runoff; also, construction activities of combined projects could contribute sediments or other pollutants in stormwater runoff; however, these contributions are not expected to be substantial.

As analyzed above, implementation of the 2020 LRDP would include post-construction design measures that increase rainwater infiltration; flow prevention planning for sites in the Hill Campus that prevent downstream flooding and substantial siltation and erosion; and continuing implementation of best practices controlling stormwater flows, reducing possible sedimentation and pollutant loading in stormwater runoff. Similarly, the City of Berkeley General Plan EIR found that most anticipated development would occur on previously developed sites, and include measures to reduce runoff volumes. The Countywide Phase I NPDES permit further regulates runoff flows. Other UC Berkeley projects and development of AC Transit's BRT would also largely occur on sites dominated by existing impervious surfaces.

Cumulative Impact HYD-4: The 2020 LRDP, in combination with other reasonably foreseeable projects, may alter drainage patterns and increase impervious surfaces to an extent that exceeds the capacity of stormwater drainage systems. However, the contribution of the 2020 LRDP to these impacts is not anticipated to be cumulatively considerable.

Development in Berkeley has the potential to increase stormwater runoff volumes and overwhelm existing storm drainage components during peak events. However, existing City programs requiring drainage plans prior to project approval would adequately mitigate this potential impact, and the City's General Plan EIR finds that no impact would occur.⁷¹ The majority of development anticipated under the City of Berkeley General Plan and the Draft Southside Plan would occur in previously developed areas; similarly, other UC Berkeley projects, development under the City of Oakland General Plan, and development of AC Transit's BRT would largely occur on sites dominated by existing impervious surfaces.

Stormwater generated within the LBNL facility is currently managed in conformance with LBNL's National Pollutant Discharge Elimination System (NPDES) General Permit for Storm Water Discharges Associated with Industrial Activity. Overall, 14 acres of impervious surfaces may be added to the LBNL site under the 2004 LBNL LRDP.⁷² It is possible that, given an increase in impervious surfaces in the Hill Area due to Hill Campus development under the 2020 LRDP, combined with development under the LBNL 2004 LRDP, stormwater flows may exceed the capacity of stormwater drainage systems serving the Strawberry Creek watershed. However, if LBNL adopts measures similar to those described in CBPs HYD-1-b, 2-c, 4-c, 4-e and LRDP Mitigation Measure HYD-5, above, significant impacts would not occur.

As described in Section 4.7.8, above, development under the 2020 LRDP would not substantially reduce existing quantities of pervious surfaces in the Strawberry Creek watershed, and implementation of SWMP post-construction design measures, as well as implementation of LRDP Mitigation Measure HYD-5, would increase rainwater infiltration and ensure appropriate hydrologic controls are implemented for projects developed

under the 2020 LRDP. Continuing Best Practice HYD-4-e would ensure that there is no net increase in stormwater runoff from the campus resulting from implementation of the 2020 LRDP; therefore, the contribution of the 2020 LRDP under Cumulative Impact HYD-4 would not be cumulatively considerable.

Cumulative Impact HYD-5: The 2020 LRDP could, in combination with other reasonably foreseeable projects, place structures which could impede or redirect flood flows within the 100-year flood hazard area. However, the contribution of the 2020 LRDP to this impact is not anticipated to be cumulatively considerable.

Impacts of private sector development in the 100-year flood zone would be mitigated by the implementation of Berkeley General Plan policies that ensure that new development does not contribute to an increase in flood potential.⁷³ The Berkeley General Plan does not propose development that would substantially alter a natural watercourse.⁷⁴ Development in Oakland that occurs near the 100-year flood zones would be regulated by the City's ordinances on watercourse protection such that flood flows within a 100-year flood hazard area would not be impeded.⁷⁵

Stormwater generated within the LBNL facility is currently managed in conformance with LBNL's National Pollutant Discharge Elimination System (NPDES) General Permit for Storm Water Discharges Associated with Industrial Activity. Overall, 14 acres of impervious surfaces may be added to the LBNL site under the 2004 LBNL LRDP.⁷⁶

As described in Section 4.7.8, above, development under the 2020 LRDP would not substantially reduce existing quantities of pervious surfaces in the Strawberry Creek watershed, and implementation of SWMP post-construction design measures, as well as implementation of LRDP Mitigation Measure HYD-5, would increase rainwater infiltration and ensure appropriate hydrologic controls are implemented for projects developed under the 2020 LRDP. Since, with best practices and mitigation, the impacts of the 2020 LRDP are less than significant, the contribution of the 2020 LRDP under Cumulative Impact HYD-5 would not be cumulatively considerable.

4.7.10 REFERENCES

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- ²⁹ *Oakland General Plan, Land Use and Transportation Element, Draft Environmental Impact Report*, October 1997, pages III.I-1 to III.I-2.
- ³⁰ UC Berkeley, *Long Range Development Plan Draft Environmental Impact Report*, January 1990, page 4.8-7.
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4.8 LAND USE

This chapter describes existing land uses in each of the 2020 LRDP Land Use Zones and evaluates the potential for development under the 2020 LRDP to affect those land uses. This chapter also examines the potential land use impacts from the Tien Center and from cumulative projects.

The analysis in this section focuses on the compatibility of land uses proposed in the 2020 LRDP with existing and planned land uses within the Campus Park, Adjacent Blocks, Southside, Hill Campus and LRDP Housing Zone. The analysis for the Tien Center focuses on the compatibility of the proposed project with existing and planned land uses within the Campus Park and Adjacent Blocks North.

During the scoping period for this EIR, land use-related comments requested that the EIR examine the consistency of the 2020 LRDP with the City of Berkeley General Plan and the Southside Plan. These issues are addressed in this chapter.

4.8.1 ANALYTICAL METHODS

Data used in preparing this chapter were obtained from several sources, including previous studies prepared for UC Berkeley and the cities of Berkeley and Oakland. Applicable regional and local land use plans were reviewed, and policies relevant to the 2020 LRDP and Tien Center are summarized in Section 4.8.3.

Existing land use and land use designations are summarized for each of the 2020 LRDP planning areas. In some parts of the LRDP Housing Zone, existing land use data were not available, so site visits were conducted to record existing land use. The analysis of potential impacts projected the scope and distribution of development proposed under the 2020 LRDP and determined whether this development would be consistent with applicable plans and policies. Potential conflicts between campus and other land uses were also examined.

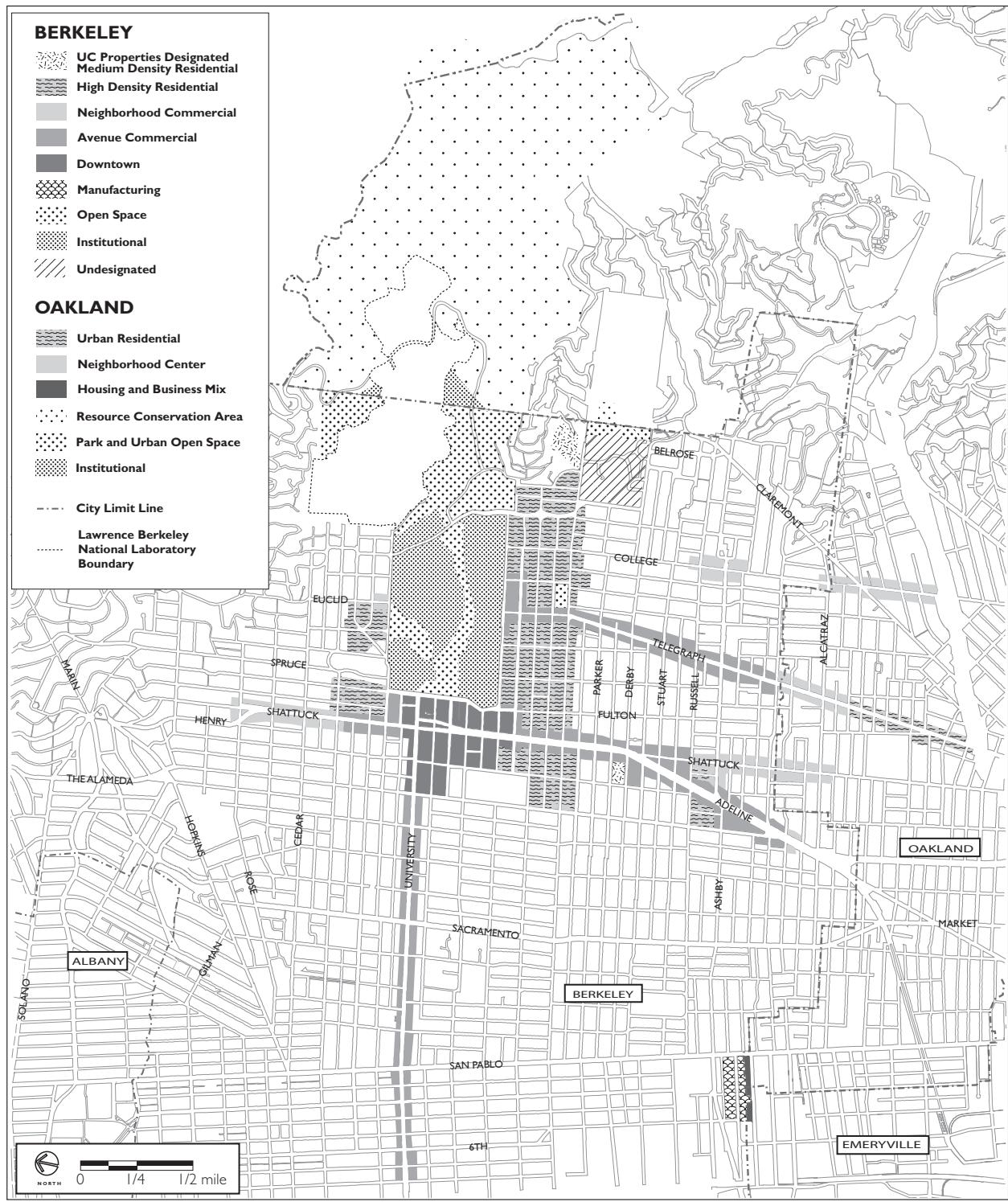
4.8.2 REGULATORY FRAMEWORK

EXECUTIVE ORDER D-16-00

Although not mandatory, the Regents of the University of California are encouraged to comply with Executive Order D-16-00, issued August 2, 2000, which establishes the Governor's sustainable building goal: 'to site, design, deconstruct, construct, renovate, operate, and maintain State buildings that are models of energy, water and materials efficiency; while providing healthy, productive and comfortable indoor environment and long-term benefits to Californians.¹ The land use policies in the 2020 LRDP support the general principles of sustainable building by concentrating future campus growth in urbanized areas already served by existing roads and infrastructure.

EXECUTIVE ORDER D-46-01

Executive Order D-46-01 establishes the criteria the State must use to locate and lease space, including such considerations as proximity to public transit and affordable housing, preservation of historic and architecturally significant structures, economic renewal opportunities, and integration of the community into the process.²



Sources: City of Berkeley, General Plan Land Use Diagram, Updated April 2003; City of Oakland, General Plan Land Use and Transportation Element, March 1998.

Note: Areas not shaded are not in the 2020 LRDP area.

FIGURE 4.8-1
**BERKELEY AND OAKLAND GENERAL PLAN
 LAND USE DESIGNATIONS IN THE 2020 LRDP AREA**

4.8.3 LOCAL PLANS AND POLICIES

Although the University is constitutionally exempt from local land use regulations when using its property in furtherance of its educational purposes, it is University policy to evaluate proposed projects for consistency with local plans and policies. Therefore, this section outlines the plans and policy goals of the cities of Berkeley and Oakland related to land use.

CITY OF BERKELEY

As shown in Figure 3.1-5, the Campus Park, Adjacent Blocks, and Southside, a portion of the Hill Campus, and most of the LRDP Housing Zone lie within the City of Berkeley city limits. Major City of Berkeley policy documents relevant to the 2020 LRDP include the following:

BERKELEY GENERAL PLAN

In October, 2000, the City of Berkeley Planning Commission published a new Draft General Plan.³ On December 18, 2001 the Berkeley City Council certified the General Plan Update EIR and approved the Housing, Land Use and Transportation Elements of the Draft Plan as amended by the City Council. The City Council approved the final changes to the plan in Spring 2002, thereby adopting the first Berkeley General Plan since 1977.

The Land Use Element includes several policies relevant to the proposed 2020 LRDP. Relevant policies from other Elements are presented in their related chapters of this EIR. The Land Use Element prescribes how land can be developed, and provides for the overall consistency and compatibility of land use within the city.

One objective of the Land Use Element of the Berkeley General Plan is to ‘minimize the negative impacts and maximize the benefits of University of California on the citizens of Berkeley.’⁴ Although UC Berkeley is not subject to local land use regulations, the Land Use Element contains policies specific to the University’s presence in Berkeley and its future expansion.⁵ Land use policies specific to UC Berkeley are listed in Table 4.8-1.

The City of Berkeley General Plan assigns all land in the city to one of twelve land use designations. Land use designations assigned to land within the 2020 LRDP study area are shown in Figure 4.8-1, and are described for each Land Use Zone in section 4.8.4.

FINDINGS OF THE BERKELEY GENERAL PLAN EIR

The City of Berkeley General Plan EIR concluded that adoption of the General Plan would have few less than significant land use impacts and only one potentially significant land use impact. The EIR found that implementation of Policy T-36, which called for exploring opportunities to move existing long-term parking out of the Downtown, University and Southside areas to new satellite parking facilities, could result in a potentially significant impact. Mitigation for this potential impact was to require environmental review of proposed satellite parking lots and associated shuttle services prior to city approval.⁶

TABLE 4.8-1

BERKELEY GENERAL PLAN: UC BERKELEY-SPECIFIC LAND USE POLICIES⁷

LU-14	Community Service Centers. Work with the Berkeley Unified School District and the University of California to establish a network of community centers including school sites, neighborhood resource centers, and city facilities that offer community services such as child care, health care, and recreational programs.
LU-35	Mutually Beneficial Land Use Decisions. Develop and foster close working relationships with the University of California Berkeley to ensure and facilitate land use decisions that are mutually beneficial to both the institution and the adjoining neighborhoods.
LU-36	University Impacts and Costs. Minimize the negative impacts of the size of the campus population and campus expansion on adjacent neighborhoods and the city as a whole.
LU-37	University Housing. Encourage the University to maximize the supply of housing for students, faculty and staff to minimize the impacts of the University on the citywide supply of housing.
LU-38	University Impact on City Tax Revenue. Discourage to the maximum extent possible additional use of land by the University that would result in the removal of property from the tax rolls or a reduction of tax revenue to the city.
LU-39	University Traffic. Reduce traffic impacts of the University on the citywide transportation system.
LU-40	Public Use of University Facilities and Grounds. Continue to support maximum opportunities for citizen use of campus libraries and recreational facilities, the maintenance of the hill lands as open space and the adoption of University development standards and policies to conserve and enhance present open space resources.
LU-41	Public Agency Development. Ensure that all land use plans, development, and expansion by public agencies are consistent with city laws, the city's General Plan and Zoning Ordinance to the extent feasible, and the California Environmental Quality Act.

BERKELEY DOWNTOWN PLAN

The City of Berkeley Downtown Plan was adopted in 1990 to address economic decline in the downtown. The goals, objectives and policies of the Downtown Plan were adopted as an amendment to the 1977 Master Plan, and were re-adopted (with amendments) with the new General Plan.⁸ The primary aim of the Downtown Plan is to establish the Downtown as a 'compact, economically vital, historic city center with a defined core area and transition zones buffering residential neighborhoods'.⁹

The Downtown Plan recognizes the importance of the campus as a downtown presence. The Downtown Plan contains objectives and policies specific to UC Berkeley that address the relationship between the campus and the downtown. These policies and objectives are contained in the University of California Element. This Element sets forth three objectives regarding the University:

- Encourage the University to have a social and cultural presence in the downtown.
- Encourage the University to provide housing for students in and near downtown.
- Ensure University related development contributes positively to the downtown.

The University of California Element of the Downtown Plan includes a set of policies associated with each objective. Ideas contained in these policies include building a downtown museum, limiting campus development in accordance with the city's infrastructure, encouraging the integration of campus cultural life with the downtown, and supporting new student housing that does not take additional land off the tax rolls.¹⁰ The Downtown Plan also contains a number of policies addressing the physical relationship of Oxford Street to the campus.

SOUTH BERKELEY AREA PLAN

The South Berkeley Area Plan was adopted in 1990 primarily to address economic development and housing assistance in the South Berkeley area.¹¹ The Plan covers the area from Dwight Way to the Oakland border, primarily from San Pablo Avenue to Shattuck Avenue. A portion of this area is in the LRDP Housing Zone. The South Berkeley Area Plan remains a valid area-specific adjunct to the General Plan,¹² and sets forth three policies relevant to UC Berkeley:

- Encourage mixed use developments along commercial corridors.
- Develop connections between local businesses and the University.
- Promote public, social service, University, and non-profit employment for South Berkeley residents.¹³

UNIVERSITY AVENUE STRATEGIC PLAN

Portions of the University Avenue Strategic Plan area lie in the Adjacent Blocks West and in the LRDP Housing Zone. The Plan, completed in 1996, encourages the revitalization of University Avenue by providing suitable economic development and housing, increasing public safety, promoting a more pedestrian-oriented environment, and creating a land use mix that strengthens neighborhood identity. The Plan also seeks to protect and improve neighborhood quality of life, enhance University Avenue as a gateway to the city, adjacent neighborhoods, and the downtown, and enhance public transit systems.

SOUTH SHATTUCK STRATEGIC PLAN

The South Shattuck Strategic Plan covers a 35 block area stretching along the Shattuck and Adeline corridors from Dwight Way to Ashby Avenue. A portion of the LRDP Housing Zone lies within the Plan area. The purpose of the Plan is to address the specific economic, urban design, housing, and transportation issues in the South Shattuck area. Four specific areas in which improvements could be made are targeted in the Plan: Shattuck between Dwight & Ward, Shattuck between Ward & Ashby, Adeline between Ward & Ashby, and adjacent residential neighborhoods.¹⁴

CITY OF OAKLAND

Much of the Hill Campus and a portion of the LRDP Housing Zone lie within the City of Oakland city limits. Thus, City of Oakland policies that relate to these areas are relevant to the 2020 LRDP.

OAKLAND GENERAL PLAN

The Oakland General Plan Land Use and Transportation Element includes several policies relevant to the proposed 2020 LRDP. Relevant policies from other Elements are presented in their related chapters of this EIR. The Land Use and Transportation

Element encourages several types of new residential development including transit-oriented development and transit villages,¹⁵ infill development and housing in designated mixed housing type and urban housing areas.¹⁶

Specific General Plan policies give high priority to facilitating the construction of housing units, require high quality design for new residential construction, and support mixing housing types.¹⁷ Within North Oakland, the key objectives of the General Plan include preserving community character and identity; maintaining established residential densities in most areas, while recognizing the potential for higher densities in areas served by transit; and promoting commercial revitalization in some locations.¹⁸

4.8.4 EXISTING SETTING

This section describes existing land uses and building information in the Campus Park, its City Environs, and the Hill Campus relevant to the 2020 LRDP. While the University functions as a single academic enterprise, the areas that comprise its campus differ significantly in terms of physical capacity and environmental sensitivity. To allow more precise analysis of both, the 2020 LRDP is organized in terms of the land use zones shown in Figure 3.1-1 and described below.

CAMPUS PARK

The historic 180-acre Campus Park is defined by Hearst Avenue on the north, Oxford/Fulton Streets on the west, Bancroft Way on the south, and Gayley Road/Piedmont Avenue on the east. As shown in Table 4.8-2, the Campus Park contains 56 percent of the UC Berkeley built space inventory. Although intensively developed, the Campus Park retains a distinctive parklike environment of natural and formal open spaces, as well as an outstanding ensemble of historic architecture. It serves both as the center of campus intellectual life and as a scenic and cultural resource for the entire Bay region.

Presently, the Campus Park is undergoing construction and seismic retrofits in several buildings. The new construction projects now underway were previously evaluated under separate environmental review. Seismic retrofits are, in general, exempt from CEQA review if they include no other significant changes to the buildings.¹⁹

In the Berkeley General Plan, the Campus Park is designated Institutional, except for the riparian and other natural areas along Strawberry Creek, which are designated Open Space. Institutional areas in the Berkeley General Plan are areas for institutional, government, educational, recreational, open space, natural habitat, woodlands, and public service uses and facilities.²⁰ Within areas designated Institutional, the General Plan allows building intensity ranging from FAR 1 to FAR 4.²¹ The Open Space designation includes parks, recreational facilities, community services, and facilities to maintain these uses.

TABLE 4.8-2

UNIVERSITY BUILDING SPACE BY LOCATION 2001-2002	GSF ²²	% Total
Campus Park	8,325,202	56%
Hill Campus	349,433	2%
City Environs		
Adjacent Blocks	2,121,249	14%
Southside	1,455,534	10%
Other Berkeley	805,665	5%
Space Within 2020 LRDP Scope	13,057,083	87%
University Village Albany	967,962	7%
Richmond Field Station	549,100	4%
Other Locations	287,415	2%
Total UC Berkeley Space	14,861,560	13%

HILL CAMPUS

The Hill Campus consists of roughly 800 acres extending east from Stadium Rimway to Grizzly Peak Boulevard. The Hill Campus surrounds a 200-acre area managed under the separate jurisdiction of Lawrence Berkeley National Laboratory (LBNL), which is not within the scope of the 2020 LRDP. Lawrence Berkeley National Laboratory operates under its own LRDP and EIR, approved separately by the UC Regents.

While the Hill Campus contains several UC Berkeley facilities concentrated along Centennial Drive, including the Lawrence Hall of Science, the Botanical Garden, the Space Sciences Laboratory and the Mathematical Sciences Research Institute, the primary use of the Hill Campus is natural open space, including over 300 acres in the Ecological Study Area. The Hill Campus contains two percent of the UC Berkeley built space inventory.

The Berkeley General Plan designates the Berkeley portion of the Hill Campus as Open Space, which allows recreational facilities, schoolyards, community services, and facilities necessary for the maintenance of the areas.²³ Almost the entire Oakland portion of the Hill Campus is designated Resource Conservation Area in the Oakland General Plan. Under this designation, buildings are not considered suitable for Resource Conservation Areas except as required for their maintenance.

CITY ENVIRONS

While the City Environs consist of several zones, described further below, the zones are similar in consisting mostly of city blocks served by city streets, and including campus properties interspersed with non-campus properties. In the City Environs, the objectives of UC Berkeley are informed by the goals of Berkeley and Oakland, to ensure their character and livability are respected and enhanced through new capital investment.

ADJACENT BLOCKS

This zone includes the blocks adjacent to the north, west, south and east of the Campus Park. Those to the north, west, and south are city blocks defined by city streets, but include numerous major campus facilities. The 'blocks' to the east are owned entirely by the University, but are separated from the Campus Park by Gayley Road and Piedmont Avenue. Gayley Road north of the Stadium is owned by the University.

For the purpose of land use and environmental analysis, the 2020 LRDP subdivides the Adjacent Blocks into three subzones, below. The Adjacent Blocks together contain 14 percent of the UC Berkeley built space inventory, and roughly 45 percent of the land within them is owned by the University.

ADJACENT BLOCKS NORTH are those blocks defined by the Hill Campus, LBNI, Ridge Road, Scenic Avenue, the Hearst Avenue frontage from Scenic Avenue to Oxford Street, Oxford Street, and the Campus Park. Major campus facilities on these blocks include Etcheverry Hall, Soda Hall, Goldman School of Public Policy, the Greek Theatre, and the Bowles, Stern and Foothill residence halls. In the Berkeley General Plan, most sites in the Adjacent Blocks North are designated Medium or High Density Residential. Building intensity in Medium and High Density Residential areas range from 20 to 40 dwelling units per net acre and 40 to 100 dwelling units per net acre, respectively.

Suitable uses in the Medium Density Residential designation also include community services, schools, open space, recreational uses and institutional facilities. The High Density Residential designation includes these plus ground floor commercial space where permitted by zoning. Neighborhood Commercial designations occur at the intersection of Euclid and Hearst Avenues, while the area east of Gayley Road is designated Institutional. Suitable uses in Neighborhood Commercial areas include local-serving commercial, residential, office, community service, and institutional: building intensity ranges from less than FAR 1 to FAR 3.²¹

ADJACENT BLOCKS WEST are those blocks defined by Oxford Street, Virginia Street, Walnut Street, Hearst Avenue, Shattuck Avenue, Durant Street, Ellsworth Street, and the Campus Park. Major campus facilities on these blocks include the University Printing Plant, University Hall, 2195 Hearst, and the plant research facilities of the Oxford Tract.

In the Berkeley General Plan, most sites on the Adjacent Blocks West are designated Downtown. The remainder are designated High Density Residential and Avenue Commercial. Suitable uses in the Downtown designation include medium- and high-density housing, arts and entertainment, and retail, office, cultural, open space, civic, and institutional facilities. Development intensity ranges from less than FAR 1 to FAR 6. It is General Plan policy to increase the residential population in the Downtown. Suitable uses in Avenue Commercial areas include local-serving and regional-serving commercial, residential, office, community service, and institutional uses: building intensity ranges from less than FAR 1 to FAR 4.²¹

ADJACENT BLOCKS SOUTH are those blocks defined by Ellsworth Street, Durant Avenue, College Avenue, the Bancroft Avenue frontage from College to Piedmont Avenue, Bancroft Avenue, Stadium Rimway, and the Campus Park. Major campus facilities on these blocks include Memorial Stadium, International House, University Art Museum, and Tang Health Center. In the Berkeley General Plan, the Adjacent Blocks South are primarily designated High Density Residential, with some Avenue Commercial along Telegraph Avenue and Bancroft Avenue. Memorial Stadium and International House are designated Open Space.

SOUTHSIDE

The Southside includes the blocks defined by Durant Avenue, Prospect Street, Dwight Way, and Fulton Street, as well as the 50-acre, University-owned Clark Kerr Campus and Smyth-Fernwald housing complex. The Clark Kerr Campus includes student and faculty housing, a recreation center, conference facility, and child care. The University owns roughly 45 percent of the land in the Southside, including the Clark Kerr Campus. The Southside contains 10 percent of the UC Berkeley built space inventory.

The Clark Kerr Campus and adjacent Smyth-Fernwald housing complex have 34 buildings, which together comprise slightly over a third of UC Berkeley space in the Southside. The Clark Kerr Campus contains a wide range of uses including the Golden Bear Recreation Center, a conference facility, student and faculty housing, childcare, and a variety of recreational facilities. The Smyth-Fernwald complex contains student family apartments. A set of legal covenants with the city and with neighboring property owners specifies how the Clark Kerr Campus will be used and developed through 2032; these covenants are described in greater detail in section 4.8.6.

In 2003, five new University housing buildings were under construction in the Southside: two each in the Unit 1 and Unit 2 complexes, and another directly across from the Anna Head complex on Channing Way. Once complete, these buildings will add another 1,080 single student beds to the UC Berkeley built space inventory in the Southside.

As commonly used in Berkeley, the term ‘Southside’ also includes most of the Adjacent Blocks South. The 2020 LRDP treats these blocks separately, because they differ from the balance of the Southside in terms of both current land use and the nature of future development proposed by the University. However, projects on the Adjacent Blocks implemented under the 2020 LRDP that lie within the area of the City of Berkeley Southside Plan shall, as a general rule, conform to the Southside Plan, as described in 4.8.6.

In the Berkeley General Plan, most of the Southside is designated High Density Residential, with some Avenue Commercial along Telegraph Avenue. People’s Park is designated Open Space. The University-owned Smyth-Fernwald complex is designated Medium Density Residential, while the Clark Kerr Campus is undesignated.²⁴

LRDP HOUSING ZONE

Although primarily within the City of Berkeley, the LRDP Housing Zone also extends into portions of Oakland. In the Berkeley General Plan, land in the LRDP Housing Zone outside the other land use zones described above is primarily designated Avenue Commercial along University, Telegraph, Shattuck, and Adeline, with some pockets of Neighborhood Commercial along College and North Shattuck, and High Density Residential south of the Downtown and west of Shattuck.

The LRDP Housing Zone extends into North Oakland along Telegraph and Shattuck Avenues. Along these arterials, the City of Oakland General Plan land use designations are a mix of Urban Residential and Neighborhood Center Mixed Use. Where the LRDP Housing Zone extends into Oakland along College Avenue, the land use designation is Neighborhood Center Mixed Use. Both designations encourage high density residential development, of up to 125 units per acre, in combination with active ground floor retail, cultural and service uses.²⁵

OTHER BERKELEY SITES

Most of the space in this category is located at 2000 Carleton and 6701 San Pablo. These and other University sites comprise five percent of the UC Berkeley built space inventory. The Berkeley General Plan designates the 2000 Carleton site as Medium Density Residential. Building intensity in Medium Residential areas ranges from 20 to 40 dwelling units per net acre. Suitable uses in the Medium Density Residential designation also include community services, schools, open space, recreational uses and institutional facilities.

The north half of the 6701 San Pablo site lies in Berkeley, while the balance lies in Oakland (southeast quadrant) and Emeryville (southwest quadrant). The Berkeley General Plan designates its portion for Manufacturing; these areas are intended to maintain and preserve areas of Berkeley for manufacturing and industrial uses necessary for a multi-faceted economy and job growth. The Oakland General Plan designates its portion as Housing and Business Mix, a designation that gives equal weight to housing and business, and is intended to guide a transition from heavy industry to low-impact light industry and other business that can co-exist compatibly with housing.

4.8.5 STANDARDS OF SIGNIFICANCE

The significance of the potential impacts of the 2020 LRDP and Tien Center on land use was determined based on the following standards:

Standard: Would the project physically divide an established community?

Standard: Would the project conflict with any applicable habitat conservation plan or natural community conservation plan?

Standard: Would the project conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project, adopted for the purpose of avoiding or mitigating an environmental effect?

Standard: Would the project conflict with local land use regulations such that a significant incompatibility is created with adjacent land uses?

4.8.6 POLICIES AND PROCEDURES GUIDING FUTURE PROJECTS

This section describes existing policies and procedures that would help to minimize land use impacts of development under the 2020 LRDP. It references both the policies in the 2020 LRDP itself and other University agreements affecting land use.

2020 LRDP

Review of individual projects under the 2020 LRDP would influence land use impacts by guiding the location, program, and design of new UC Berkeley projects. While all the LRDP Objectives described in Chapter 3.1 bear directly indirectly on land use, the following are particularly relevant:

- Plan every new project to represent the optimal investment of land and capital in the future of the campus
- Plan every new project as a model of resource conservation and environmental stewardship
- Build a campus that fosters intellectual synergy and collaborative endeavors both within and across disciplines.
- Maintain and enhance the image and experience of the campus, and preserve our historic legacy of landscape and architecture.
- Plan every new project to respect and enhance the character, livability, and cultural vitality of our City Environs.
- Maintain the Hill Campus as a natural resource for research, education and recreation, with focused development on suitable sites.

The 2020 LRDP includes a number of specific policies and procedures for individual project review to support these objectives, which are described below.

CAMPUS PARK

The 2020 LRDP requires that while the design of each campus building should reflect its own time and place, it should also reflect the enduring values of elegance and quality, and contribute to a memorable identity for the University as a whole. Toward this goal, major capital projects would be reviewed at each stage of design by the UC Berkeley Design Review Committee, described in chapter 4.1.

The Campus Park Guidelines contained in the 2020 LRDP would guide these reviews to ensure they both reflect a coherent aesthetic vision and support the academic goals of the University. The Guidelines prescribe general design principles for the Campus Park as a whole, as well as more prescriptive criteria in selected areas to ensure:

- The major elements of the campus landscape armature, as well as its most significant historic exterior spaces, are preserved from intrusion by buildings,
- Projects within the classical core enhance the architectural integrity of the ensemble, and complement rather than compete with historic buildings,
- Projects at the city interface create a graceful transition from campus to city, and enhance the visual image and pedestrian experience of the campus edge,
- Projects facing places of interaction provide enclosure and security, admit sunlight, and have active ground level uses that observe and activate the place.

Moreover, given the variety of site conditions present in the Campus Park, project specific design guidelines would be prepared for each major project, based on the Campus Park Guidelines. The project specific design guidelines would specify the landscape and open space improvements to be incorporated into the project scope and budget.

HILL CAMPUS

As described in Chapter 3.1, the 2020 LRDP would limit future development in the Hill Campus to a few selected areas. No new development within the timeframe of the 2020 LRDP is expected within the areas designated as Ecological Study Area, Reserve Study Areas, or the open space buffers adjacent to Research areas.

Development within the Research areas, the Botanical Garden, and Strawberry Canyon Recreation area would be limited to buildings and other facilities of modest scale within or adjacent to areas already developed with buildings and infrastructure. Housing would be initially limited to the two housing sites identified in the 2020 LRDP: any additional future housing sites would be subject to further environmental review under CEQA.

2020 LRDP policies that pertain to the Hill Campus include:

- Establishing a management authority for the Ecological Study Area,
- Ensuring the future management of, and investments in, the Ecological Study Area and the Botanical Garden are integrated and synergetic,
- Maintaining the visual primacy of the natural landscape in the Hill Campus, and
- Managing the landscape to reduce fire risk and restore native vegetation patterns.

Major capital projects under the 2020 LRDP would be reviewed at each stage of design by the UC Berkeley Design Review Committee, and project specific guidelines would be prepared for each major project. The project specific design guidelines would specify the landscape and open space improvements to be incorporated into the project scope and budget.

CITY ENVIRONS

UC Berkeley serves the entire state of California, and has a mission that can not always be met entirely within the parameters of municipal policy. In the City Environs, however, the objectives of UC Berkeley should be informed by the plans and policies of Berkeley and Oakland, to ensure their character and livability are respected and enhanced through new University investment.

Throughout the City Environs, major capital projects would be reviewed at each stage of design by the UC Berkeley Design Review Committee, based on project specific design guidelines prepared for each project. The University would make informational presentations of all major projects in the City Environs in Berkeley to the City of Berkeley Planning Commission and, if relevant, the City of Berkeley Landmarks Commission, for comment prior to schematic design review by the UC Berkeley Design Review Committee. Similarly, the University would make informational presentations of all major projects located in the City Environs in Oakland to the City of Oakland Planning Commission and, if relevant, to the Landmarks Preservation Advisory Board.

Projects on the Adjacent Blocks that lie within the area of the Southside Plan would use the Southside Plan, described below, as a general guide for project design.

SOUTHSIDE. In 1997 the City of Berkeley and UC Berkeley signed a Memorandum of Understanding, which states ‘the city and the University will jointly participate in the preparation of a Southside Plan...the campus will acknowledge the Plan as the guide for campus developments in the Southside area.’

The city and University have since collaborated on a draft Southside Plan, which as of July 2003 was being finalized for formal city adoption (see next section). Assuming no further substantive changes are made by the city prior to adoption, the University would as a general rule use the design guidelines and standards prescribed in the Southside Plan as its guide for the location and design of projects implemented under the 2020 LRDP within the geographic area of the Southside Plan.

AGREEMENTS WITH THE CITY OF BERKELEY

The University has made several agreements with the City of Berkeley that would minimize land use impacts of the 2020 LRDP.

CLARK KERR CAMPUS MEMORANDUM OF UNDERSTANDING / COVENANTS & RESTRICTIONS

In 1982, a Memorandum of Understanding (MOU) was executed by the City of Berkeley and the University regarding the 50-acre Clark Kerr Campus.²⁶ A Declaration of Covenants and Restrictions with nearly identical provisions was executed by the University with property owners within a defined area around the Clark Kerr Campus.²⁷ These agreements essentially limit future use of the Clark Kerr Campus through 2032 to the program described in the Dwight-Derby Site Plan approved by the Regents of the University of California in March 1982. Amendment of the MOU requires consent by the Berkeley City Council, while amendment of the Declaration requires consent by a majority of property owners within the area defined in the Declaration.

1990 LRDP MITIGATION IMPLEMENTATION AND COOPERATIVE RELATIONS AGREEMENTS

In October 1989, the City of Berkeley and UC Berkeley entered into a Memorandum of Accord which addressed many of the critical issues facing the city and University at that time.²⁸ Following adoption of the 1990 LRDP, the Memorandum of Accord was expanded upon and validated by the LRDP Mitigation Implementation and Cooperative Relations Agreements, both of which are described briefly below.

In 1990, the University and the City of Berkeley executed a Cooperative Relations Agreement (CRA) with regard to various matters of mutual concern. Via the CRA, the University agreed to several economic development activities, to assist with the construction of a facility for the homeless, and to lease space to the city at 6701 San Pablo Avenue. The CRA also addressed city-University support for mixed-use facilities in the Downtown, support of city economic goals, and use of the city's First Source Hiring Program for contractors and employees.²⁹

At the same time the CRA was signed, a Mitigation Implementation Agreement (MIA) was also executed by the University and the City of Berkeley. The MIA outlines various actions and procedures to facilitate the implementation of the 1990 LRDP and EIR mitigation measures. The MIA terminates at the conclusion of academic year 2005-2006 or upon approval of a new LRDP for UC Berkeley.³⁰

SOUTHSIDE PLAN AND SOUTHWEST SPORTS COMPLEX MOU

In 1997, the City of Berkeley and UC Berkeley executed a Memorandum of Understanding (MOU) to create a City-Campus Planning Advisory Group charged with helping UC Berkeley and the city coordinate future development, housing, recreation, circulation, transit and parking plans and projects. The MOU contains several UC Berkeley and city commitments regarding the Southwest Sports Complex.³¹

The MOU also stipulated that the city and UC Berkeley jointly work on creating plans to help protect neighboring areas from traffic impacts, including transit system improvements in the downtown, campus and environs, and jointly participate in preparing a Southside Plan and a UC Neighborhoods Circulation Plan. As described elsewhere in this document below, both of these plans have been completed.

SOUTHSIDE & DOWNTOWN TRANSPORTATION DEMAND MANAGEMENT STUDY

Pursuant to the 1997 Memorandum of Understanding, UC Berkeley and the City of Berkeley jointly commissioned the Southside & Downtown Transportation Demand Management (TDM) Study.^{32 33} The document's intent is to guide future transportation planning by the City and University within the areas south and west of the Campus Park.

The study considers facilities and programs for automobiles (e.g. parking structures), bicycles (e.g. bicycle parking), pedestrians (e.g. sidewalk improvements), and transit (e.g. expanded transit subsidy programs). The strategies and findings of the TDM Study are designed to inform other plans, including the city's General Plan, the Southside Plan and UC Berkeley's Long Range Development Plan.

The study area for the TDM Study is bounded by Hearst Avenue, Martin Luther King Jr. Way, Dwight Way and Prospect Street. This area includes the Southside, the Downtown, and UC Berkeley. The study area also includes residential areas adjacent to and enclosed within its boundaries. The TDM Study has two goals:

- Improve the livability of Berkeley's core, including the University, Downtown, Southside and surrounding neighborhoods.
- Improve the vitality of Berkeley's core, including its role as a place for living, business, research, teaching, study, worship, shopping, recreation and entertainment.

For each goal, the Study contains objectives and proposed strategies addressing parking, housing, safety, job development, aesthetics, streetscape, traffic, transit, bicycling, walking, and ridesharing.

SOUTHSIDE PLAN

A Draft Southside Plan prepared with input from the City of Berkeley and the University was published for public review in January 2000. The Southside Plan may ultimately become an amendment to the City's General Plan, which is anticipated to result in changes to some General Plan land use designations within the Southside.³⁴

As envisioned in the MOU, the Southside Plan contains analysis and policies leading to improvements in traffic, parking, pedestrian and bicycle travel, housing, seismic safety, design, historic preservation, land use, economic development, and public safety. The MOU provides that UC Berkeley 'will acknowledge the Plan as the guide for campus developments in the Southside area.' As of July 2003, the policies of the Southside Plan had been endorsed in principle by the city and UC Berkeley, and the city was finalizing the Plan and starting EIR preparation.

The Southside Plan designates four land use subareas in the Southside and includes policies for each subarea. The Plan gives priority to housing in the Residential Subareas: new residential development is particularly encouraged in the Residential High Density Subarea. The policies for the Residential Mixed Use Subarea encourage a mix of land uses, encourage new infill development, conserve existing architectural and historic resources, and ensure the design of new buildings is compatible with existing buildings and the character of the Southside. The policies for the Commercial Subarea encourage mixed-use buildings with housing above retail uses.

4.8.7 2020 LRDP IMPACTS

This section describes the potential land use impacts of the 2020 LRDP based on the Standards of Significance, whether they are significant or less than significant, and whether any significant impacts can be mitigated to less than significant levels.

EFFECTS FOUND NOT TO BE SIGNIFICANT

The Initial Study found that the 2020 LRDP would have no significant impacts in regard to the following thresholds:

Would the project physically divide an established community?

The City of Berkeley has developed around and in conjunction with UC Berkeley, and the city and University communities are profoundly interwoven. Thus the Initial Study determined that the 2020 LRDP does not have the potential to physically divide an established community, and therefore no further analysis is required.

Would the project conflict with any applicable habitat conservation plan or natural community conservation plan?

The Campus Park, City Environs, and the Hill Campus are not located within any area designated for an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved conservation plan. Therefore, the Initial Study concluded that no further analysis is required.

LESS THAN SIGNIFICANT IMPACTS

LRDP Impact LU-1: The 2020 LRDP would not conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project, adopted for the purpose of avoiding or mitigating an environmental effect.

The University is constitutionally exempt from local land use regulations when using its property in furtherance of its educational mission. The University is the only agency with jurisdiction over such projects. Therefore, the potential impact of the 2020 LRDP with respect to land use plans, policies or regulations of agencies with jurisdiction over the project is *less than significant* and requires no mitigation.

LRDP Impact LU-2: The 2020 LRDP would not conflict with local land use regulations such that a significant incompatibility is created with adjacent land uses.

Because UC Berkeley serves the entire state of California, its mission can not always be met entirely within the parameters of municipal policy. In the City Environs, however, the 2020 LRDP would require future projects to be informed by city plans and policies, to ensure the character and livability of neighboring cities are respected and enhanced through new University investment.

Section 4.8.4 describes the relevant provisions of the Berkeley and Oakland General Plans. The ‘significant incompatibilities’ which are the subject of this Standard could result if a project conflicted with uses allowed under the general plans in terms of **activities** or in terms of **physical characteristics**, such as height, setbacks, style, and materials. The following examination of potential incompatibilities refers to the respective general plans of Berkeley and Oakland as guides in identifying such potential incompatibilities with respect to land use.

BERKELEY GENERAL PLAN

With respect to activities, 90 to 100 percent of the new academic and support program space anticipated under the 2020 LRDP would be located on the Campus Park or Adjacent Blocks. The Campus Park itself is designated Institutional, except for the riparian and other natural areas along Strawberry Creek, which are designated Open Space. Since the Open Space areas roughly coincide with the Natural Preserves in the 2020 LRDP Campus Park Guidelines, which preclude intrusion by new buildings, no significant incompatibilities with respect to use are anticipated in the Campus Park.

As noted in 4.8.4 above, the Berkeley General Plan EIR includes UC Berkeley under the Institutional category.³⁵ Except for the areas east of Gayley Road designated as Open Space, institutional uses are allowed in every Berkeley General Plan land use designation occurring in the Adjacent Blocks,³⁶ so in general no significant incompatibilities with respect to use are anticipated.

The Berkeley portions of the LRDP Housing Zone outside the Adjacent Blocks and Southside are primarily designated Avenue Commercial, which allows residential uses. Since the University anticipates only residential projects within these areas, no significant incompatibilities with respect to use are anticipated. Moreover, the LRDP Housing Zone by definition excludes areas designated as low density residential in a municipal general plan as of July 2003.

Portions of the Adjacent Blocks and Hill Campus east of Gayley Road in Berkeley are designated Open Space, which does not allow new buildings except those required to maintain the open spaces. However, these areas today include a number of large University facilities, including the Foothill, Bowles and Stern Residence Halls, International House, Memorial Stadium, Greek Theatre, and Strawberry Canyon Recreation Area. While new University projects in these areas may not be consistent with the Berkeley General Plan designation, they are not expected to create significant incompatibilities with respect to use, as long as the uses in the new projects are similar to existing uses on or adjacent to the project sites.

OAKLAND GENERAL PLAN

Almost the entire Oakland portion of the Hill Campus is designated in the Oakland General Plan as Resource Conservation, which does not allow new buildings except those required for maintenance. While most of this area is comprised of the Ecological Study Area and the Botanical Garden, which are compatible with this designation, it also includes the Silver Space Sciences Laboratory, the Mathematical Sciences Research Institute, the Field Station for Behavioral Research and, at the city boundary, the Lawrence Hall of Science. It also includes two possible sites for faculty, staff, or visitor housing.

While new University projects in these areas may not be consistent with the Oakland General Plan designation, they are not expected to create significant incompatibilities with respect to use, as long as the uses in the new projects are similar to existing uses on or adjacent to the project sites.

Portions of the LRDP Housing Zone extend into Oakland. The primary general plan designations within these areas are Urban Residential and Neighborhood Center Mixed Use, both of which allow residential uses. Since the University anticipates only residential projects within these areas, no significant incompatibilities with respect to use are anticipated.

CONTINUING BEST PRACTICES

Projects may also create significant incompatibilities due to their **physical characteristics**. However, while the University must ensure the needs of its mission are met, it also recognizes city land use regulations as a valuable guide in creating projects that respect and enhance the character and livability of the City Environs. UC Berkeley Best Practices to minimize land use incompatibilities include the following:

Continuing Best Practice LU-2-a: New projects in the Campus Park would as a general rule conform to the Campus Park Guidelines. The Guidelines include specific provisions to ensure projects at the city interface create a graceful transition from campus to city.

Continuing Best Practice LU-2-b: UC Berkeley would make informational presentations of all major projects in the City Environs in Berkeley to the Berkeley Planning Commission and, if relevant, the Berkeley Landmarks Commission for comment prior to schematic design review by the UC Berkeley Design Review Committee. Major projects in the City Environs in Oakland would similarly be presented to the Oakland Planning Commission and, if relevant, to the Oakland Landmarks Preservation Advisory Board.

Continuing Best Practice LU-2-c: Each individual project built in the City Environs under the 2020 LRDP would be assessed to determine whether it could pose potential significant land use impacts not anticipated in the 2020 LRDP, and if so, the project would be subject to further evaluation under CEQA. In general, a project in the City Environs would be assumed to have the potential for significant land use impacts if it:

- Includes a use that is not permitted within the city general plan designation for the project site, or
- Has a greater number of stories and/or lesser setback dimensions than could be permitted for a project under the relevant city zoning ordinance as of July 2003.

Continuing Best Practice LU-2-d: Assuming no further substantive changes are made by the city prior to adoption, the University would as a general rule use the design guidelines and standards prescribed in the Southside Plan as its guide for the location and design of projects implemented under the 2020 LRDP within the geographic area of the Southside Plan.

Continuing Best Practice LU-2-e: To the extent feasible, University housing projects in the 2020 LRDP Housing Zone would not have a greater number of stories nor lesser setback dimensions than could be permitted for a project under the relevant city zoning ordinance as of July 2003.

The above provisions of the 2020 LRDP should ensure the potential for University projects under the 2020 LRDP to create significant land use incompatibilities is *less than significant*.

4.8.8 TIEN CENTER IMPACTS

This section describes the potential land use impacts of the Chang Lin Tien Center for East Asian Studies based on the Standards of Significance, whether they are significant or less than significant, and whether any significant impacts can be mitigated to less than significant levels. Chapter 4.0 includes further explanation about this project-level analysis as it relates to CEQA and the 2020 LRDP.

EFFECTS FOUND NOT TO BE SIGNIFICANT

The Initial Study found that the Tien Center would have no significant impacts in regard to the following thresholds:

Would the project physically divide an established community?

The Tien Center project would be built within the Campus Park boundaries. Therefore, the Initial Study concluded that no effects related to the physical division of an established community would occur.

Would the project conflict with any applicable habitat conservation plan or natural community conservation plan?

The Campus Park is not located within any area designated for an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved conservation plan. Thus, no further analysis regarding these thresholds is required for the Tien Center.

LESS THAN SIGNIFICANT IMPACTS

Tien Center Impact LU-1: As a project implementing the 2020 LRDP, the Tien Center would not conflict with any applicable land use plan, policy or regulation of an agency with jurisdiction over the project, adopted for the purpose of avoiding or mitigating an environmental effect.

The University is constitutionally exempt from local land use regulations when using its property in furtherance of its educational mission. The University is the only agency with jurisdiction over such projects. Therefore, the potential impact of the 2020 LRDP with respect to land use plans, policies or regulations of *other* agencies with jurisdiction over the project is *less than significant* and requires no mitigation.

The 2020 LRDP prescribes Location Guidelines in order to optimize the use of campus land and resources and, in particular, ensure the limited supply of land on or adjacent to the Campus Park is prioritized for those functions that require it.

Phase 1 of the Tien Center would house the East Asian Library. Phase 2 would house the Institute for East Asian Studies and the Department of East Asian Languages and Cultures, including offices, lounges, an auditorium, classrooms and seminar rooms. As indicated in Table 3.1-4, ‘instructional spaces’, ‘faculty offices, research and conference spaces’, and ‘libraries and student workspaces’ are all campus functions prioritized for the Campus Park. Thus, the Tien Center is in full conformance with the 2020 LRDP Location Guidelines.

Tien Center Impact LU-2: As a project implementing the 2020 LRDP, the Tien Center would not conflict with local land use regulations such that a significant incompatibility is created with adjacent land uses.

The Tien Center would be built within the Campus Park, surrounded by similar academic facilities. No land use incompatibilities are expected.

4.8.9 CUMULATIVE IMPACTS

This section evaluates whether the 2020 LRDP, in combination with other University and non-University projects which are reasonably foreseeable, would result in significant cumulative land use impacts.

This analysis considers cumulative growth as represented by the implementation of municipal general plans, implementation of the proposed Lawrence Berkeley National Laboratory 2004 LRDP, the draft Southside Plan, the AC Transit Major Investment Study, the proposed redevelopment of University Village Albany, and implementation of the 2020 LRDP, as described in 4.0.5. The analysis also includes growth anticipated by the City of Berkeley General Plan EIR and by previously certified UC Berkeley EIRs, including the Northeast Quadrant Science and Safety Projects (SCH 2001022038), Seismic Replacement Building 1 (SCH 99122065), and the Underhill Area Projects (SCH 99042051).

The geographic context for the analysis of cumulative land use impacts includes the City of Berkeley and the areas of the City of Oakland within the scope of the 2020 LRDP. All the projects implemented under the 2020 LRDP or the Lawrence Berkeley National Laboratory LRDP would be located within this area. Given the localized nature of impacts under the Standards of Cumulative Significance, below, any potential cumulative land use impacts would occur within this geographic context.

The only effects that may occur outside these cities would be residential or other projects indirectly induced by the aforementioned projects: for example, housing to accommodate new employees at UC Berkeley or Lawrence Berkeley National Laboratory. However, any such projects would be governed by local codes and ordinances, and are thus presumed to be compatible with existing land use.

The significance of the potential cumulative land use impacts was determined based on the following standards, which are identical to those presented in section 4.8.5, except

for those found to have no potential for environmental impact in the 2020 LRDP Initial Study, and therefore no potential for a cumulatively considerable impact.

Standard: *Would the project conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project, adopted for the purpose of avoiding or mitigating an environmental effect?*

Standard: *Would the project conflict with local land use regulations such that a significant incompatibility is created with adjacent land uses?*

The analysis in section 4.8.7 found these impacts to be *less than significant* for the 2020 LRDP. The question posed in this section is twofold:

- Is the potential *cumulative* impact of the 2020 LRDP *and* other reasonably foreseeable projects under these standards significant?
- Is the contribution of the 2020 LRDP to these impacts cumulatively considerable?

Cumulative Impact LU-1: The 2020 LRDP, in combination with other reasonably foreseeable projects, would not conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project, adopted for the purpose of avoiding or mitigating an environmental impact.

LBNL is a national research facility operated for the US Department of Energy by the University of California. The only jurisdictions with land use authority over UC Berkeley and LBNL activities conducted on property under the control of the University are the University, for UC Berkeley, and the University and US Department of Energy, for LBNL.

Private sector projects on non-University-owned land in the cumulative study area would be subject to separate environmental review as well as municipal general plans, zoning regulations, and design review, minimizing the potential for incompatible land uses. This cumulative impact is therefore *less than significant*.

Cumulative Impact LU-2: The 2020 LRDP, in combination with other reasonably foreseeable projects, would not conflict with local land use regulations such that a significant cumulative incompatibility is created with adjacent land uses.

As noted above, development under the 2020 LRDP could result in changes to the existing land use environment within the geographic context, which could combine with land use changes allowed by local jurisdictions to create cumulative impacts. Changes to the existing land use environment could occur through the conversion of vacant land to other uses or through changes from one land use to another. Although growth under the 2020 LRDP might not always be met entirely within the parameters of municipal policy, in general development under the 2020 LRDP is expected to be compatible with adjacent general plan designations and thus with adjacent existing and future land use.

The 2020 LRDP is also not expected to result in cumulative incompatibilities with existing and future land use at Lawrence Berkeley National Laboratory, since the UC Berkeley-LBNL boundary is largely buffered by open space. Like the UC Berkeley 2020 LRDP, the LBNL 2004 LRDP is being designed to minimize impacts to adjacent land

uses: its 2003 Revised Notice of Preparation describes a zone of undeveloped vegetation management areas around the perimeter of the site.³⁷ Moreover, except at its northwest corner the LBNL site is further buffered from non-University properties by the Hill Campus lands of UC Berkeley.

The Albany General Plan accounts for the goals of the City of Albany and the intentions of UC Berkeley with regard to the University Village property,³⁸ and therefore no significant incompatibilities are expected due to the planned future development of University Village Albany.

Private sector projects on non-University-owned land within the geographic context would be subject to separate environmental review and to municipal general plans, zoning regulations, and design review. Therefore, the implementation of the 2020 LRDP, together with the cumulative impacts of other reasonable foreseeable projects within the geographic context, would not result in significant incompatibilities among existing and future land uses. This cumulative impact is *less than significant*.

4.8.10 REFERENCES

- ¹ State of California, *Executive Order D-16-00*, August 2, 2000.
- ² Letter to members of the Committee on Grounds and Buildings from the UC Office of the Secretary of the Regents, December 5, 2002, www.ucop.edu/ucophome/busfin/greenbldgs/re36.pdf.
- ³ City of Berkeley, *Draft General Plan*, October 2000.
- ⁴ City of Berkeley, *Planning Commission General Plan*, April 2002, Land Use Element, page LU-8.
- ⁵ City of Berkeley, *Planning Commission General Plan*, April 2002, Land Use Element, pages LU-8 to LU-10 and LU-20 to LU-22.
- ⁶ *City of Berkeley Draft General Plan EIR*, February 2001, pages 53 to 54.
- ⁷ City of Berkeley, *Planning Commission General Plan*, April 2002, Land Use Element, pages LU-13, LU-20, and LU-21.
- ⁸ City of Berkeley, *Downtown Plan Goals, Objectives, Policies*, www.ci.berkeley.ca.us/planning/landuse/plans/dtgoals.htm, retrieved February 17, 2004.
- ⁹ *City of Berkeley General Plan 2002*, Land Use Element, page LU-5.
- ¹⁰ City of Berkeley, *Downtown Plan Goals, Objectives, Policies*, www.ci.berkeley.ca.us/planning/landuse/plans/dtgoals.htm, retrieved February 17, 2004.
- ¹¹ *City of Berkeley Draft General Plan EIR*, February 2001, page 45.
- ¹² City of Berkeley, *Conditions, Trends and Issues*, <http://www.ci.berkeley.ca.us/planning/landuse/plans/conditions/intro.htm>, retrieved January 28, 2004.
- ¹³ City of Berkeley, *Conditions, Trends and Issues*, <http://www.ci.berkeley.ca.us/planning/landuse/plans/conditions/cal.htm>, retrieved February 17, 2004.
- ¹⁴ City of Berkeley, *South Shattuck Strategic Plan*, <http://www.ci.berkeley.ca.us/planning/advance/southshattuck/intro.htm>, retrieved February 17, 2004.
- ¹⁵ *City of Oakland General Plan, Land Use and Transportation Element*, March 1998, page 51.
- ¹⁶ *City of Oakland General Plan, Land Use and Transportation Element*, March 1998, page 106-107.
- ¹⁷ *City of Oakland General Plan, Land Use and Transportation Element*, March 1998, page 106-108.
- ¹⁸ *City of Oakland General Plan, Land Use and Transportation Element*, March 1998, pages 220-221.
- ¹⁹ *CEQA Guidelines*, Categorical Exemptions, Title 14, Chapter 3, Article 19, Section 15301(d), http://ceres.ca.gov/topic/env_law/ceqa/guidelines/, retrieved March 5, 2004.
- ²⁰ City of Berkeley, *Planning Commission General Plan*, April 2002, Land Use Element, page LU-25.

- ²¹ FAR stands for floor area ratio, a measure of development intensity defined as the ratio of the total building floor space on a site to the area of the site. City of Berkeley *Planning Commission General Plan*, April 2002, page LU-25.
- ²² GSF is measured by the campus as “outside gross square feet”, which consists of the sum of enclosed gross square feet, measured to the outside walls of the building, plus 50 percent of covered/unenclosed gross square feet.
- ²³ City of Berkeley, *Planning Commission General Plan*, April 2002, Land Use Element, page LU-25.
- ²⁴ City of Berkeley, *Planning Commission General Plan*, April 2002, Land Use Diagram, http://www.ci.berkeley.ca.us/maproom/maps/pdfs/gp_landuse.pdf, retrieved February 17, 2004.
- ²⁵ *City of Oakland General Plan, Land Use and Transportation Element*, March 1998, page 149.
- ²⁶ City of Berkeley and Regents of the University of California, *Memorandum of Understanding Resolution 51,172-N.S.*, April 23, 1982.
- ²⁷ Regents of the University of California, *Declarations of Covenants and Restrictions*, April 23, 1982.
- ²⁸ City of Berkeley, *Conditions, Trends and Issues*, www.ci.berkeley.ca.us/planning/advance/conditions/cal.htm, retrieved February 17, 2004.
- ²⁹ *Cooperative Relations Agreement between the Regents of the University of California and the City of Berkeley*, July 26, 1990.
- ³⁰ *Mitigation Implementation Agreement by and between the City of Berkeley and The Regents of the University of California*, July 26, 1990.
- ³¹ *Memorandum of Understanding By and Between the City of Berkeley and the University of California, Berkeley*, March 12, 1997.
- ³² City of Berkeley/UC Berkeley, *Southside/Downtown TDM Study*, March 2001. Prepared by Nelson/Nygaard Consulting Associates.
- ³³ City of Berkeley, *Planning Commission General Plan*, April 2002, Land Use Element, page LU-8.
- ³⁴ City of Berkeley, *Planning Commission General Plan*, April 2002, Land Use Element, page LU-26.
- ³⁵ City of Berkeley, *Planning Commission General Plan*, April 2002, Land Use Element, page LU-25.
- ³⁶ City of Berkeley, *Planning Commission General Plan*, April 2002, Land Use Element, www.ci.berkeley.ca.us/planning/landuse/plans/generalplan/landuse.html.
- ³⁷ Lawrence Berkeley National Laboratory, *Revised Notice of Preparation, Draft Environmental Impact Report*, October 28 2003
- ³⁸ *City of Albany General Plan, 1990-2010*, page 31.

4.9 NOISE

This chapter assesses the effects of the 2020 LRDP and the Chang-Lin Tien Center for East Asian Studies on the noise environment on and around UC Berkeley and the 2020 LRDP area. The section addresses the potential increases in noise levels that would result from implementation of the 2020 LRDP and the Chang-Lin Tien Center for East Asian Studies and the potential for the 2020 LRDP and the Tien Center to expose people to substantial noise levels, or cause substantial ground borne vibration effects.

During the scoping period for this EIR, comments were received regarding potential noise impacts resulting from construction of projects under the 2020 LRDP. This issue is addressed in this chapter.

4.9.1 ANALYTICAL METHODS

Noise is defined as unwanted sound. Airborne sound is a rapid fluctuation of air pressure above and below atmospheric pressure. Sound levels are usually measured and expressed in decibels (dB) with 0 dB corresponding roughly to the threshold of hearing. Decibels and other technical terms are defined in Table 4.9-1.

Most of the sounds which we hear in the environment do not consist of a single frequency, but rather a broad band of frequencies, with each frequency differing in sound level. The intensities of each frequency add together to generate a sound. The method commonly used to quantify environmental sounds consists of evaluating all of the frequencies of a sound in accordance with a filter that reflects the fact that human hearing is less sensitive at low frequencies and extreme high frequencies than in the frequency mid-range.

This is called "A" weighting, and the decibel level measured is called the A-weighted sound level (dBA). The level of a sound source can be measured using a sound level meter that includes an electrical filter corresponding to the A-weighting curve. Typical A-weighted levels measured in the environment and industry are shown in Table 4.9-2.

Although the A-weighted noise level may adequately indicate the level of environmental noise at any instant in time, community noise levels vary continuously. Most environmental noise includes a conglomeration of noise from distant sources which create a relatively steady background noise in which no particular source is identifiable. To describe the time-varying character of environmental noise, the statistical noise descriptors, L_{01} , L_{10} , L_{50} , and L_{90} , are commonly used. They are the A-weighted noise levels equaled or exceeded during one percent, ten percent, 50 percent, and 90 percent of a stated time period. A single number descriptor called the L_{eq} is also widely used. The L_{eq} is the average A-weighted noise level during a stated period of time that generates equivalent acoustical energy to the time varying ambient levels.

TABLE 4.9-1
DEFINITIONS OF ACOUSTICAL TERMS

Decibel, dB	A unit describing the amplitude of sound, equal to 20 times the logarithm to the base 10 of the ratio of the pressure of the sound measured to the reference pressure, which is 20 micropascals (20 micronewtons per square meter).
Frequency, Hz	The number of complete pressure fluctuations per second above and below atmospheric pressure.
A-Weighted Sound Level, dBA	The sound pressure level in decibels as measured on a sound level meter using the A-weighting filter network. The A-weighting filter de-emphasizes the very low and very high frequency components of the sound in a manner similar to the frequency response of the human ear and correlates well with subjective reactions to noise. All sound levels in this report are A-weighted.
L ₀₁ , L ₁₀ , L ₅₀ , L ₉₀	The A-weighted noise levels that are exceeded 1%, 10%, 50%, and 90% of the time during the measurement period.
Equivalent Noise Level, L _{eq}	The average A-weighted noise level during the measurement period.
Community Noise Equivalent Level, CNEL	The average A-weighted noise level during a 24-hour day, obtained after addition of 5 decibels in the evening from 7:00 pm to 10:00 pm and after addition of 10 decibels to sound levels in the night between 10:00 pm and 7:00 am.
Day/Night Noise Level, DNL, L _{dn}	The average A-weighted noise level during a 24-hour day, obtained after addition of 10 decibels to levels measured in the night between 10:00 pm and 7:00 am.
L _{max} , L _{min}	The maximum and minimum A-weighted noise level during the measurement period.
Ambient Noise Level	The composite of noise from all sources near and far. The normal or existing level of environmental noise at a given location.
Intrusive	That noise which intrudes over and above the existing ambient noise at a given location. The relative intrusiveness of a sound depends upon its amplitude, duration, frequency, and time of occurrence and tonal or informational content as well as the prevailing ambient noise level.

TABLE 4.9-2
TYPICAL SOUND LEVELS MEASURED IN THE ENVIRONMENT AND INDUSTRY

Noise Generators (at a Given Distance from Source)	A-Weighted Sound Level in Decibel	Indoor Noise Environments	Subjective Impression
	140		
Civil defense siren (100 feet)	130		
Jet take-off (200 feet)	120		Pain threshold
	110	Rock music concert	
Pile driver (100 feet)	100		Very loud
Ambulance siren (100 feet)			
	90	Boiler room	
Freight cars (50 feet)		Printing press plant	
Pneumatic drill (50 feet)	80	Kitchen with garbage disposal running	
Freeway (100 feet)			
Vacuum cleaner (10 feet)	70		Moderately loud
	60	Data processing center	
		Department store	
Light traffic (100 feet)	50	Private business office	
Large transformer (200 feet)			
	40		Quiet
Soft whisper (5 feet)	30	Quiet bedroom	
	20	Recording studio	
	0		Threshold of hearing

Illingworth & Rodkin, Inc., *Handbook of Acoustical Measurements and Noise Control*, 1988.

In determining the daily level of environmental noise, it is important to account for the difference in response of people to daytime and nighttime noises. During the nighttime, exterior background noises are generally lower than the daytime levels. However, most household noise also decreases at night and exterior noise becomes very noticeable. Further, most people sleep at night and are very sensitive to noise intrusion. To account for human sensitivity to nighttime noise levels, a descriptor, L_{dn} or DNL (day/night average sound level), was developed. The L_{dn} divides the 24-hour day into the daytime of 7:00 a.m. to 10:00 p.m. and the nighttime of 10:00 p.m. to 7:00 a.m. The nighttime noise level is weighted 10 dB higher than the daytime noise level.

Noise levels from a source diminish as distance to the receptor increases. Other factors such as reflecting surfaces or shielding from barriers also help intensify or reduce noise levels at any given location. A commonly used rule of thumb for traffic noise is that for every doubling of distance from the road, the noise level is reduced by 3 to 4.5 dBA, and for a single source of noise, such as a piece of stationary equipment, the noise is reduced by 6 dBA, for each doubling of distance away from the source. Noise levels may also be reduced by intervening structures; generally, a single row of buildings between the receptor and the noise source reduces the noise level by about 5 dBA.

Community reaction to an increase in noise levels varies, depending upon the magnitude of the change. In general, a difference of 3 dBA is a minimally perceptible change, while a 5 dBA difference is the typical threshold that would cause a change in community reaction. An increase of 10 dBA would be perceived by people as a doubling of loudness. A doubling of traffic flow on any given roadway would cause a noise increase of approximately 3 dBA. Similarly, twice the amount of railroad activity would be required to increase the rail contribution to community noise level by 3 dBA.

For typical residential construction (i.e., light frame construction with ordinary sash windows), the amount of exterior to interior noise reduction is at least 20 dBA with exterior doors and windows closed. With windows partially open for ventilation, the typical amount of exterior to interior noise reduction that can be expected is approximately 15 dBA. Buildings constructed of stucco or masonry with dual-glazed windows and solid core exterior doors can be expected to achieve an exterior to interior noise reduction of approximately 25-30 dBA.

2020 LRDP

Noise impacts resulting from development and operation of the 2020 LRDP were assessed using several methods. Analyses were conducted using baseline noise levels quantified using noise measurements conducted in March-April, 2001 and February-March, 2003.

Increases in traffic noise levels in the area were calculated based on traffic data generated for the 2020 LRDP. The compatibility of proposed developments was assessed in accordance with State guidelines developed by the Office of Noise Control and discussed in the Regulatory Framework Section (4.9.2). Noise and vibration impacts resulting from construction activities were calculated based on generic construction noise and vibration levels and assessed with respect to existing ambient levels, limits proposed in local ordinances, and other thresholds to protect against vibration effects.

TIEN CENTER

Ambient noise levels were measured at the site proposed for the Tien Center project. Noise sensitive receivers in the vicinity of the project site were identified. Significance criteria were established based on the sensitivity of the surrounding uses. Noise impacts were assessed by comparing project generated noise during construction and operation to existing ambient noise levels and appropriate significance thresholds.

4.9.2 REGULATORY FRAMEWORK

FEDERAL

The Noise Control Act of 1972 directed the U.S. Environmental Protection Agency (EPA) to develop noise level guidelines that would protect the population from the adverse effects of environmental noise. The EPA published guidelines (EPA Levels Document, 1974) containing recommendations of 55 dBA Ldn outdoors and 45 dBA Ldn indoors as a goal for residential land uses. The Agency is careful to stress that the recommendations contain a factor of safety and do not consider technical or economic feasibility issues and, therefore, should not be construed as standards or regulations. The Department of Housing and Urban Development (HUD) standards define Ldn levels below 65 dBA outdoors as acceptable for residential use. Outdoor levels up to 75 dBA Ldn may be made acceptable through the use of insulation in buildings. The goal of the HUD standards is to achieve a maximum interior level of 45 dBA Ldn.

STATE

The State of California has developed noise and land use compatibility guidelines.¹ The guidelines are based on exterior noise exposure in terms of the Ldn or CNEL. Residential multi-family land uses are normally acceptable where the Ldn is up to 65 dBA and conditionally acceptable where the Ldn is 60 dBA to 70 dBA. The overlap reflects the reality that projects within this category have differing sensitivities to noise. Other land uses proposed under the 2020 LRDP could be categorized as schools, libraries and office buildings, which are considered normally acceptable where the Ldn is up to 70 dBA and conditionally acceptable where the Ldn is 60 to 70 dBA. Conditionally acceptable noise environments may require additional noise attenuation to achieve acceptable exterior or interior noise environments. Where land uses are exposed to noise levels above those considered normally acceptable, additional mitigations are normally needed to abate noise. The state building code includes standards for noise insulation for new residential development with an outdoor noise exposure greater than 60 L_{dn}.²

The State of California additionally regulates the noise emission levels of licensed motor vehicles traveling on public thoroughfares, sets noise emission limits for certain off-road vehicles and watercraft, and sets required sound levels for light-rail transit vehicle warning signals. The extensive state regulations pertaining to worker noise exposure are for the most part applicable only to the construction phase of any project (for example California Occupational Safety and Health Administration Occupational Noise Exposure Regulations [8CCR, General Industrial Safety Orders, Article 105, Control of Noise Exposure section 5095, et. seq.]) or for workers in a “central plant” and/or a maintenance facility, or involved in the use of landscape maintenance equipment or heavy machinery.

4.9.3 LOCAL PLANS AND POLICIES

Although the University is constitutionally exempt from local regulations when using its property in furtherance of its educational purposes, it is University policy to evaluate proposed projects for consistency with local plans and policies. Therefore, this section outlines the plans and policy goals of the cities of Berkeley and Oakland related to noise.

CITY OF BERKELEY

BERKELEY GENERAL PLAN

The City of Berkeley General Plan does not contain a Noise Element, but instead incorporates noise policies and actions into the Environmental Management Element. Policy EM-47 seeks to eliminate existing noise problems and prevent significant future degradation of the acoustic environment. Policy EM-48 seeks to reduce local and regional traffic, “which is the single largest source of unacceptable noise in the City”.³ Policy EM-49 states that the City will “require operational limitations and all feasible noise buffering for new commercial, industrial, institutional or recreational uses that generates significant noise impacts near residential uses.”

FINDINGS OF THE BERKELEY GENERAL PLAN EIR

The City of Berkeley General Plan EIR assumed a net increase in Berkeley households of 3,176 (approximately 3,340 housing units), an increase in population of 6,955 people⁴, an increase of 10,895 jobs⁵, and a city-wide increase in automobile trips generated of approximately 5.1 percent.⁶ The General Plan EIR assumed an increase of 5,635 new jobs in the period 2000 to 2020 within the area bounded by Hearst, Shattuck, Dwight, and the eastern City limits. UC Berkeley accounted for much of this projected growth.⁸

The General Plan EIR utilized a noise exposure map to illustrate the noise levels along each roadway taking into account shielding from buildings; General Plan policies, including Land Use Compatibility Standards, are intended to ensure that new development under the General Plan will be compatible with the existing and future noise environment.

The EIR found that new development, particularly residential uses on and adjacent to major transit corridors, could be exposed to excessive noise. The mitigation measure requires the City to establish standards and procedures for use in reviewing new development for conformance with Title 24, part 2 of the California Administrative Code, and for conformance with City policy.⁹

The EIR further found that implementation of the General Plan would increase traffic noise levels along some roadway segments, potentially exposing residences to excessive noise levels. Traffic noise modeling found a potential 3 dBA increase, an effect found not to be significant. Cumulative noise effects were found to be less than significant with the adoption of land use compatibility guidelines, and other noise effects were considered localized in nature, so that no significant cumulative noise effects would occur with implementation of the General Plan.

CITY OF BERKELEY NOISE ORDINANCE

The City of Berkeley Municipal Code, Chapter 13.40, Community Noise, establishes land use to land use noise level limits for developed lands within the City of Berkeley subject to its jurisdiction. Residential exterior noise limits are established in terms of the median hourly (L₅₀) sound level. The limits are adjusted upward in 5 dB increments for sounds of shorter duration. In residential areas, the L₅₀ limits range from 55 dBA to 60 dBA during the daytime (7:00 a.m. to 10:00 p.m.) and 45 dBA to 55 dBA during the nighttime (10:00 p.m. to 7:00 a.m.). The commercial daytime limit is 65 dBA and the commercial nighttime limit is 60 dBA.

The noise ordinance also regulates construction and demolition noise. Section 13.40.070, Prohibited Acts, states: “The following acts and the causing or permitting thereof are declared to be in violation of this chapter:

Construction/Demolition:

- a. Operating or causing the operation of any tools or equipment used in construction, drilling, repair, alteration, or demolition work between weekday hours of 7 p.m. and 7 a.m., or 8 p.m. and 9 a.m. on weekends or holidays such that the sound there from creates a noise disturbance across a residential or commercial real property line, except for emergency work of public service utilities or by variance issued by the N[oise] C[ontrol] O[fficer]. (This section shall not apply to the use of domestic power tools as specified in Section 13.40.070(B)(11).)
- b. Noise Restrictions at Affected Properties: Where technically and economically feasible, construction activities shall be conducted in such a manner that the maximum sound levels at affected properties will not exceed those listed in the following schedule:

Mobile Equipment

Maximum sound levels for nonscheduled, intermittent, short-term operation (less than 10 days) of mobile equipment:

	R-1, R-2 Residential	R-3 and Above Multi-Family Residential	Commercial Industrial
Daily 7 am to 7 pm	75 dBA	80 dBA	85 dBA
Weekends, 9 am to 8 pm and Legal Holidays	60 dBA	65 dBA	70 dBA

Stationary Equipment

Maximum sound levels for repetitively scheduled and relatively long-term operation (periods of 10 days or more) of stationary equipment:

	R-1, R-2 Residential	R-3 and Above Multi-Family Residential	Commercial Industrial
Daily, 7 am to 7 pm	60 dBA	65 dBA	70 dBA
Weekends, 9 am to 8 pm and Legal Holidays	50 dBA	55 dBA	60 dBA

CITY OF OAKLAND

The City of Oakland General Plan establishes general policies and programs to reduce noise to acceptable levels throughout the City. The policies are directed towards compatible land use planning and control of ground transportation and aircraft noise. No specific quantitative limits are set forth. Chapter 17.120 of the Planning Code establishes noise performance standards in residential areas. Daytime noise limits range from 60 to 80 dBA during the daytime and 45 to 65 dBA during the nighttime, depending upon the

statistical distribution of the noise source. Allowable noise levels in commercial areas and manufacturing areas are 5 dBA and 10 dBA higher, respectively.

Short-term construction activities are restricted in residential areas to 80 dBA daily on weekdays and 65 dBA on weekends, and in commercial/industrial areas to 85 dBA on weekdays and 70 dBA on weekends. Long-term operation of stationary equipment is restricted to 65 dBA in residential areas on weekdays and 55 dBA on weekends, and to 70 dBA in commercial/industrial areas on weekdays and 60 dBA on weekends. Activities that generate perceptible vibration in residential areas are prohibited (motor vehicles, trains, and temporary construction or demolition are exempted from the vibration standard).¹⁰

4.9.4 EXISTING SETTING

The noise environment in the UC Berkeley Campus Park, the Hill Campus, and the City Environs, and along transportation corridors in the LRDP Housing Zone, results primarily from vehicular traffic on the street network and circulating on the Campus Park. Intermittent noise resulting from jet aircraft over-flights contribute to the noise environment to a lesser extent. In the Campus Park, sounds generated by people, including conversations, musical instruments, and personal transportation devices such as skateboards and bicycles, are heard where people congregate and circulate. Away from these areas, the natural sounds of water moving in the streams, wind in the trees, birds and Sather Tower (The Campanile) chimes are heard.

Noise levels have been monitored in the study area during preparation of environmental impact reports for specific projects and in preparation of this EIR. Figure 4.9-1 shows the locations of ambient noise measurements considered in this EIR, and is tied to Table 4.9-3. Noise levels were monitored over 24 hours at three locations designated LT-1, LT-2 and LT-3. These locations were selected to characterize existing ambient levels at representative locations along major roadways and in a quieter area of the City Environs. The results of these long-term measurements are included in Appendix G. Additional short-term measurements were conducted by Illingworth & Rodkin, Inc. and others in the last several years to characterize the noise environment throughout the study area. The results of these measurements are shown in Table 4.9-3. The measured data shows a wide range of noise levels and noise sources.

As shown by the data in Table 4.9-3, noise levels on the Campus Park are highest at the campus edges, where it adjoins Hearst Avenue, Oxford Street, Bancroft Way, and Gayley Road. Measurements indicate average noise levels of 64 to 71 dBA L_{eq} along these heavily-traveled streets. Traffic noise levels diminish rapidly as one moves away from the perimeter and into the Campus Park. Only the sounds of particularly loud vehicles, such as those generated by heavy trucks and buses, intrude into the interior of the Campus Park.

An example of a quiet area on the Campus Park is the north side of Doe Library, adjacent to Memorial Glade, which was measured in measurement I&R ST7. While there was a distant low hum of traffic, construction activity and distant aircraft when this measurement was made, the environment was quiet and contemplative, without loud intrusive sounds. Near Sather Gate, south of Wheeler Hall (measurement I&R ST8), sounds included the steady murmur of voices and footsteps as students pass in the

range of 61 to 63 dBA, a skateboarder who generated a noise level of 65 dBA, a bicyclist who generated a sound level of 57 dBA, and the distant sounds of the Campanile chimes generating a sound level of 63 dBA.

In the Adjacent Blocks, traffic noise on the street network dominates the noise environment. Along Shattuck Avenue (location LT-1), typical hourly average noise levels range from 68 to 71 dBA during the daytime and drop to about 55 dBA at night. The measured day/night average noise level at this location was 71 L_{dn} . Short-term measurements made along other streets in the areas adjacent to the Campus Park showed similar noise levels. Figure G-1 in Appendix G shows the distribution of noise levels within each hour and the variation in noise levels from hour to hour.

Away from the main streets, noise levels vary significantly from low levels of 49 to 50 dBA where there is little local traffic, up to 60 dBA along moderately traveled streets. For example, the measured noise level at the intersection of Scenic Avenue and Ridge Road near the Graduate Theological Union Hewlett Library was 58 L_{dn} . This is characteristic of noise levels away from major streets in the Adjacent Blocks North. Noise levels are higher on the Southside. The measured level along Channing Way near Dana Street, across from Residence Halls Unit 3, was 69 L_{dn} . Figures G-2 and G-3 in Appendix G show the 24-hour distribution of noise levels at the intersection of Scenic Avenue and Ridge Road (location LT-2) and along Channing Way near Dana Street (location LT-3), respectively.

The LRDP Housing Zone includes areas adjacent to the Campus Park, Southside, and the transportation routes heading to and from the Campus Park. Noise levels along the major transportation routes in Berkeley were quantified during the recent update of the City of Berkeley General Plan. Table 4.9-4 shows daily average (L_{dn}) noise levels along the Berkeley Street network in the vicinity of the Campus Park and along the identified campus transportation routes.

**TABLE 4.9-3
NOISE MEASUREMENT RESULTS**

Measurement	Location	Date	Time	L_{eq}	L_{max}	L_{min}	$L_{(1)}$	$L_{(10)}$	$L_{(50)}$	$L_{(90)}$	Comments
Campus Park											
I&R ST-5	South of the Campanile and adjacent to Stephens Hall	2/27/03	15:20	55	65	50	64	57	52	51	
I&R ST-6	North Gate	2/27/03	16:20	61	72	52	69	65	58	55	Hearst Ave. traffic predominant noise source
I&R ST-7	North of Doe Memorial Library	2/27/03	16:35	49	58	46	56	53	48	46	Quiet noise environment
I&R ST-8	Southwest of Wheeler Hall, near Sather Gate	2/27/03	16:50	57	68	51	64	59	55	52	Pedestrian Area
EIP-1	Between Warren Hall and GPB Teaching Bldg	3/01-4/01	Daytime	58	--	--	--	--	--	--	
EIP-3	North of Moffitt Undergraduate Library	3/01-4/01	Daytime	48	61	46	--	--	47	--	
Adjacent Blocks West											
EIP-2	Intersection of Bancroft Way and Fulton Street	3/01-4/01	Daytime	68	81	--	--	--	--	--	
I&R LT-1	Intersection of Shattuck Avenue and Delaware Street	2/26/03-2/27/03	24 Hrs (Fig. G-1)	--	--	--	--	--	--	--	Shattuck Ave. traffic noise dominates noise environment
Adjacent Blocks North											
I&R LT-2	Intersection of Scenic Avenue and Ridge Road	2/26/03-2/27/03	24 Hrs (Fig. G-2)	--	--	--	--	--	--	--	
I&R ST-1	Intersection of Arch and Cedar Streets	2/26/03	14:00	50	66	42	62	53	46	43	Light Traffic
			14:10	54	73	41	66	57	46	43	Loud Car
I&R ST-2	Intersection of Hearst Avenue and Scenic Avenue	2/26/03	15:35	67	82	55	76	70	65	58	Noisy westbound (uphill) traffic
			15:45	67	77	56	74	70	65	59	
I&R ST-3	Hearst Avenue at Highland Place	2/26/03	16:30	62	76	55	75	64	59	56	Loud Buses
			16:40	64	80	55	77	66	60	57	
EIP-4	Top of Greek Theatre	3/01-4/01	Evening	49	52	47	--	--	48	--	
EIP-5	Stern Hall	3/01-4/01	Evening	54	64	51	--	--	54	--	
			Daytime	60	69	54	--	--	59	--	

**TABLE 4.9-3
NOISE MEASUREMENT RESULTS**

Measurement	Location	Date	Time	L _{eq}	L _{max}	L _{min}	L ₍₁₎	L ₍₁₀₎	L ₍₅₀₎	L ₍₉₀₎	Comments
EIP-6	Foothill Housing - La Loma and Hearst Avenues	3/01-4/01	Daytime	66	82	55	--	--	62	--	
EIP-7	Intersection of Hearst and LeRoy Avenues	3/01-4/01	Daytime	58	75	49	--	--	54	--	
EIP-8	Ridge Road near Euclid Avenue	3/01-4/01	Daytime	60	72	44	--	--	55	--	
EIP-9	Scenic Avenue north of Hearst Avenue	3/01-4/01	Daytime	55	68	45	--	--	51	--	
EIP-10	Oxford Street north of Hearst Avenue	10/99	Daytime	62	74	--	--	--	--	--	
Adjacent Blocks South & Southside											
I&R LT-3	Intersection of Channing Way and Dana Street	3/18/03-3/19/03	24 Hrs – (Fig. G-3)	--	--	--	--	--	--	--	Channing Way traffic dominates
I&R ST-9	Intersection of Durant and Telegraph Avenues	3/18/03	15:15	68	82	59	77	71	65	61	Durant St. Traffic
			15:25	67	82	59	79	69	64	61	
I&R ST-10	Telegraph Avenue at Channing Way	3/18/03	15:40	71	89	59	82	74	65	61	Telegraph Ave. Traffic
			15:50	69	88	58	84	68	63	60	
EIP-11	Intersection of College Avenue and Haste Street	3/01-4/01	Daytime	66	83	--	--	--	--	--	
EIP-12	Unit 1 Residence Halls	3/01-4/01	Daytime	58	75	--	--	--	--	--	
EIP-13	Intersection of Channing Way and Bowditch Street	3/01-4/01	Daytime	68	87	--	--	--	--	--	
Hill Campus											
I&R ST-4	End of Canyon Road	2/27/03	14:50	58	68	47	66	60	57	53	

TIEN CENTER

Ambient noise levels near the site for the Chang-Lin Tien Center for East Asian Studies are quiet, characterized by noise measurements made near Memorial Glade. Typical day-time levels in this area are about 50 dBA L_{eq} . Noise-sensitive campus buildings and areas in the environs of the site include Haviland Hall adjacent to the west, McCone Hall to the east, Memorial Glade immediately to the southeast, and the Moffitt and Doe Libraries to the south.

4.9.5 STANDARDS OF SIGNIFICANCE

The significance of the potential impacts of the 2020 LRDP and Tien Center with regard to noise was determined based on the following standards:

Standard: Would the project expose people to or generate noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?

Standard: Would the project result in a substantial permanent increase in ambient noise levels in the project vicinity?

Standard: Would the project expose people to or generate excessive ground-borne vibration or ground-borne noise levels?

Standard: Would the project result in a substantial temporary or periodic increase in ambient noise levels in the project vicinity?

4.9.6 POLICIES AND PROCEDURES GUIDING FUTURE PROJECTS

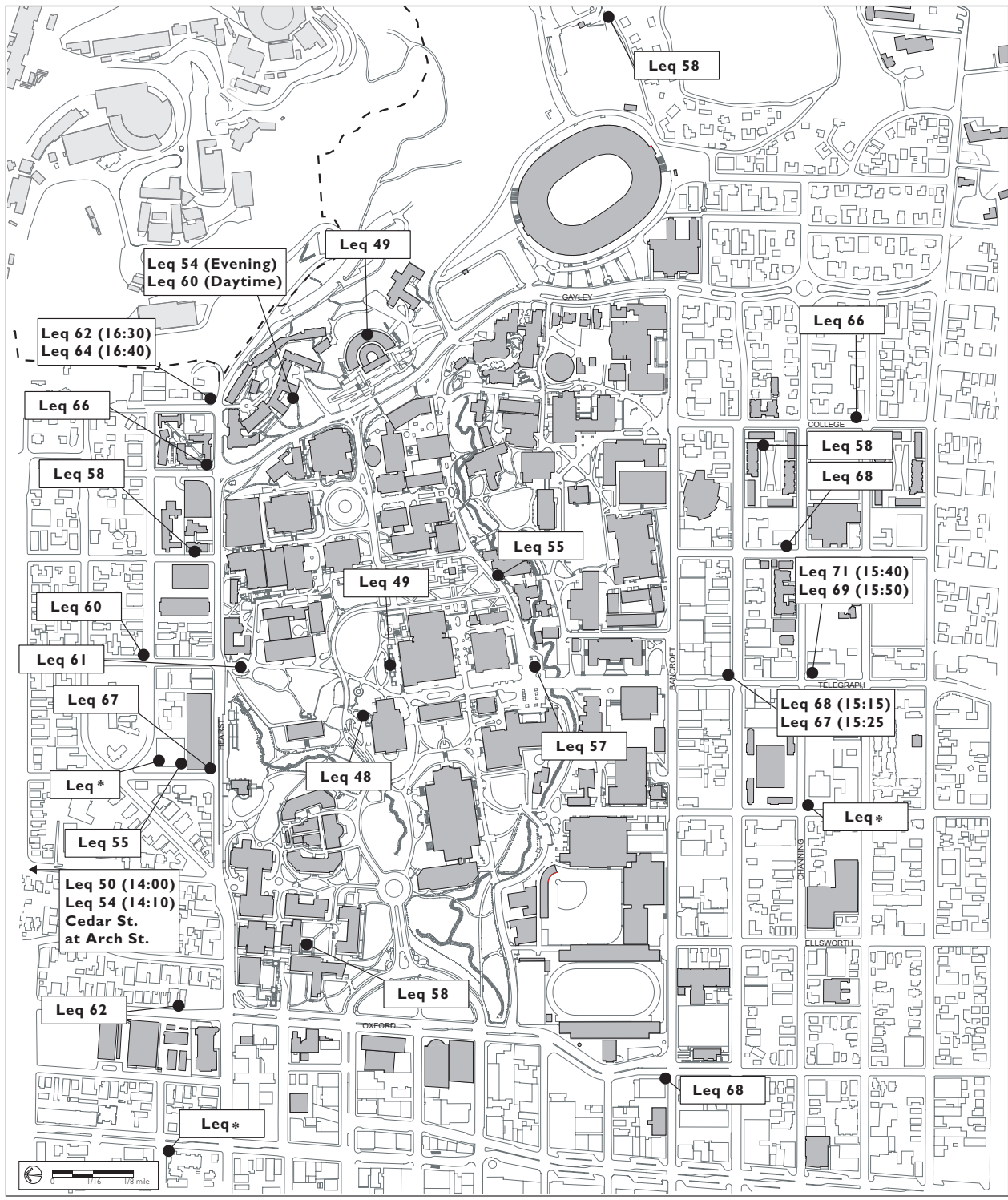
This section describes existing policies and procedures that would help to minimize noise impacts of development under the 2020 LRDP. It discusses both the policies in the 2020 LRDP itself and other University policies and programs affecting noise.

2020 LRDP

While the 2020 LRDP does not contain any policies that specifically address noise, several Objectives bear directly or indirectly on the noise environment, most importantly:

- **Maintain and enhance the image and experience of the campus, and preserve our historic legacy of landscape and architecture.**
- **Plan every new project to respect and enhance the character, livability, and cultural vitality of our City Environs.**

Specific policies relevant to reducing noise impacts on and around the campus include: locating all new university housing within a mile or 20 minutes of campus by transit; reducing demand for parking through incentives for alternate travel modes; collaborating with cities and transit providers to improve service to campus; and minimizing private vehicle traffic in the Campus Park.



Sources: Illingworth & Rodkin, 2003; EIP Associates, 2001.

--- Lawrence Berkeley National Laboratory Boundary

* Leq at these sites was measured over a 24-hour period.
See Figures G-1 through G-3.

FIGURE 4.9-1
CITY ENVIRONS
NOISE MEASUREMENT LOCATIONS

CAMPUS POLICIES AND PROCEDURES

OFFICE OF ENVIRONMENT HEALTH AND SAFETY PROGRAMS

The campus office of EH&S works with construction project teams to implement noise reduction measures and performs noise monitoring at any specific site, upon the request of the campus community.

FACILITIES SERVICES COMMUNICATION AND RESPONSE PROGRAMS

UC Berkeley has a construction project communication program, through which the University communicates with the public and campus community neighbors about forthcoming or ongoing construction projects. Under the program, Facilities Services (FS) engages in a range of steps to ensure responsive communications.

FS reviews site utilization and staging plans early on to reduce the impacts of construction equipment and circulation on neighbors. FS then coordinates project goals, scope, and timeline for effective communications, followed by the distribution of flyers and emails to communicate construction project specifics, e.g. hours of work, dates of construction, expected impacts, and contact information. During demolition, site preparation and construction, FS sends out construction communications on a regular basis, sends special notices in advance when unusual episodes of noise are expected, provides project information for inclusion in campus publications, and responds to, and maintains records of, all complaints.

FS coordinates with City staff to communicate and lessen impacts, coordinates complaint responses with the campus EH&S, and participates in campus-wide efforts to reduce instances of construction impacts on the campus community and neighbors.¹¹

HEALTH AND CONSTRUCTION WORKING GROUP

The Health and Construction Workgroup was formed in 2000, as a multi-departmental response team to advocate for the health of the campus community during on-campus construction. The major objectives of the Workgroup are to 1) identify health-related concerns that arise during the planning, design, and construction of campus facilities, 2) develop guidelines and recommendations for the campus administration that will prevent and/or minimize the negative health impacts of construction, and 3) provide input into the planning phases of capital projects so that managers and program committees address individual and community health issues in building and program plans.

TABLE 4.9-4

EXISTING NOISE LEVELS (L_{DN}) ALONG TRANSPORTATION ROUTES IN THE LRDP HOUSING ZONE (ADJACENT TO THE ROADWAY FOR SEGMENTS SHOWN)

San Pablo Avenue		College Avenue	
Gilman-Cedar	68	Dwight-Derby	68
Cedar-University	68	Derby-Ashby	68
University-Dwight	67	S. of Ashby	69
Solano Avenue		Gilman Street	
San Pablo-The Alameda	69	Santa Fe-Hopkins	68
Hearst Avenue		Gayley/Piedmont/Warring	
Eastshore-Sixth	65	Hearst-Bancroft	68
MLK, Jr.-Milvia	65	Bancroft-Durant	68
Oxford-Euclid	70	Durant-Piedmont	67
Euclid-Gayley	69	Piedmont-Derby	69
Sacramento Street		Claremont Ave./Blvd.	
Cedar-University	67	Alcatraz-Uplands	66
University-Dwight	68	The Uplands-Ashby	70
Dwight-Ashby	68	Ashby-Derby	70
MLK, Jr. Way/The Alameda		Oxford/Fulton Street	
N. of Solano	63	Cedar-Hearst	68
Solano-Marin	65	Hearst-University	71
Marin-Rose	67	University-Durant	71
Rose-Cedar	67	Durant-Dwight	64
Cedar-University	68	Dwight-Derby	67
University-Allston	68	Milvia Street	
Allston-Dwight	68	Cedar-Hearst	64
Dwight-Ashby	68	Hearst-University	64
Ashby-Adeline	67	University-Allston	66
S. of Alcatraz	72	Allston-Dwight	64
Shattuck/Henry/Sutter Street		University Avenue	
N. of The Circle	66	I-80-Sixth	73
The Circle-Rose	67	Sixth-San Pablo	73
Rose-Cedar	69	San Pablo-Sacramento	72
Cedar-University	69	Sacramento-MLK, Jr.	72
University-Allston	69	MLK, Jr.-Shattuck	70
Allston-Dwight	69	Shattuck-Oxford	69
Dwight-Ward	70	6th & 7th Street	
Ward-Ashby	67	Hearst-University	68
S. of Ashby	66	University-Dwight	71
Alcatraz Avenue		Delaware Street	
Sacramento-Adeline	67	San Pablo-Sacramento	64
Bancroft Way		Durant Avenue	
Oxford-Telegraph	67	Oxford-Ellsworth	65
Telegraph-College	66	Ellsworth-Telegraph	66
College-Piedmont	65	Telegraph-College	64
Haste Street		Derby Street	
Oxford-Ellsworth	65	Telegraph-College	62
Ellsworth-Telegraph	65	Warring-Claremont	68
Telegraph-College	64		

TABLE 4.9-4

EXISTING NOISE LEVELS (L_{DN}) ALONG TRANSPORTATION ROUTES IN THE LRDP HOUSING ZONE (ADJACENT TO THE ROADWAY FOR SEGMENTS SHOWN)

Dwight Way		Ashby Avenue	
San Pablo-Sacramento	68	MLK, Jr.-Shattuck	73
Sacramento-MLK, Jr.	68	Shattuck-Telegraph	73
Shattuck-Ellsworth	68	Telegraph-College	72
Ellsworth-Telegraph	69	College-Claremont	72
Telegraph-College	66	E. of Claremont (Tunnel Rd.)	74
College-Piedmont	67		

Source: City of Berkeley, *General Plan Draft EIR*, February 2001, pages 270-271.

4.9.7 2020 LRDP IMPACTS

This section describes the potential noise impacts of the 2020 LRDP based on the Standards of Significance, whether they are significant or less than significant, and whether any significant impacts can be mitigated to less than significant levels.

LESS THAN SIGNIFICANT IMPACTS

LRDP Impact NOI-1: Implementation of the 2020 LRDP would increase vehicular traffic in the 2020 LRDP planning area, but would not result in a substantial permanent increase in ambient noise levels due to increased vehicular traffic on local roadways.

New motor vehicle trips to the Campus Park, along the transportation routes to the Campus Park or in the LRDP Housing Zone, would result in an increase in traffic-related noise. A substantial increase in noise would occur if traffic noise levels are projected to increase by greater than 3 dBA L_{dn} along roadway segments with adjoining noise sensitive land uses. Along an existing roadway a doubling in traffic is normally required to cause a 3 dBA increase.

The increase in vehicular traffic noise was calculated by comparing traffic resulting from the implementation of the 2020 LRDP to existing traffic volumes along the roadway segments at the 74 intersections analyzed in Chapter 4.12 and shown in Figure 4.12-1. Projected increases in traffic do not approach a doubling in volumes along any of the roadways.

The predicted increase in vehicular traffic noise is 0 to 1 dB L_{dn} throughout the street network. Such an increase is imperceptible and would result in a *less than significant* impact.

LRDP Impact NOI-2: Projects implementing the 2020 LRDP would not result in operational noise levels in excess of local standards.

Heating, ventilating, and air conditioning equipment associated with new buildings developed under the 2020 LRDP may generate noise. The noise could affect sensitive areas on the Campus Park, on other University properties, or on adjacent non-University properties.

Continuing Best Practice NOI-2: Mechanical equipment selection and building design shielding would be used, as appropriate, so that noise levels from future building operations would not exceed the City of Berkeley Noise Ordinance limits for commercial areas or residential zones as measured on any commercial or residential property in the area surrounding a project proposed to implement the 2020 LRDP. Controls that would typically be incorporated to attain this outcome include selection of quiet equipment, sound attenuators on fans, sound attenuator packages for cooling towers and emergency generators, acoustical screen walls, and equipment enclosures.¹²

SIGNIFICANT IMPACTS AND MITIGATION MEASURES

LRDP Impact NOI-3: University housing developed under the 2020 LRDP could expose residents to excessive noise levels. This impact is *significant and unavoidable*.

Existing noise levels along major transportation routes in the LRDP Housing Zone are shown in Table 4.9-4. The range of noise levels is 64 L_{dn} to 74 L_{dn}. Noise exposure levels in this range could affect the use of indoor and outdoor spaces in new University housing built under the 2020 LRDP, and would exceed the 60 L_{dn} threshold set forth in the State Building Code and the 65 L_{dn} guideline for residential uses proposed by the State and adopted by local jurisdictions.

Typical California construction materials/techniques provide 12 to 18 dBA of noise reduction when going from outside to inside. A nominal noise reduction of 15 dBA is typically assumed for predicting interior noise levels with windows open. Because noise exposure levels exceed 60 dBA L_{dn} in the LRDP Housing Zone, interior noise levels are predicted to exceed the 45 L_{dn} noise insulation standard if windows are assumed to be open for ventilation. Noise exposures standard would be minimized to the extent feasible by Mitigation Measure NOI-3, but due to the variety of site-specific conditions and the existing noise levels within the LRDP Housing Zone it may not be feasible to eliminate such exposures entirely. Not all occupants of University housing would be exposed to noise levels above the standard; occupants of units facing noisy streets would experience the noisiest conditions. Given the academic importance of housing students close to campus, as reflected in the 2020 LRDP Objectives, this impact would remain *significant and unavoidable*.

LRDP Mitigation Measure NOI-3: The University would comply with building standards that reduce noise impacts to residents of University housing to the full feasible extent; additionally, any housing built in areas where noise exposure levels exceed 60 L_{dn} would incorporate design features to minimize noise exposures to occupants.

LRDP Impact NOI-4: Noise resulting from demolition and construction activities necessary for implementation of the 2020 LRDP would, in some instances, cause a substantial temporary or periodic increase in noise levels, in excess of local standards prescribed in Section 13.40.070 of the City of Berkeley noise ordinance, at affected residential or commercial property lines. This is a *significant and unavoidable* impact.

Construction activities are an existing and on-going source of noise at UC Berkeley. As described in Section 4.0.6, construction of approximately one million gross square feet of new housing and program space for the University was underway in the Campus Park and City Environs in 2003.

Impacts at a residential or commercial property over the 2020 LRDP planning period may be the result of construction at one or many sites, over time. Because construction implementing the 2020 LRDP would occur at varying locations, and because construction at any one location would, by nature, eventually be completed, construction-related noise impacts are considered temporary or periodic.

Noise generation during a construction project depends upon several factors:

- The phase of construction, e.g. demolition, excavation, building erection.
- The movement of construction vehicles to and from a project site.
- The type of equipment used.
- The location of the equipment on the construction site.
- The amount of time that a given piece of equipment is operated in a noisy mode.

These factors vary during a construction project. The type of noise generated during construction would also vary from project to project, depending upon the size of the construction project, whether or not pile driving is required, etc.

Representative noise levels resulting from individual pieces of construction equipment are shown in Table 4.9-5. During a typical construction phase, the cumulative hourly average noise level resulting from construction activities on the site typically range from 85 to 90 dBA at a distance of 50 feet. At a distance of approximately 200 feet from a construction site boundary, typical hourly average noise levels would be expected to range from approximately 73 to 78 dBA. Short-term operation of mobile equipment could potentially generate noise levels above the allowable levels in the Berkeley Noise Ordinance if such activities are occurring within about 280 feet of a single-family residence, 160 feet of a multi-family residence, or within about 100 feet of a commercial/industrial use, assuming that the activities are occurring on a weekday during the daytime.

If the construction activities are determined to be “repetitively scheduled and relatively long-term operations” of 10 days or more of stationary equipment, such activities could exceed the Berkeley Noise Ordinance limits within approximately 1000 to 1500 feet of a single-family residence, 500 to 1000 feet from a multi-family residence, and 500 feet of a commercial/industrial land use. Given no other attenuating factors, where these circumstances are met construction-generated noise from stationary equipment would be expected to exceed limits set forth in local noise ordinances.

It would not be possible to mitigate this impact to less than significant levels in all cases. However, UC Berkeley would include the following measures in all construction projects to minimize construction noise to the maximum extent feasible.

TABLE 4.9-5
TYPICAL CONSTRUCTION EQUIPMENT NOISE EMISSIONS

	L _{max} Level (dBA) ^{a,b}	Impact/Continuous
Arc Welder	73	Continuous
Auger Drill Rig	85	Continuous
Backhoe	80	Continuous
Bar Bender	80	Continuous
Boring Jack Power Unit	80	Continuous
Chain Saw	85	Continuous
Compressor ^c	70	Continuous
Compressor (other)	80	Continuous
Concrete Mixer	85	Continuous
Concrete Pump	82	Continuous
Concrete Saw	90	Continuous
Concrete Vibrator	80	Continuous
Crane	85	Continuous
Dozer	85	Continuous
Excavator	85	Continuous
Front End Loader	80	Continuous
Generator	82	Continuous
Generator (25 KVA or less)	70	Continuous
Gradall	85	Continuous
Grader	85	Continuous
Grinder Saw	85	Continuous
Horizontal Boring Hydro Jack	80	Continuous
Hydra Break Ram	90	Impact
Impact Pile Driver	95	Impact
Insitu Soil Sampling Rig	84	Continuous
Jackhammer	85	Impact
Mounted Impact Hammer (hoe ram)	90	Impact
Paver	85	Continuous
Pneumatic Tools	85	Continuous
Pumps	77	Continuous
Rock Drill	85	Continuous
Scraper	85	Continuous
Slurry Trenching Machine	82	Continuous
Soil Mix Drill Rig	80	Continuous
Street Sweeper	80	Continuous
Tractor	84	Continuous
Truck (dump, delivery)	84	Continuous
Vacuum Excavator Truck (vac-truck)	85	Continuous
Vibratory Compactor	80	Continuous
Vibratory Pile Driver	95	Continuous
All other equipment with engines > 5 HP	85	Continuous

^a Measured at 50 feet from the construction equipment, with a “slow” (1 sec.) time constant.

^b Noise limits apply to total noise emitted from equipment and associated components operating at full power while engaged in its intended operation.

^c Portable Air Compressor rated at 75 cfm or greater and that operates at greater than 50 psi.

Continuing Best Practice NOI-4-a: The following measures would be included in all construction projects:

- Construction activities will be limited to a schedule that minimizes disruption to uses surrounding the project site as much as possible. Construction outside the Campus Park area will be scheduled within the allowable construction hours designated in the noise ordinance of the local jurisdiction to the full feasible extent, and exceptions will be avoided except where necessary.
- As feasible, construction equipment will be required to be muffled or controlled.
- The intensity of potential noise sources will be reduced where feasible by selection of quieter equipment (e.g. gas or electric equipment instead of diesel powered, low noise air compressors).
- Functions such as concrete mixing and equipment repair will be performed off-site whenever possible.

For projects requiring pile driving:

- With approval of the project structural engineer, pile holes will be pre-drilled to minimize the number of impacts necessary to seat the pile.
- Pile driving will be scheduled to have the least impact on nearby sensitive receptors.
- Pile drivers with the best available noise control technology will be used. For example, pile driving noise control may be achieved by shrouding the pile hammer point of impact, by placing resilient padding directly on top of the pile cap, and/or by reducing exhaust noise with a sound-absorbing muffler.
- Alternatives to impact hammers, such as oscillating or rotating pile installation systems, will be used where possible.

Continuing Best Practice NOI-4-b: UC Berkeley will continue to precede all new construction projects with community outreach and notification, with the purpose of ensuring that the mutual needs of the particular construction project and of those impacted by construction noise are met, to the extent feasible.

LRDP Mitigation Measure NOI-4: UC Berkeley will develop a comprehensive construction noise control specification to implement additional noise controls, such as noise attenuation barriers, siting of construction laydown and vehicle staging areas, and the measures outlined in Continuing Best Practice NOI-4-a as appropriate to specific projects. The specification will include such information as general provisions, definitions, submittal requirements, construction limitations, requirements for noise and vibration monitoring and control plans, noise control materials and methods. This document will be modified as appropriate for a particular construction project and included within the construction specification.

LRDP Impact NOI-5: Construction of campus facilities under the 2020 LRDP could expose nearby receptors to excessive groundborne vibration, but the mitigation measures described below would ensure this impact is *less than significant*.

Construction activities can cause vibration that varies in intensity depending on several factors. Of all construction activities, use of pile driving and vibratory compaction equipment typically generate high ground-borne vibration levels. Because of the impulsive nature of such activities, the use of the peak particle velocity descriptor (ppv) has been routinely used to measure and assess ground-borne vibration. Peak particle velocity has been used almost exclusively,¹³ to assess the potential of vibration to induce structural damage and the degree of annoyance for humans.

Primary concerns with construction-induced vibration, such as the potential to damage a structure, interfere with research activities or disrupt a learning or working environment, are evaluated against different vibration limits. To avoid structural damage, the California Department of Transportation uses a vibration limit of 0.5 inches/sec, ppv for structurally sound buildings designed to modern engineering standards. A conservative vibration limit of 0.2 inches/sec, ppv has been used for buildings that are found to be structurally sound, but where structural damage is a major concern.

For historic buildings or buildings that are documented to be structurally weakened, 0.08 inches/sec, ppv is often used to provide the highest level of protection. All of these limits have been used successfully and compliance to these limits has not been known to result in appreciable structural damage. All vibration limits referred to herein apply on the ground level and take into account the response of structural elements (i.e. wall and floors) to ground-borne excitation.

An impact pile driver can typically generate maximum peak particle velocities of 0.6 to 0.7 inch/sec at a distance of 25 feet. A vibratory (or sonic) pile driver typically generates ground-borne vibration levels of approximately 0.17 inch/sec ppv at a distance of 25 feet. Other construction activities generate substantially lower vibration levels. For example, a jackhammer generates a peak particle velocity of about 0.04 inch/sec at 25 feet. Structural damage is, therefore, rarely expected at distances of greater than 25 to 50 feet. The exception would be when pile driving is occurring in close proximity to a historic building, particularly one which is in poor structural condition. Attenuation of vibration with distance depends upon the soil condition at the site. Assuming a conservative attenuation rate, such buildings within approximately 200 feet of impact pile driving may be susceptible to architectural (cosmetic) or structural damage.

Perceptible vibrations from impact pile driving can occur at distances of up to approximately 500 feet. Similarly, vibration-sensitive research activities may also be subject to adverse effects from ground-borne vibration at distances of approximately 500-1000 feet from pile driving activity.

LRDP Mitigation Measure NOI-5: The following measures will be implemented to mitigate construction vibration:

- UC Berkeley will conduct a pre-construction survey prior to the start of pile driving. The survey will address susceptibility ratings of structures, proximity of sensitive receivers and equipment/operations, and surrounding soil conditions. This survey will document existing conditions as a baseline for determining changes subsequent to pile driving.

- UC Berkeley will establish a vibration checklist for determining whether or not vibration is an issue for a particular project.
- Prior to conducting vibration-causing construction, UC Berkeley will evaluate whether alternative methods are available, such as:
 - Using an alternative to impact pile driving such as vibratory pile drivers or oscillating or rotating pile installation methods.
 - Jetting or partial jetting of piles into place using a water injection at the tip of the pile.
- If vibration monitoring is deemed necessary, the number, type, and location of vibration sensors would be determined by UC Berkeley.

4.9.8 TIEN CENTER IMPACTS

This section describes the potential noise impacts of the Tien Center based on the Standards of Significance, whether they are significant or less than significant, and whether any significant impacts can be mitigated to less than significant levels.

The site for the Tien Center is quiet, characterized by noise measurements made near Memorial Glade. Typical daytime levels in this area are about 50 dBA Leq. Noise-sensitive campus buildings in areas in the environs of the site include Havilland Hall adjacent to the west, McCone Hall to the east, Memorial Glade immediately to the southeast, and the Moffitt and Doe Libraries to the south.

LESS THAN SIGNIFICANT IMPACTS

Tien Center Impact NOI-1: Operation of the Tien Center would not generate a substantial permanent increase in ambient noise levels in the project vicinity.

As a project implementing the 2020 LRDP, the Tien Center project would incorporate all the noise-reduction measures described above (see Continuing Best Practice NOI-4). Operation of the Tien Center would not cause noise that exceeds acceptable exposure limits for adjacent users. Further, as described in the Initial Study/Notice of Preparation the Tien Center project is not associated with an increase in enrollment, and would expand its staff by only five people.¹⁴ Therefore, no substantial increase in traffic noise would be associated with the Tien Center project.

Tien Center Impact NOI-2: Noise levels generated by construction of the Tien Center would not exceed locally established noise standards, nor generate excessive ground-borne vibration or ground-borne noise levels.

As a project implementing the 2020 LRDP, the Tien Center project would incorporate all the noise-reduction measures described above (see Continuing Best Practice NOI-4-a and NOI-4-b, and LRDP Mitigation Measure NOI-4). Further, the Tien Center construction site would be nestled in the interior of the core campus, and is approximately 388 feet from the nearest private property line. This distance, plus the fact that topography north of the site would further attenuate construction noise, indicate use of mobile construction equipment at the Tien Center site would not be anticipated to exceed limits established in Section 13.40.070 of the City of Berkeley noise ordinance.

Construction of the Tien Center would not entail use of pile driving, and would not be expected to expose nearby receptors to excessive groundborne vibration or groundborne noise.

4.9.9 CUMULATIVE IMPACTS

This section evaluates whether the 2020 LRDP, in combination with other University and non-University projects which are reasonably foreseeable, would result in significant cumulative noise impacts.

This analysis considers cumulative growth as represented by the implementation of municipal general plans, implementation of the proposed Lawrence Berkeley National Laboratory 2004 LRDP, the draft Southside Plan, the AC Transit Major Investment Study, the proposed redevelopment of University Village Albany, and implementation of the 2020 LRDP, as described in 4.0.5. The analysis also includes growth anticipated by the Berkeley General Plan EIR and by previously certified UC Berkeley EIRs, including the Northeast Quadrant Science and Safety Projects (SCH 2001022038), Seismic Replacement Building 1 (SCH 99122065), and the Underhill Area Projects (SCH 99042051).

For the **ambient noise environment**, the geographic context for the analysis of cumulative noise impacts includes the City of Berkeley and the areas of the City of Oakland within the scope of the 2020 LRDP, specifically including streets in the Housing Zone and streets leading to the Campus Park. All the projects implemented under the 2020 LRDP or the Lawrence Berkeley National Laboratory 2004 LRDP would be located within this area. For the **construction noise environment**, the context includes only the immediate vicinity of 2020 LRDP development areas.

The significance of potential cumulative noise impacts was determined based on the following standards:

Standard: *Would the project expose people to or generate noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?*

Standard: *Would the project result in a substantial permanent increase in ambient noise levels in the project vicinity?*

Standard: *Would the project result in a substantial temporary or periodic increase in ambient noise levels in the project vicinity?*

Standard: *Would the project expose people to or generate excessive ground-borne vibration or ground-borne noise levels?*

The question posed in this section is twofold:

- Is the potential *cumulative* impact of the 2020 LRDP *and* other reasonably foreseeable projects below these standards?
- Is the contribution of the 2020 LRDP to these impacts cumulatively considerable?

Cumulative Impact NOI-1: The 2020 LRDP, in combination with other projects, is not anticipated to result in a substantial permanent increase in ambient noise levels.

Cumulative Impact NOI-2: The 2020 LRDP, in combination with other projects, is not anticipated to result in a substantial temporary or periodic increase in ambient noise levels.

Cumulative Impact NOI-3: The 2020 LRDP, in combination with other projects, would not expose people to or generate excessive ground-borne vibration or ground-borne noise levels.

The analysis in section 4.9.7 found the 2020 LRDP itself would not result in a substantial permanent increase in ambient noise levels, and thus the 2020 LRDP would not contribute noise impacts that are cumulatively considerable. Operational noise levels would continue to be reduced by selecting equipment and designing shielding to ensure noise levels comply with local standards.

Increased vehicular traffic noise on the local street network resulting from implementation of the 2020 LRDP, the City of Berkeley General Plan, the Draft Southside Plan, the 2004 LBNL LRDP and the BRT was calculated by comparing future cumulative traffic volumes (see Chapter 4.12) to existing traffic volumes along the roadway segments at the 74 intersections analyzed in the traffic chapter. The predicted increase in vehicular traffic noise is 0 to 2 dB L_{dn} throughout the street network. Such an increase is not substantial and would result in a less than significant cumulative impact. This finding is consistent with prior analyses prepared for specific projects, the 1990 LRDP, and the Berkeley General Plan. Thus no significant cumulative noise impacts would result from implementation of the 2020 LRDP when combined with projected cumulative development.

Cumulative Impact NOI-4: The 2020 LRDP, in combination with other projects, would expose people to noise levels in excess of established standards. This is a *significant and unavoidable* impact.

Construction noise impacts may combine to expose people to excessive noise. UC Berkeley and the City of Berkeley continue to evolve a construction communication and coordination program to reduce potential construction noise effects to the full feasible extent; however, temporary noise effects from combined construction projects are likely to occur in the future, as they do in the present. While this is an on-going condition, the specific vicinity impacted by cumulative construction would likely shift as projects complete and new projects begin. Therefore, cumulative construction noise may result in *significant and unavoidable* exposures in excess of local noise standards.

The analysis in Section 4.9.7 further found that housing developed under the 2020 LRDP could expose occupants to noise levels exceeding the 60 L_{dn} threshold set forth in the State Building Code and the 65 L_{dn} guideline for residential uses proposed by the State and adopted by local jurisdictions. Combined with other housing constructed under the General Plan in the city of Oakland, in Berkeley under the draft Southside Plan or the General Plan, more people may be exposed to noise levels in excess of established standards. While campus best practices and the mitigation measure prescribed above would minimize such exposures for residents of new University housing, this impact would remain *significant and unavoidable*.

4.9.10 REFERENCES

- ¹ *Guidelines for the Preparation and Content of the Noise Element of the General Plan*, prepared by California Department of Health Services, 1988.
- ² *City of Berkeley Draft General Plan EIR*, February 2001, page 277.
- ³ *City of Berkeley Draft General Plan EIR*, February 2001, page 273.
- ⁴ *City of Berkeley Draft General Plan EIR*, February 2001, page 34.
- ⁵ *City of Berkeley Draft General Plan Final EIR*, June 2001, page 35.
- ⁶ *City of Berkeley Draft General Plan EIR*, February 2001, page 128.
- ⁸ *City of Berkeley Draft General Plan EIR*, February 2001, page 34; *City of Berkeley Draft General Plan Final EIR*, June 2001, pages 49 to 51.
- ⁹ *City of Berkeley Draft General Plan Final EIR*, June 2001, page 277;
- ¹⁰ City of Oakland, Planning Code, Title 17, Chapter 17.120 Performance Standards, http://bpc.iserver.net/codes/oakland/_DATA/TITLE17/Chapter_17_120_PERFORMANCE_S TANDAR/17_120_050_Noise_.html, retrieved March 4, 2004.
- ¹¹ Shaff, Christine, Communications Manager, UCB Facilities Services. Personal communication with Janet Brewster, Analyst, UCB Facilities Services, October 24, 2003.
- ¹² UC Berkeley, *Seismic Replacement Building 1, Final Environmental Impact Report*, September 2000, page 60.
- ¹³ Dowding, Charles H., *Construction Vibrations*, Prentice Hall, 1996; Lewis L. Oriard, *The Effect of Vibration and Environmental Forces*, International Society of Explosives Engineers, 1999.
- ¹⁴ UC Berkeley, *Notice of Preparation: Environmental Impact Report for the 2020 LRDP and Chang-Lin Tien Center for East Asian Studies*, August 29, 2003, page 14.

4.10 POPULATION AND HOUSING

This chapter presents information on existing and projected population and housing in the 2020 LRDP project area, and evaluates the potential impacts of the proposed 2020 LRDP. This chapter also examines the potential population and housing impacts from the Tien Center and from cumulative projects.

In addition to evaluation of potential environmental impacts based on the Standards of Significance, this chapter also includes employment and housing market analyses. The latter analysis examines the possible effects of the 2020 LRDP on the private housing market serving UC Berkeley, by comparing the demand for housing generated by the 2020 LRDP with existing and projected future supply. While effects on employment and on the housing market are not in themselves environmental impacts as defined by CEQA, jobs-housing balance in the city and region is a matter of public concern, and is addressed extensively in the Berkeley General Plan.

During the scoping period for this EIR, most comments relating to population and employment questioned the need for an increase in campus population and the impacts this growth could have on the other environmental topics covered in this EIR. The proposed increase in student, faculty and staff housing received both support and opposition. These issues, to the extent they relate to potential environmental impacts, are addressed throughout this EIR.

4.10.1 ANALYTICAL METHODS

City and regional baseline data on population, households, and employment were obtained primarily from the 1990 Census, the 2000 Census, and ABAG's *Projections 2003*. Except where otherwise noted, all projections of future city and regional conditions are from *Projections 2003*. University data were obtained from the 1990-2005 LRDP for 1990 conditions, and from the proposed 2020 LRDP for current and future conditions.

The current and projected headcounts for UC Berkeley include all individuals enrolled or employed at UC Berkeley. This represents the most conservative basis for environmental analysis, since it overestimates the actual number of individuals on campus at any one time. On any given day, a portion of UC Berkeley's students and employees are absent due to vacation, sick leave, part-time schedules, or sabbaticals. Others, such as students studying abroad, are located at remote sites. The reports of campus population UC Berkeley submits each year to the city of Berkeley adjusts for these absent individuals, and as a result the campus headcount figures in the UC Berkeley reports to the city are slightly lower than the figures in this chapter.¹

While the campus operates 365 days a year, the academic calendar is broken down into the *regular terms*, fall and spring semesters, and the *summer session*. The regular terms headcount is represented as a two-semester average. Student headcount is currently significantly lower in summer than in the regular terms. Faculty and staff headcounts are also slightly lower in summer. However, for the purpose of environmental analysis, this EIR assumes that total headcount would remain constant throughout the calendar year. This represents a worst-case scenario and allows for possible growth in UC Berkeley programs during the summer.

ABAG staff have advised the University that *Projections 2003* does not include the increment of growth in enrollment and employment proposed in the 2020 LRDP. ABAG projections do include growth projections from the city of Berkeley, which do assume some University-related growth.² However, for the purpose of analysis this EIR conservatively assumes that the entire 2020 LRDP program represents growth above and beyond the 2020 conditions forecast in *Projections 2003*.

4.10.2 REGULATORY FRAMEWORK

There are no federal regulations regarding population and housing relevant to the 2020 LRDP or the Tien Center project. The only relevant state regulation is the University's Auxiliary Enterprise Policy.

UC AUXILIARY ENTERPRISE POLICY

Housing at UC Berkeley is an auxiliary enterprise. The University of California Accounting Manual states, 'Auxiliary enterprise activities should generate sufficient funds to cover all their operating expenses, debt repayment obligations, repayment of advances from Regents' working capital, and to provide reserves for the long-term maintenance of facilities and the replacement of equipment.'³

In other words, the entire cost of housing construction, operation, and maintenance must be supported by rents and other revenues. The desire to improve the amount and quality of housing must therefore be balanced by the need to keep rents at reasonable levels, and avoid building surplus capacity. The 2020 LRDP housing targets may therefore be adjusted in the future to reflect changes in market conditions and demand for University housing.

4.10.3 LOCAL PLANS AND POLICIES

Although the University is constitutionally exempt from local land use regulations when using its property in furtherance of its educational purposes, it is University policy to evaluate proposed projects for consistency with local plans and policies. Therefore, this section outlines the plans and policy goals of the cities of Berkeley and Oakland related to population and housing.

CITY OF BERKELEY

BERKELEY GENERAL PLAN

The Berkeley General Plan includes population, housing and employment policies relevant to the 2020 LRDP, some of which are specific to UC Berkeley. The overall goals of the plan in this regard include increasing the supply of affordable housing in Berkeley, promoting living-wage jobs, and encouraging infill development.

LAND USE ELEMENT. The Land Use Element of the General Plan provides general direction and guidance for the physical development of Berkeley. Policies related to UC Berkeley's population and housing impacts include:⁴

- Encouraging and maintaining zoning that allows greater commercial and residential density and reduced residential parking requirements in areas with above-average transit service, such as the Downtown (LU-23).
- Encouraging development of affordable housing in the Downtown, the Southside Plan area, and other transit-oriented locations (LU-25).
- Minimizing the negative impacts of the size of the University population and of University expansion on adjacent neighborhoods and the city as a whole (LU-36).
- Encouraging the University to maximize its supply of housing for students and employees as a means to minimize impacts on the citywide housing market (LU-37).

HOUSING ELEMENT. The Housing Element of the General Plan presents the city's overall housing goals and policy framework. The Element includes objectives and policies to address the housing demand generated by University enrollment and employment as well as the supply of University housing.

One of the objectives contained in the Housing Element states the city's intention to work with UC Berkeley to create new housing and jointly address issues of mutual concern. Policies under this objective include:⁵

- Maximizing the supply of suitably-located affordable housing for students (H-33).
- Expanding housing opportunities for faculty and staff (H-33).
- Encouraging construction of group quarters for students near the campus (H-34).
- Supporting University housing that does not take additional land off the tax rolls (H-35).
- Supporting University-related housing that avoids displacement of existing residents or a loss of existing rental housing resources for other residents (H-36).
- Encouraging the University to maintain its residential buildings as housing, to return converted residential buildings back to residential use, and, where feasible, to convert unused or underutilized buildings to residential use (H-37).

ECONOMIC DEVELOPMENT AND EMPLOYMENT ELEMENT. The Economic Development and Employment Element includes citywide policies aimed at increasing the number of jobs that go to Berkeley residents. It encourages the University to hire Berkeley residents.

FINDINGS OF THE BERKELEY GENERAL PLAN EIR

The Berkeley General Plan EIR drew the following conclusions regarding the influence of the General Plan on population, employment and housing:⁶

- With development under the city's General Plan, the population of Berkeley would remain below 120,000, the figure established as its capacity in the 1977 Master Plan.
- Construction of student housing by the University of California would have a beneficial effect on housing conditions in the city.
- Policies designed to increase housing supply would result in a better jobs/housing balance in Berkeley.
- Policies to increase residential housing supply in the city may increase density in some areas of the city, but this was determined to be a less than significant impact.
- Implementation of the General Plan would not result in any significant impacts related to population, employment, or housing.

CITY OF OAKLAND

The City of Oakland Housing Element includes housing policies relevant to the 2020 LRDP. These policies include encouraging market-rate housing, below-market-rate housing, housing meeting special needs, mixed-use housing in commercial zones, and encouraging the re-use of vacant commercial and industrial buildings for housing.

4.10.4 EXISTING SETTING

This section presents existing conditions and projections for campus enrollment, employment, and housing, and their relationship to existing and projected conditions for the city and region.

EMPLOYMENT AND ENROLLMENT

UC Berkeley influences population growth and distribution in Berkeley and surrounding cities two ways: by changes in enrollment and changes in employment. This section describes existing and projected campus enrollment and employment within the city and regional context.

CITY AND REGIONAL EMPLOYMENT

Berkeley is part of the larger 9-county Bay Region economy, which is projected to experience continued economic growth in the future. As shown in Table 4.10-1, ABAG projects that regional employment will grow by 27 percent from 2000 to 2020. Alameda County employment is projected to grow by 30 percent during this period.

ABAG's projected job growth within the city of Berkeley by 2020 is projected to be slower, with an addition of 6,630 jobs, representing only 0.7 percent of projected regional job growth. As noted above, the 2020 figures in Table 4.10-1 are based on ABAG's *Projections 2003* and are assumed not to include the employment growth projected under the 2020 LRDP.

In comparison, the Berkeley General Plan EIR projected an increase of 5,635 jobs from 2000 to 2020 within the area defined by Hearst, Shattuck, Dwight, and the eastern city limit.⁷ This area includes the entire Campus Park, nearly the entire Adjacent Blocks West, the entire Adjacent Blocks South, the entire Southside except Clark Kerr Campus, and the Berkeley portion of the Hill Campus. Job growth in the city as a whole was expected to be 10,895 from 2000 to 2020, including job growth at UC Berkeley and Lawrence Berkeley National Laboratory.⁸ The EIR found implementation of the General Plan would not result in any significant impacts related to population, employment, or housing.⁹

UC BERKELEY ENROLLMENT AND EMPLOYMENT

Table 4.10-2 shows campus enrollment and employment, which are described in this EIR in terms of *headcount*. This is the number of individuals enrolled or employed at UC Berkeley, plus an estimate of average daily visitors and vendors. Students make up the largest percentage of campus headcount, followed by nonacademic staff, academic staff, and faculty; the academic staff category includes postdoctoral fellows and visiting scholars. The staff figures are adjusted to exclude student workers in order to avoid double-counting.

TABLE 4.10-1

CITY & REGIONAL EMPLOYMENT:

ABAG PROJECTIONS 2003

	Census 1990	Census 2000	Projected 2020	% Growth 2000-2020
Bay Area Region	3,206,080	3,753,670	4,752,590	27%
Alameda County	644,100	753,674	977,436	30%
Berkeley	73,580	77,200	83,830	9%

Under the 2020 LRDP, regular term campus headcount is projected to increase by up to 12 percent over what it was in 2001-2002, compared to a projected increase of 6 percent in the city of Berkeley population, and 20 percent in the regional population, during the period 2000-2020.

Table 4.10-2 does not include UC Berkeley Extension. Extension program activities occur primarily during evening and weekend hours, often in campus facilities. Also, roughly 600 students each year attend the UC Berkeley fall extension program, housed in leased space. The majority of these students enroll as regular students in the spring semester, taking the place of freshmen who leave UC Berkeley after the fall semester.

No substantial increase in Extension enrollment is anticipated during the timeframe of the 2020 LRDP, and Extension is committed to maintaining its current San Francisco programs (as of October 2003) in San Francisco.¹⁰

POPULATION

This section describes existing and projected city and regional population and the residential distribution of campus population.

CITY AND REGIONAL POPULATION

As shown in Table 4.10-3, ABAG projects that the population of the 9-county Bay Area Region will grow by 20 percent from 2000 to 2020. Alameda County, with the second largest population in the Region, is expected to grow by 19 percent during this same period.

Census 2000 reported a population of 102,743 for Berkeley, almost exactly the same as in 1990. However, based on extensive field research conducted in fall 2002, the city of Berkeley believes that this figure represents a significant undercount of individuals in group quarters. Based on its research, the city recommends a figure of 106,354 as its 2000 population.¹¹ Table 4.10-3 incorporates this revision, and allocates the entire increment beyond the 2000 Census to the group quarters category. The corresponding figures for the Bay Area Region and Alameda County are also adjusted accordingly in Table 4.10-3. Household and household population figures are shown in Table 4.10-3 as reported in Census 2000.

UNIVERSITY OF CALIFORNIA, BERKELEY
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 4.10 POPULATION & HOUSING

TABLE 4.10-2 Estimated Headcount Estimated Headcount Projected Headcount
UC BERKELEY HEADCOUNT 1990 2001-2002 2020 LRDP

	1990	2001-2002	2020 LRDP
Students			
Regular Terms	31,364	31,800	33,450
<i>Summer</i>		11,400	17,100
Faculty	1,890	1,760	1,980
Academic Staff	3,640	3,040	4,880
Nonacademic Staff	6,809	8,140	8,950
Visitors & Vendors	1,200	1,200	2,000
Total Regular Term Headcount	44,900	45,940	51,260
Total Employment		12,940	15,810

Academic staff category includes postdoctoral fellows and visiting scholars.
 Total employment includes visiting scholars. While visiting scholars are not UC Berkeley employees, they also place demands on the housing market during their tenures at UC Berkeley.
 Total employment excludes students, other visitors and vendors.

TABLE 4.10-3 Census Census Projected % Growth
CITY & REGIONAL POPULATION 1990 2000 2020 2000-2020

	1990	2000	2020	% Growth 2000-2020
Bay Area Region				
Total Population ¹²	6,020,147	6,787,373	8,168,300	20%
Household Population	5,868,736	6,640,974	8,013,800	21%
Group Quarters Population ¹²	151,411	146,399	154,500	6%
Number of Households	2,245,865	2,466,020	2,950,970	20%
Average Household Size	2.61	2.69	2.72	
Alameda County				
Total Population ¹²	1,276,702	1,449,352	1,720,499	19%
Household Population	1,242,068	1,416,006	1,686,392	19%
Group Quarters Population ¹²	34,634	33,346	34,107	2%
Number of Households	479,518	523,366	616,121	18%
Average Household Size	2.59	2.71	2.74	
Berkeley				
Total Population ¹²	102,724	106,354	113,100	6%
Household Population	91,442	96,921	104,374	8%
Group Quarters Population ¹²	11,282	9,433	8,726	-7%
Number of Households	43,453	44,955	48,610	8%
Average Household Size	2.10	2.16	2.15	

TABLE 4.10-4
UC BERKELEY PLACE OF RESIDENCE Employees¹³ Students¹⁴

	Employees ¹³	Students ¹⁴
Berkeley	25%	61%
Oakland/Piedmont	16%	8%
Other Neighboring Cities	17%	9%
San Francisco	8%	5%
Other	34%	17%

Other neighboring cities include Albany, Alameda, El Cerrito, Emeryville, Kensington, and Richmond.

UC BERKELEY POPULATION DISTRIBUTION

As shown in Table 4.10-4, current residential data indicate roughly 61 percent of students, and roughly 25 percent of employees, report residences in the city of Berkeley. The student percentage for Berkeley is nearly identical to the 61.5 percent figure reported in the 1990-2005 LRDP EIR.¹⁵ Roughly 58 percent of faculty and staff, and 78 percent of students, report residences in the inner East Bay.

HOUSING

This section describes housing characteristics in the city and region, and existing and projected housing for UC Berkeley.

CITY AND REGIONAL HOUSING

As shown in Table 4.10-3, the number of households in the Bay Area Region grew by about 10 percent from 1990 to 2000, and is projected to increase by 20 percent from 2000 to 2020. Alameda County ranked second in the Bay Area in terms of households in 2000; its households are projected to increase by 18 percent from 2000 to 2020.

The 2000 Census reported 44,955 households in Berkeley in 2000, of which 59 per cent were non-family households. The number of Berkeley households is projected to increase by 8 percent by 2020. The average household size in Berkeley in 2000 was 2.16 persons, compared to 2.69 in the Bay Area as a whole. Household size in Berkeley is projected to remain roughly constant through 2020.

The 2000 Census reported 46,875 housing units in Berkeley, 2.5 percent more than in 1990. In 2000, 43 percent of units in Berkeley were owner-occupied, compared to 58 percent for the region as a whole. Berkeley has a diverse housing stock: 45 percent of the city's housing units in 2000 were single-family homes, while 21 percent were in buildings with two to four units, and 35 percent were in buildings with five or more units. Roughly a third of this 35 percent were in buildings of 20 or more units.

UC STUDENT HOUSING

As shown in Table 4.10-5, in 2003 UC Berkeley presently owns and operates roughly 5,440 bed spaces for single students, as well as 1,030 units for student families. In 2003, another 1,110 University-owned and -operated bed spaces for single students were under construction on three sites in the Southside, and another 1,260 beds were in design at UC Berkeley's Albany Village.¹⁶

Another estimated 3,375 bed spaces are located in University-affiliated housing, including roughly 1,500 in fraternities and sororities and 1,290 in twelve cooperatives. International House, operated by an independent nonprofit organization, provides another 585 single student beds. Once the projects under construction are completed, University-owned and operated housing will accommodate roughly 24 percent of the 2001-2002 student headcount, while University affiliate-operated housing will accommodate another 11 percent.¹⁷

UC EMPLOYEE HOUSING

UC Berkeley owns 27 faculty apartments and has developed 75 faculty condominium units. The University of California also provides housing assistance to faculty through four programs administered by each campus:

TABLE 4.10-5

UC BERKELEY HOUSING	Existing 2003	Und Const 2003	In Design ¹⁸ 2003	Proposed 2020 LRDP
University Operated Student Housing				
Residence Hall Beds	5,186	690		
Singles Apartment Beds ¹⁹	252	420	1,260	up to 2,500
Family Apartment Units	1,030			
Affiliate Operated Student Housing				
International House Beds	585			
Cooperative House Beds	1,290			
Sorority & Fraternity Beds ²⁰	1,500			
University Operated Faculty Units ¹⁹	27		30	up to 200

- The supplemental home loan program provides loans to assist eligible faculty in acquiring a principal place of residence.
- The salary differential housing allowance program provides a special housing allowance of up to \$25,150 per eligible faculty for housing-related costs.
- The mortgage origination program provides a stable source of financing for the purchase of homes by faculty at each UC campus.
- The University develops for-sale housing on land owned by the University.

UC Berkeley does not provide housing for visiting scholars. However, visiting scholars may use the campus housing office for assistance in locating housing.

4.10.5 STANDARDS OF SIGNIFICANCE

The significance of potential impacts on population and housing was determined based on the following standards:

Standard: Would the project 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)?

Standard: Would the project displace substantial numbers of existing housing or people, necessitating the construction of replacement housing elsewhere?

4.10.6 POLICIES AND PROCEDURES GUIDING FUTURE PROJECTS

This section describes existing policies and procedures that would help to minimize population and housing impacts of development under the 2020 LRDP. It references both the policies in the 2020 LRDP itself and other University agreements affecting population and housing.

2020 LRDP

Review of individual projects under the 2020 LRDP would influence the distribution of population in the city and region by guiding the location of new University housing. 2020 LRDP Objectives particularly relevant to population, employment, and housing include:

4.10-8

- **Provide the housing, access, and services we require to support a vital intellectual community and promote full engagement in campus life.**
- **Stabilize enrollment at a level commensurate with our academic standards and our land and capital resources.**
- **Plan every new project to respect and enhance the character, livability, and cultural vitality of our city environs.**

Toward this end, the 2020 LRDP includes policies for both the amount and location of new University housing in support of this Objective. In terms of housing supply, the 2020 LRDP includes the following targets:

- Increase single undergraduate bed spaces to equal 100% of entering freshmen and 50% of sophomores and entering transfers by 2020.
- Increase single graduate student bed spaces to equal 50% of entering graduate students by 2020.
- Maintain and upgrade the current supply of University housing suitable for students with children.
- Provide up to 3 years of University rental housing to new untenured ladder faculty.

In terms of location, all new University student housing built under the auspices of the 2020 LRDP would be located within the LRDP Housing Zone, defined to include:

- All sites located within a one mile radius of Doe Library, and
- All sites located within one block of a transit line providing trips to Doe Library in under 20 minutes,²¹ but
- Excluding sites with residential designations of under 40 units per acre in a municipal general plan as of July 2003.

The approximate extent of the 2020 LRDP Housing Zone is shown in Figure 3.1-5. The location standards for new University housing prescribed by the 2020 LRDP are designed to help reverse the dispersion of student residences to areas more distant from campus, and support the objective of a vital intellectual community and full engagement in campus life. In order to accomplish this, it will be important to ensure that University housing and access strategies are integrated and synergetic.

4.10.7 2020 LRDP IMPACTS

This section describes the potential population and housing impacts of the 2020 LRDP based on the Standards of Significance, whether they are significant or less than significant, and whether any significant impacts can be mitigated to less than significant levels. This section also includes analyses of the impacts of development under the 2020 LRDP on employment and regional housing supply. Although these issues are outside the scope of the Standards of Significance, they are important to the community and are therefore discussed here.

EFFECTS NOT FOUND TO BE SIGNIFICANT

The Initial Study found that the 2020 LRDP would have no significant impacts in regard to the following Standard:

Would the project displace substantial numbers of existing housing or people, requiring construction of replacement housing elsewhere?

The Initial Study determined implementation of the 2020 LRDP would not displace substantial numbers of people or housing. Further, the 2020 LRDP proposes additional housing that is not itself anticipated to require such displacements. The Initial Study therefore concluded that no further analysis is required in this EIR. If future projects are proposed that would require the displacement of substantial numbers of people or existing housing, their effects would be evaluated as required by CEQA on a project-specific basis.

LESS THAN SIGNIFICANT IMPACTS

LRDP Impact POP-1: Implementation of the 2020 LRDP would directly induce population growth in the Bay Region by increasing both enrollment and employment at UC Berkeley, but this growth would in general be accommodated in the Bay Region without significant adverse impacts.

DIRECT POPULATION GROWTH

A comparison of UC Berkeley baseline population conditions and projected 2020 population is shown in Table 4.10-6. As described in Chapter 3, UC Berkeley has been requested by the State to evaluate its ability to accommodate the equivalent of 4,000 more full-time students over base year 1998 by 2010. As of 2003, the majority of this increase had already been accommodated. By 2020, the regular term student population is expected to increase to as much as 33,450, and total employment to as much as 15,810, due to both enrollment growth and growth in sponsored research.

As shown in Table 4.10-6, the total projected direct population increase resulting from implementation of the 2020 LRDP could be as much as 9,400 people by 2020. In terms of environmental analysis, however, this estimate almost certainly overestimates the magnitude of the actual increase. At least some future UC Berkeley students and employees may already reside in Berkeley or the Bay Region, including those residents unemployed or not active in the labor market.

Table 4.10-6 excludes several changes to campus headcount that would not affect regional population growth or distribution. While the number of summer students is expected to increase significantly by 2020, this number would still be only roughly half the number of students enrolled in the regular terms.

Extension students, visitors and vendors, including construction workers, are assumed to already reside in the region or, in the case of some Extension students, to be visiting the region for only very limited period of time. Therefore, these individuals also would not significantly impact population growth.

The addition of up to 9,400 people to the Bay Area would not alter regional population significantly. Regional population is projected to grow by roughly 1.4 million from 2000 to 2020. Growth directly resulting from the 2020 LRDP would amount to less than one percent of this increment.

TABLE 4.10-6

	Estimated Headcount 2001-2002	Projected Headcount 2020 LRDP	Net Growth
PROJECTED POPULATION IMPACT			
UC Employment			
Faculty	1,760	1,980	220
Academic Staff	3,040	4,880	1,840
Nonacademic Staff	8,140	8,950	810
Total UC Employment	12,940	15,810	2,870
UC Employment Induced Household Growth (2,870 x 1.7)			4,880
UC Employment-Related Population Growth			7,750
Regular Term UC Students	31,800	33,450	1,650
Net Population Impact 2020 LRDP			9,400

Academic staff category includes postdoctoral fellows and visiting scholars.

Total UC employment excludes students, other visitors and vendors.

Employment induced household growth based on average regional household size of 2.7. This is a conservative figure in that it does not adjust for households with more than one UC employee.

The impacts of direct population growth are expected to be most pronounced in Berkeley, due to the new University housing proposed in the 2020 LRDP. Given the 2020 LRDP objective to promote a vital intellectual community and full engagement in campus life, and the value of proximity to campus in realizing this objective, the majority of this new housing is expected to be constructed within the city of Berkeley.

Up to 2,500 new student beds may be constructed under the 2020 LRDP, and it is possible this entire increment could be built within the Berkeley portion of the 2020 LRDP Housing Zone. While the 2020 LRDP only anticipates a net increase of 1,650 regular term students during this period, given the preference of students for housing close to campus it is assumed the balance of new student beds would be filled by students who would otherwise live outside Berkeley. The student housing to be built under the 2020 LRDP, therefore, could result in up to 2,500 new Berkeley residents by 2020.

The 2020 LRDP also includes up to 200 new employee housing units. Up to 100 units would be located in the Hill Campus, on sites within the city of Oakland, while the balance would be located within the 2020 LRDP Housing Zone. The balance of new employees under the 2020 LRDP would be accommodated in private sector housing, which may be built anywhere within the Bay Region. If all 100 of the Housing Zone employee units are built within Berkeley, and they accommodate households at the average regional size of 2.7, they could result in up to 270 new Berkeley residents.

This combined increase of up to 2,770 (2,500 + 270) Berkeley residents due directly to University housing built under the 2020 LRDP would represent an increase of 2.4 percent over the projected 2020 Berkeley population of 113,100. While not inconsiderable, this growth is well within the 120,000 capacity established in the city's 1977 Master Plan and the 2020 projection of 116,359 used in the Berkeley General Plan EIR.²²

Moreover, the new University housing built under the 2020 LRDP would support the policies of the Berkeley General Plan and the conclusions of the Berkeley Draft General Plan EIR cited in 4.10.3, which encourage the University to build new housing within Berkeley for both students and employees. While density in some areas of the city would

increase, the 2020 LRDP Housing Zone has been defined to ensure this increase would occur in those areas of the city most suitable for greater density, including sites in the downtown and along major transit arterials. The population growth in Berkeley due directly to University housing built under the 2020 LRDP is not, therefore, anticipated to result in significant adverse impacts.

INDIRECT IMPACTS OF POPULATION GROWTH

All development under the 2020 LRDP would occur in areas already served by local services and infrastructure. There would be no expansions of roads or utilities that could induce new urban growth. Thus there would be no indirect population growth impacts from implementation of the 2020 LRDP. Other indirect impacts of population growth, such as increased traffic and demand for public services, are discussed elsewhere in Chapter 4.

EMPLOYMENT ANALYSIS

While changes in employment are not in themselves environmental impacts as defined by CEQA or the Standards of Significance in this EIR, the increase in the number of UC Berkeley jobs has raised some concerns with respect to maintaining a diversified economy in Berkeley.

The total number of jobs within the city of Berkeley, not including the 2020 LRDP, is projected by ABAG to increase by 6,630 from 2000 to 2020. As noted above, this EIR assumes that the entire 2020 LRDP increment represents new jobs above and beyond those projected by ABAG. Under the 2020 LRDP, the number of citywide jobs could increase by up to 2,870, if all new UC Berkeley jobs are located in Berkeley.

This level of employment growth would be less than that projected in the Berkeley General Plan EIR. That EIR assumed jobs within the area defined by Hearst, Shattuck, Dwight, and the eastern city limits would grow by 5,635 during the period 2000 to 2020, including both UC Berkeley and Lawrence Berkeley National Laboratory.²³

The Notice of Preparation for the Lawrence Berkeley National Laboratory 2004 LRDP projects an increase of 1,200 staff and guests during the period 2003 to 2025.²⁴ Conservatively assuming all projected job growth for both UC Berkeley and Berkeley Lab occurs within the area described, the combined job growth of the two institutions would be 4,070 (2,870 + 1,200), or roughly 72 percent of the job growth projected for this area, and roughly 37 percent of the growth projected citywide, in the Berkeley General Plan EIR for the period 2000 through 2020.

TABLE 4.10-7 STUDENT HOUSING ANALYSIS	New UC Students by 2020	Projected New Student Beds by 2020	Bed Surplus (Deficit) by 2020	Potential Market Units Vacated by 2020
Undergraduate Students	850			
Graduate Students	800			
Total New Students	1,650			
Projected New Student Beds				
No 2020 LRDP Housing*		2,370	720	267
With 2020 LRDP Housing		4,870	3,220	1,192

* Includes 1,110 beds under construction and an estimated 1,260 in design at University Village Albany.

HOUSING ANALYSIS

This section characterizes the potential effects of the 2020 LRDP on local housing supply and demand conditions. The analyses focus on new housing demand anticipated as a result of the 2020 LRDP, in comparison to the number of units the private housing market is projected to supply. While changes in the housing market are not in themselves environmental impacts as defined by CEQA, jobs-housing balance in the city and region is a matter of public concern, and is addressed extensively in the Berkeley General Plan.

UC STUDENT HOUSING

In 2003, the University had 2,370 single student beds outside the scope of the 2020 LRDP under construction or in design. This included 1,110 single undergraduate student beds under construction on three sites in the Southside, as well as up to 1,260 single graduate student beds in design for University Village in Albany. These University Village units are to be entitled through a separate master plan EIR in advance of the 2020 LRDP.²⁵

As shown in Table 4.10-7, the housing demand generated by the net increase of 850 undergraduate and 800 graduate students anticipated in the 2020 LRDP would be more than counterbalanced by the University student housing under construction or in design in 2003, even if none of the student units proposed under the 2020 LRDP are constructed. Moreover, full completion of the 2020 LRDP housing program would result in up to 3,220 more net new student beds than net new students (1,110 + 1,260 + 2,500 – 1,650).

Assuming the private market units these students would vacate house an average of 2.7 students,²⁶ up to 1,192 private market units could become available to UC employees and other non-students as a result of student housing production at UVA and under the 2020 LRDP. While not all these student-vacated units would be suitable for all new employees, the University has a diverse workforce, and many UC employees would benefit either directly, by being able to find reasonable, suitable housing closer to campus, or indirectly, through the easing of demand on the constrained private housing market.

UC EMPLOYEE HOUSING

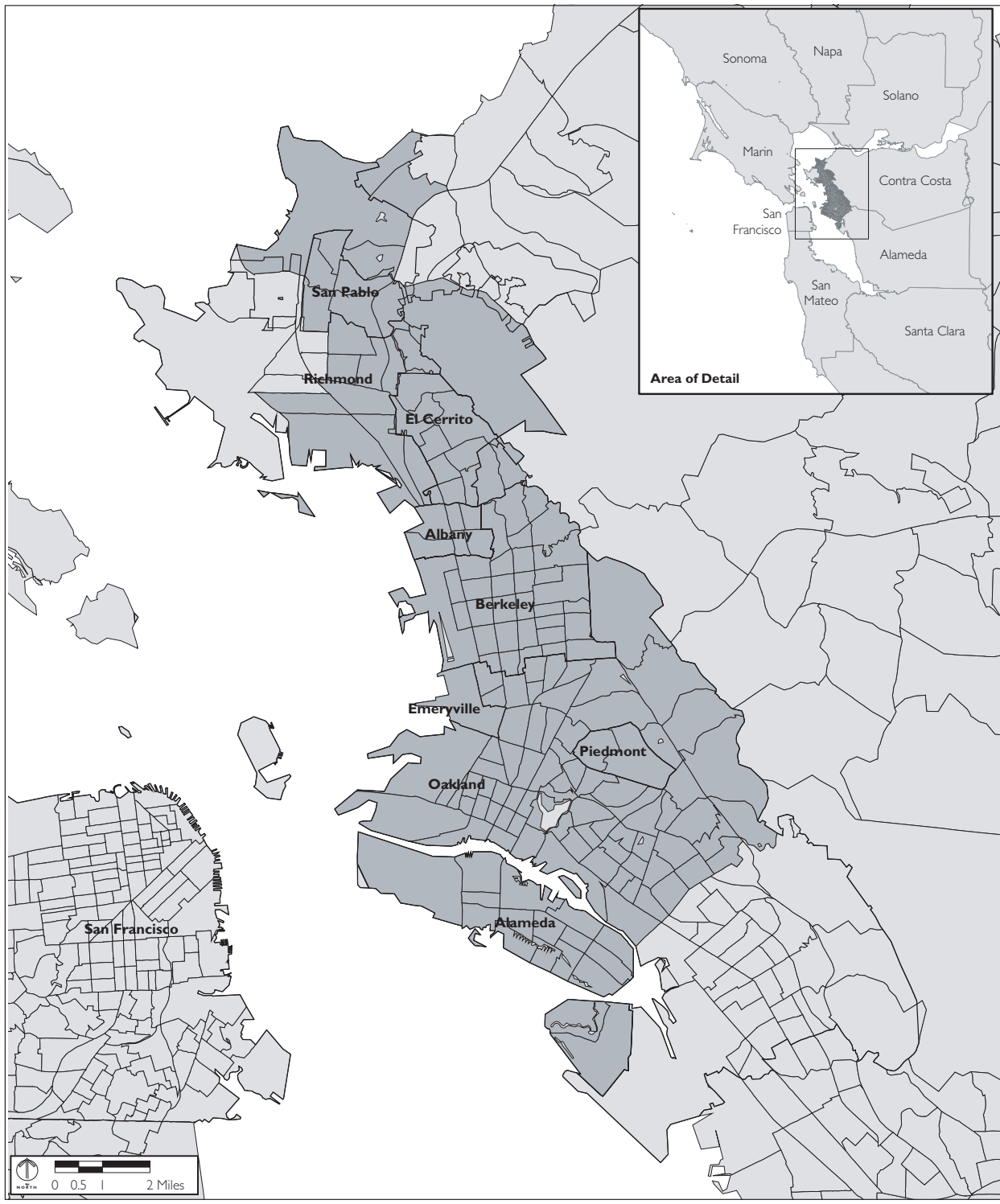
This section analyzes the potential effects of new employees from 2020 LRDP growth on the regional housing market, as summarized in Table 4.10-8. As a first step in the analysis, the net number of new employees projected by the 2020 LRDP was divided by 1.5, the average number of employees per household in the Bay Area Region. This results in an estimate of net new employee households generated by the 2020 LRDP.

TABLE 4.10-8 EMPLOYEE HOUSING ANALYSIS	Net New	New Employee	Projected New	Housing	Change
	Jobs	Households	Housing Units	Surplus (Deficit)	in
	by 2020	by 2020	2005-2020	by 2020	Deficit
UC Berkeley Jobs	2,870	1,913			
Projected New Jobs in Primary EHA					
No 2020 LRDP Growth	52,889	35,259			
With 2020 LRDP Growth	55,759	37,172			
Projected New Housing in Primary EHA					
No 2020 LRDP Growth			23,298	(11,961)	
With 2020 LRDP Growth			23,498	(13,674)	+14%
<i>Potential Vacated Student Units in Private Market</i>				1,192	
With 2020 LRDP Growth/Adjusted for Vacated Student Units				(12,482)	+4%
Projected New Jobs in Secondary EHA					
No 2020 LRDP Growth	290,771	193,847			
With 2020 LRDP Growth	293,641	195,760			
Projected New Housing in Secondary EHA					
No 2020 LRDP Growth			140,015	(53,832)	
With 2020 LRDP Growth			140,215	(55,545)	+3%
<i>Potential Vacated Student Units in Private Market</i>				1,192	
With 2020 LRDP Growth /Adjusted for Vacated Student Units				(54,353)	+1%

Next, Primary and Secondary Employee Housing Areas (EHAs) were defined, as shown in Figures 4.10-1 and 4.10-2. The Primary EHA is defined as the census tracts where 50 percent of UC Berkeley employees currently reside, as well as any intermediary tracts within this boundary. The Secondary EHA includes the census tracts where 80 percent of employees currently reside, as well as any intermediate tracts. The inclusion of intermediate tracts assumes future employees would be willing to commute from any location within the limits established by current employee residential patterns.²⁷

Next, the analysis estimated the total number of new units that would be produced in the Primary and Secondary EHAs through 2020. The net new households in the EHAs through 2020, as estimated in ABAG's *Projections 2003*, was used as a proxy to estimate the construction of new housing units. The projected housing demand was then compared to the projected supply of new housing units in the Primary and Secondary EHAs, both without and with the 200 faculty/staff units proposed under the 2020 LRDP.

Even with no growth in employment due to the 2020 LRDP, both the Primary and Secondary EHAs are projected to generate significantly more new jobs than new housing units during the period 2000 to 2020. Thus, both the Primary and Secondary EHAs are projected to see housing deficits during this period. The additional jobs created through the 2020 LRDP would increase this deficit by up to 14 percent in the Primary EHA, and by up to 3 percent in the Secondary EHA.

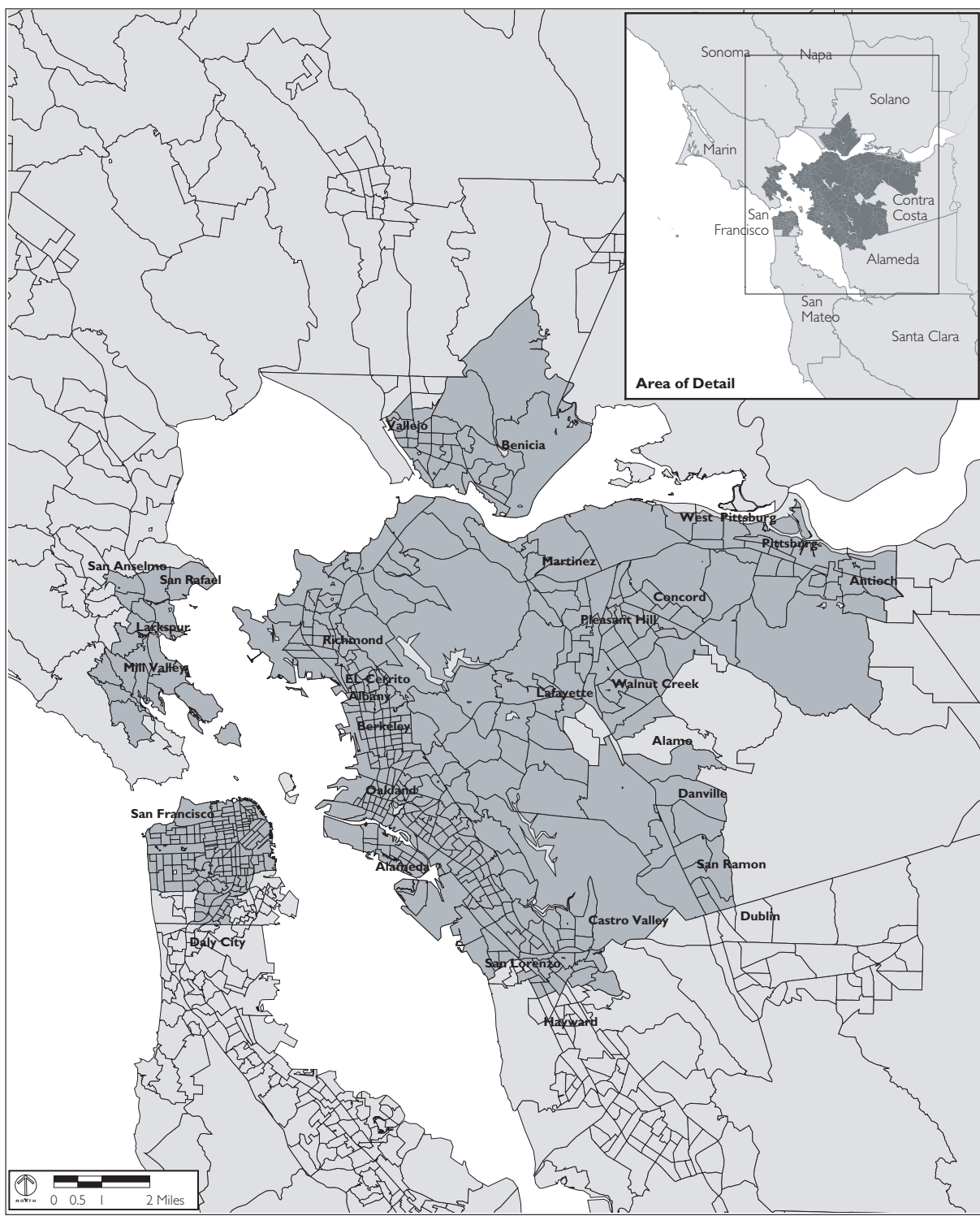


Source: Bay Area Economics, 2003

- City Boundaries
- Primary Employee Housing

The Primary Employee Housing Area is defined as the census tracts where 50 percent of UC Berkeley employees currently reside, and any intermediate tracts.

**FIGURE 4.10-1
PRIMARY EMPLOYEE HOUSING AREA**



Source: Bay Area Economics, 2003

Secondary Employee Housing Area

The Secondary Employee Housing Area is defined as the census tracts where 80 percent of UC Berkeley employees currently reside, and any intermediate tracts.

**FIGURE 4.10-2
SECONDARY EMPLOYEE HOUSING AREA**

As discussed above and shown in Table 4.11-7, full completion of the 2020 LRDP housing program, as well as the new student housing planned for University Village Albany, would also result in up to 1,192 housing units being vacated by students who move into new university housing. If these vacated units are taken into account, the 2020 LRDP would increase the projected 2020 housing deficit in the Primary EHA by only four percent rather than 14 percent, and by only one percent rather than three percent in the Secondary EHA.

The impact on jobs-housing balance in the Primary EHA is almost certainly overstated in this analysis, since it assumes that 100 percent of new UC Berkeley employees would seek housing in the Primary EHA, whereas only 50 percent of UC Berkeley employees live in the Primary EHA today. Therefore, while the projected imbalance in jobs and housing growth in the EHAs by 2020 – with or without the 2020 LRDP – is substantial, employment growth due to the 2020 LRDP is expected to account for no more than four percent of this imbalance in the Primary EHA, and no more than one percent of this imbalance in the Secondary EHA, if all of the aforementioned University housing is constructed.

4.10.8 TIEN CENTER IMPACTS

EFFECTS NOT FOUND TO BE SIGNIFICANT

The Initial Study found that the Chang-Lin Tien Center for East Asian Studies would have no significant impacts in regard to the following thresholds:

Would the project 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)?

Would the project displace substantial numbers of existing housing or people, requiring construction of replacement housing elsewhere?

The Initial Study determined that the Tien Center would house existing UC Berkeley staff and library services and would only accommodate small incremental increases in staff. The Tien Center proposal would not support and is not associated with an increase in enrollment. Altogether, 28 staff and 18 student workers would be housed in the Phase 1 building (East Asian Library).

The East Asian Library presently houses 23 permanent staff and about 18 student workers on average in Durant Hall, California Hall and CCSL. Thus, there would not be a significant increase in staff or student workers housed in the proposed East Asian Library, nor any secondary increase in employment induced by the project.

The Initial Study also determined that construction of the Tien Center would not require the displacement of people or housing. Consequently, the Initial Study concluded that no additional analysis of project-specific impacts of the Tien Center on population and housing is required in this EIR.

4.10.9 CUMULATIVE IMPACTS

This section evaluates whether the 2020 LRDP, in combination with other University and non-University projects which are reasonably foreseeable, would result in significant cumulative population or housing impacts.

This analysis considers cumulative growth as represented by the implementation of municipal general plans, implementation of the proposed Lawrence Berkeley National Laboratory 2004 LRDP, the draft Southside Plan, the AC Transit Major Investment Study, the proposed redevelopment of University Village Albany, and implementation of the 2020 LRDP, as described in section 4.0.5. The analysis incorporates growth anticipated by the Berkeley General Plan EIR and by previously certified UC Berkeley EIRs, including the Northeast Quadrant Science and Safety Projects (SCH 2001022038), Seismic Replacement Building 1 (SCH 99122065), and the Underhill Area Projects (SCH 99042051).

The geographic context for the analysis of cumulative population and housing impacts includes the 9-county Bay Region. While the increase in enrollment and employment at both UC Berkeley and Lawrence Berkeley National Laboratory would be concentrated on their respective sites, its impact on *residential* population growth would be dispersed throughout the Bay Region.

As shown in Figure 4.10-2, the area within which 80 percent of UC Berkeley employees reside extends into five counties. Moreover, this 80 percent includes many longtime UC Berkeley employees who purchased housing close to campus when it was far more reasonably priced. More recent employees have a more dispersed residential pattern, and it is likely future employees of UC Berkeley and Lawrence Berkeley National Laboratory would follow a similar pattern.

The significance of the potential cumulative population and housing impacts was determined based on the following standard, which is one of the two standards of significance presented in section 4.10.5. The other standard presented in 4.10.5 was found to have no potential for environmental impact in the 2020 LRDP Initial Study, and therefore no potential for a cumulatively considerable impact.

Standard: *Would the project 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 analysis in section 4.10.7 found this impact to be *less than significant* for the 2020 LRDP. The question posed in this section is twofold:

- Is the potential *cumulative* impact of the 2020 LRDP *and* other reasonably foreseeable projects under this standard significant?
- Is the contribution of the 2020 LRDP to this impact cumulatively considerable?

Cumulative Impact POP-1: The 2020 LRDP, in combination with other reasonably foreseeable projects, would directly induce population growth in the Bay Area, but the contribution of the 2020 LRDP would not be cumulatively considerable.

As described in section 4.10.7, UC Berkeley is expected to add up to 9,400 residents to the regional population due to implementation of the 2020 LRDP.

The Notice of Preparation for the Lawrence Berkeley National Laboratory 2004 LRDP anticipates an increase in population of 1,200 (including staff and guests) by 2025.²⁸ Since the Notice of Preparation does not identify the percentage of employees that could make up the proposed population increase, this analysis conservatively assumes 1,200 new employees. These new employees would in turn generate additional population growth due to new employee households. Conservatively assuming all these new employees would reside in the Bay Region, and an average household size equal to the regional average of 2.7, future growth of Lawrence Berkeley National Laboratory could generate up to 3,240 new Bay region residents.

Future development at University Village Albany (UVA) would not have a cumulative population impact beyond that already projected for the 2020 LRDP, since the net increase in units is planned to house single students, and these students are already counted in the projections of UC Berkeley student headcount under the 2020 LRDP.

ABAG's *Projections 2003* estimates population in the 9-county Bay Region would grow by roughly 1.4 million during the period 2000 through 2020. The Projections 2003 figures are assumed to reflect the magnitude and distribution of population growth represented in the general plans of local jurisdictions in the region. The additional cumulative growth that would occur through implementation of the new LRDPs for UC Berkeley and Lawrence Berkeley National Laboratory, up to 12,640 new residents, would represent an increase of less than one percent of the 2000-2020 *increment* of growth anticipated in Projections 2003.

While the projected 20% growth in the Bay Region population through 2020 could have significant environmental impacts, particularly to the extent it induces new development at the fringes of urbanized areas, the contribution of the 2020 LRDP to these potential impacts would not be cumulatively considerable.

4.10.10 REFERENCES

- ¹ *Campus Population Report for 2002/03*, April 1, 2003, correspondence from Vice Chancellor Horace Mitchell to City Manger Weldon Rucker.
- ² *City of Berkeley Draft General Plan Final EIR*, June 2001, page 48.
- ³ *University of California Accounting Manual*, Auxiliary Enterprises A-783-1, page 7.
- ⁴ City of Berkeley, *Planning Commission General Plan, Land Use Element*, December 2001, pages LU-15, LU-16, LU-20, and LU-21.
- ⁵ City of Berkeley, *Planning Commission General Plan, Housing Element*, December 2001, pages H-15 and H-16.
- ⁶ *City of Berkeley Draft General Plan EIR*, February 2001, page 66.
- ⁷ *City of Berkeley Draft General Plan Final EIR*, June 2001, pages 48-49.
- ⁸ *City of Berkeley Draft General Plan Final EIR*, June 2001, pages 34-35.
- ⁹ *City of Berkeley Draft General Plan EIR*, February 2001, page 66.

- ¹⁰ Rosenwald, Judah, UC Berkeley Extension, Personal Communication, 10 October 2003
- ¹¹ Kamlarz, Phil, City of Berkeley, Letter to UC Berkeley, 10 July 2003, documenting 2000 undercount of individuals in group quarters. Letter requests UC Berkeley to use 106,354 rather than 102,743 as the baseline 2000 population for Berkeley.
- ¹² Figures for total and group quarters population adjusted to reflect City request cited above.
- ¹³ *UC Berkeley Employee Database*, as of 28 February 2003.
- ¹⁴ UC Berkeley, Office of the Registrar, December 2003. Figures for student residences represent all students reporting addresses within the nine county Bay Region for academic year 2002-2003.
- ¹⁵ UC Berkeley, *Long Range Development Plan Draft Environmental Impact Report*, January 1990, table 4.14-2, page 4.14-6
- ¹⁶ ‘In design’ refers to housing proposed for University Village Albany. As described in Chapter 3, this project is outside the scope of the 2020 LRDP, and is being developed under its own Regents’ approved Master Plan and EIR.
- ¹⁷ Percentage of students in UC owned housing based on one student per family unit: in fact, the average is somewhat higher, so the 24 percent estimate is conservative.
- ¹⁸ The ‘in design’ category refers to housing proposed for University Village Albany. As described in Chapter 3, this project is outside the scope of the 2020 LRDP, and is being developed under its own Regents’ approved Master Plan and EIR.
- ¹⁹ Future university housing built under the auspices of the 2020 LRDP may employ a variety of models for ownership and operation, including but not limited to conventional university ownership and operation.
- ²⁰ UC Berkeley, http://www.housing.berkeley.edu/livingatcal/alternative_housing.html, retrieved January 28, 2004
- ²¹ A transit trip to Doe Library is defined as the time on the transit vehicle to the stop nearest to campus, with no transfers, plus the walking time from the stop to Doe Library.
- ²² *City of Berkeley Draft General Plan Final EIR*, June 2001, page 36.
- ²³ *City of Berkeley Draft General Plan Final EIR*, June 2001, pages 48-49.
- ²⁴ Lawrence Berkeley National Laboratory, *Revised Notice of Preparation: Draft Environmental Impact Report*, October 28, 2003, page 8.
- ²⁵ UC Berkeley, *Subsequent Focused Draft EIR for the University Village & Albany/Northwest Berkeley Properties Master Plan Amendments*, State Clearinghouse No. 1997072039, January 30, 2004, page 31.
- ²⁶ *UC Berkeley Student Housing and Transportation Survey*, Fall 2000. 2.7 represents the average household size in private housing units reported by undergraduates.
- ²⁷ Residential patterns of faculty and staff derived from the *UC Berkeley Employee Database*, as of February 28, 2003.
- ²⁸ Lawrence Berkeley National Laboratory, *Revised Notice of Preparation: Draft Environmental Impact Report*, October 28, 2003, page 7.

4.11 PUBLIC SERVICES

This chapter evaluates the potential physical and environmental impacts on public services, including police, fire protection and emergency services, schools, and recreation resulting from implementation of the 2020 LRDP and development of the Tien Center.

During the scoping process for this EIR, comments were received regarding each of the public services topics discussed herein. In general, the comments related to the ability of service providers to meet future demand for services that could result from implementation of the 2020 LRDP. Several comments were received regarding the potential impacts to the City of Berkeley Fire Department and impacts related to fire access to the Campus Park and Hill Campus. Comments were also received regarding the potential physical impacts of the 2020 LRDP on parks and on recreational amenities.

4.11.1 POLICE

4.11.1.1 ANALYTICAL METHODS

This analysis was prepared based on interviews with representatives of the police departments at UC Berkeley and the cities of Oakland and Emeryville, as well as a review of the Berkeley General Plan EIR and the general plans for all cities in the cumulative projects area. Current conditions, as described by the UC Police Department (UCPD) and documented in general plans, were compared to future conditions anticipated under the 2020 LRDP. The analysis considers potential impacts on police services that could result in new or altered police facilities that may cause significant environmental impacts.

4.11.1.2 REGULATORY FRAMEWORK

There are no federal or state police service regulations applicable to implementation of the 2020 LRDP or development of the Tien Center.

4.11.1.3 LOCAL PLANS AND POLICIES

Although the University is constitutionally exempt from local regulations when using its property in furtherance of its educational purposes, it is University policy to evaluate proposed projects for consistency with local plans and policies. Therefore, this section outlines the plans and policy goals of the cities of Berkeley and Oakland related to police services.

BERKELEY GENERAL PLAN

The Berkeley General Plan does not contain policies that address police services.

FINDINGS OF THE BERKELEY GENERAL PLAN EIR

The Berkeley General Plan EIR¹ concluded that policies encouraging increased commercial development and residential population in the Downtown as well as higher-density housing and commercial development in commercial and mixed use districts and along transit corridors and additional University housing could result in an increased demand for police services. Mitigation for this impact was to conduct an annual review to assess the need for additional police staffing and resources. No other impacts relative to police services were found. Because the EIR analyzed city-wide growth projections, no additional cumulative impacts were found.²

OAKLAND GENERAL PLAN

The Oakland General Plan contains policies that encourage the provision of police personnel, facilities and equipment commensurate with additional development and prioritizes improved police services for locations where existing service is deficient.³

4.11.1.4 EXISTING SETTING

CAMPUS PARK

Police services in the Campus Park are primarily provided by the University of California Police Department (UCPD). The UCPD is responsible for all UC properties (including those located in Albany, Emeryville, Oakland, and Richmond as well as Berkeley) and has jurisdiction within one mile around all UC properties. The UCPD has a staff of 65 sworn police personnel, 56 non-sworn personnel and 53 student personnel, including 48 Community Service Officers. The main UCPD office is located in Sproul Hall: its 27 vehicles are parked along Barrow Lane.⁴ The UCPD has no plans for adding new facilities at this time.⁵

Although UCPD has 65 sworn officers, it has a budget for 77 officer positions. This means that in the near future UCPD could hire an additional 12 officers. The current ratio of officers per 1,000 population is 1.2.⁶ The UCPD's goal for service ratios is 1.5 officers per 1,000 campus population.⁷

In emergency situations that require an immediate response, the City of Berkeley Police Department assists the UCPD as necessary through a mutual aid agreement.⁸ Average response time for calls for service is less than five minutes for priority 1 crimes: calls involving actual or threatened injury to people, violent crimes in progress, etc..⁹

ADJACENT BLOCKS AND SOUTHSIDE

The UCPD and the City of Berkeley Police Department (BPD) share policing responsibility for the Adjacent Blocks and Southside. As part of their mutual aid agreement, two UCPD officers and two BPD police officers patrol Telegraph Avenue on a regular basis. The UCPD patrols the Southside on foot and bike five days each week. In addition, two UCPD officers patrol the fraternities and sororities in the Southside.¹⁰

The BPD has a staff of 194 sworn officers,¹¹ or roughly 1.82 authorized officers per 1,000 residents. Standard response time for Priority 1 calls is five minutes.¹² The BPD headquarters are located in the Public Safety Building on Martin Luther King Jr Way at Center Street, which opened in September 2000.

UCPD and BPD partner to ensure appropriate service levels in areas proximate to the campus and coordinate at many levels. The patrol captains from each department confer several times a week about upcoming events, coverage and other relevant issues. The chiefs also confer regularly. At a more operational level, the patrol supervisors and/or watch commanders also meet regularly regarding particular events and coverage.¹³ An existing written agreement assigns ten campus officers on a full time basis to work jointly with the city in the areas around campus.¹⁴

HILL CAMPUS

UCPD provides police services to the Hill Campus. Since 1987, UCPD's patrol responsibility for the Hill Campus has been supplemented by Community Service Officers,

who patrol trails, acting as high-visibility safety monitors and first-aid providers. Typical problems occurring along the trails in the Hill Campus include sign vandalism or theft; prohibited mountain bike use; conflicts between cyclists, pedestrians, joggers and/or pet owners; and illegal use of motorized vehicles.

LRDP HOUSING ZONE

The portion of the LRDP Housing Zone located in Berkeley is served by the BPD, which is described above under “Adjacent Blocks and Southside.” The portion of the LRDP Housing Zone located in Oakland is served by the Oakland Police Department (OPD), in police beats 10Y, 11X, 12X and 12Y. These four beats have a total of nine sworn officers and six vehicles. The total sworn OPD personnel is 784, or approximately 1.96 officers per 1,000 residents. Average response time in Oakland is between five and ten minutes.¹⁵ OPD headquarters is located at 7th Street and Broadway in downtown Oakland.

4.11.1.5 STANDARDS OF SIGNIFICANCE

The significance of the potential impacts of the 2020 LRDP and Tien Center on police services was determined based on the following standard:

Standard: Would the project result in the provision of new or altered police facilities in order to maintain acceptable service ratios or other established performance objectives, the construction of which could cause significant environmental impacts?

4.11.1.6 POLICIES AND PROCEDURES GUIDING FUTURE PROJECTS

2020 LRDP

Review of individual projects under the 2020 LRDP would influence public services impacts by guiding the location, scale, form and design of new University projects. Four of the Objectives described in Chapter 3.1 are particularly relevant to public services:

- **Provide the housing, access, and services we require to support a vital intellectual community and promote full engagement in campus life.**
- **Stabilize enrollment at a level commensurate with our academic standards and our land and capital resources.**
- **Plan every new project to respect and enhance the character, livability, and cultural vitality of our City Environs.**
- **Maintain the Hill Campus as a natural resource for research, education, and recreation, with focused development on suitable sites.**

These 2020 LRDP objectives indirectly affect the demand for police services, but there are no specific policies regarding these services.

CAMPUS POLICIES AND PROCEDURES

CAMPUS PLAN REVIEW. The plan check and design review process would continue to minimize police service impacts of development under the 2020 LRDP. Through this process, the UCPD completes a plan review of all proposed University buildings to maximize public safety features in and around proposed buildings.¹⁶

TECHNICAL REVIEW COMMITTEE. The UCPD also participates on the campus Technical Review Committee (TRC). TRC meets monthly to review and coordinate administrative unit activities around construction planning. Through participation on TRC, UCPD can plan service levels and plan around service interruptions to maximize public safety.

4.11.1.7 2020 LRDP IMPACTS

This section describes the potential police service impacts of the 2020 LRDP based on the Standards of Significance, whether they are significant or less than significant, and whether any significant impacts can be mitigated to less than significant levels.

LESS THAN SIGNIFICANT IMPACTS

LRDP Impact PUB-1.1: Implementation of the 2020 LRDP could increase the demand for police services, but is not anticipated to result in construction of new or altered facilities.

The 2020 LRDP could have both direct and indirect effects on the need for police services facilities. Direct effects may occur as a result of new University facilities and the people they accommodate. Indirect effects may occur through employment-related growth and the resulting increase in regional population. Direct effects would be confined to UC Berkeley and to the cities of Berkeley and Oakland, in which all new University projects under the 2020 LRDP would be located.

UCPD. As noted above, the UCPD's goal for service ratios is 1.5 officers per 1,000 campus population. Based on the projected campus headcount of 51,260 in 2020-2021, and assuming that the 12 existing budgeted officer positions were filled, UCPD would meet its stated goal. The UCPD has no plans for facility expansion commensurate with filling the budgeted sworn personnel positions,¹⁷ so no physical impacts from this staff expansion would occur. Growth in the Southside, Adjacent Blocks and Hill Campus under the 2020 LRDP can be accommodated by UCPD if it fills the existing budgeted officer positions. Thus, no significant impacts to UCPD are expected.

BPD. The Berkeley General Plan EIR found the demand for police services could increase as the result of higher density residential and commercial development, to be mitigated through an annual review of staff and resource needs. Since UCPD would be responsible for police services within the Campus Park and Hill Campus, and would continue to partner with the city in providing services to the Adjacent Blocks and Southside, no new BPD facilities are anticipated as a result of the 2020 LRDP. However, police service impacts on the BPD would be further mitigated by the following best practice:

Continuing Best Practice PUB-1.1: UCPD would continue its partnership with the City of Berkeley police department to review service levels in the City Environs.

OPD. The Oakland Police Department has indicated that 2020 LRDP development would not require development of new police facilities.¹⁸

OTHER CITIES. As explained in chapter 4.10, the projected UC Berkeley employment related growth under the 2020 LRDP is 7,750 individuals: 2,870 employees times the average regional household size of 2.7. Together with the projected increase in regular

terms enrollment of 1,650 students, the 2020 LRDP could cause a net increase of up to 9,400 in the regional population. If this entire increment is assumed to represent a net increase in population, it would account for less than 0.1 percent of additional growth beyond the year 2020 estimate by ABAG Projections 2003 for the 9-county Bay Region. However, this figure overstates the actual likely impact, since some percentage of this employment related growth is likely to be absorbed within the pool of existing Bay Region residents.

Based on current residential patterns shown in table 4.10-4, roughly 25 per cent of the employment-related increment could reside in Berkeley and another 16 percent in Oakland and Piedmont. Another 17 percent of this increment, or up to 1,318 individuals, could reside in Albany, Alameda, El Cerrito, Emeryville, Kensington and Richmond, equal to 0.5 percent of additional growth beyond year 2020 estimates. The balance of 2020 LRDP employment-related growth, up to 3,254 individuals, would be distributed throughout the balance of the Bay Region. These increments in themselves are not anticipated to result in construction of new or altered police facilities.

4.11.1.8 TIEN CENTER IMPACTS

The Tien Center project would be built within the Campus Park boundaries and would be served by UCPD. UCPD does not anticipate any impacts to provision of police services related to increases in campus headcount. Thus any police impacts due to the construction of the Tien Center would be *less than significant*.

4.11.2 FIRE PROTECTION AND EMERGENCY SERVICES

The section describes existing conditions and potential impacts relating to the provision of fire protection and emergency services to the 2020 LRDP area and the Tien Center.

4.11.2.1 ANALYTICAL METHOD

This analysis was prepared based on interviews with representatives of city fire departments and the Alameda County Fire Department, which provides service under contract to LBNL, as well as a review of the Berkeley General Plan EIR and the general plans for all cities in the cumulative projects area. Current conditions, as described by the fire departments and documented in general plans and other sources, were compared to future conditions anticipated under the 2020 LRDP.

The analysis considers potential impacts on fire and emergency services that could result from a significant risk involving wildland fires; interference with an adopted emergency response or evacuation plan; inadequate emergency access; or new or altered fire or emergency medical service facilities that may cause significant environmental impacts.

4.11.2.2 REGULATORY FRAMEWORK

There are no federal regulations regarding fire safety.

State fire regulations are set forth in Sections 13000 et seq of the California Health and Safety Code, which include regulations concerning building standards (as also set forth in the California Building Code), fire protection and notification systems, fire protection devices such as extinguishers and smoke alarms, high-rise building and childcare facility

standards, and fire suppression training. The State Fire Marshal enforces these regulations and building standards in all state-owned buildings, state-occupied buildings, and state institutions throughout California, including the University of California.

Fire fuel management in the Hill Campus must comply with environmental protection regulations, including the Clean Air Act, the Clean Water Act, the Endangered Species Act, the Migratory Bird Treaty Act, and is coordinated with many agencies for the protection of Hill Campus resources and special status species. Chapter 4.3, Biological Resources, contains additional information about these regulations. The Hill Campus is also subject to Title 19 of the California Code of Regulations, which mandates fire-breaks of up to 100 feet around buildings or structures in, upon or adjoining any mountainous, forested, brush- or grass-covered lands.¹⁹

4.11.2.3 LOCAL PLANS AND POLICIES

Although the University is constitutionally exempt from local regulations when using its property in furtherance of its educational purposes, it is University policy to evaluate proposed projects for consistency with local plans and policies. Therefore, this section outlines the plans and policy goals of the cities of Berkeley and Oakland related to fire and emergency services.

BERKELEY GENERAL PLAN

Berkeley General Plan policies require inclusion of fire prevention features in new construction; support of existing mutual aid efforts; implementation of fire safety programs; and reduction of fire hazard risks in existing developed areas by improving fire fighting infrastructure and maintaining private property.²⁰ The Plan also identifies 750 existing hillside residences near and adjacent to wildland areas as vulnerable to wildfires. As part of Policy S-22 to reduce fire hazards in existing developed areas, the General Plan includes a policy to build a new hill area fire station with wildland firefighting equipment and ability.²¹

FINDINGS OF THE BERKELEY GENERAL PLAN EIR

The Berkeley General Plan EIR concluded that policies encouraging increased commercial development and residential population in the Downtown as well as higher-density housing and commercial development in commercial and mixed use districts and along transit corridors, and additional University housing, could result in increased demand for fire services. Approximately 708 additional emergency and non-emergency calls were assumed based on 2020 population levels and current calls-per-resident ratios.²²

Mitigation measures for this impact include Berkeley Fire Department (BFD) review of development projects to prevent additional fire safety hazards, and an annual assessment of service capacity to determine whether additional staffing or impact fees are required to support fire services.²³ The Berkeley General Plan EIR found the construction of a new hill area fire station could result in direct or indirect environmental impacts, but that any such impacts would be evaluated in project-specific CEQA review.²⁴ However, the EIR also found "...The Draft General Plan does not require the expansion of police, fire, solid waste, or health and support services to support growth projected by the Draft General Plan."²⁵

OAKLAND GENERAL PLAN

The Oakland General Plan contains policies that encourage the provision of fire personnel, facilities and equipment commensurate with additional development; distribute public services to meet the needs of City residents; encourage balance of needs for additional housing with impacts to emergency response capabilities; prioritize improved fire services for locations where existing service is deficient.²⁶

4.11.2.4 EXISTING SETTING

CAMPUS PARK, ADJACENT BLOCKS AND SOUTHSIDE

This section describes existing conditions with respect to both fire and emergency services and hazardous materials emergency response on and around the Campus Park.

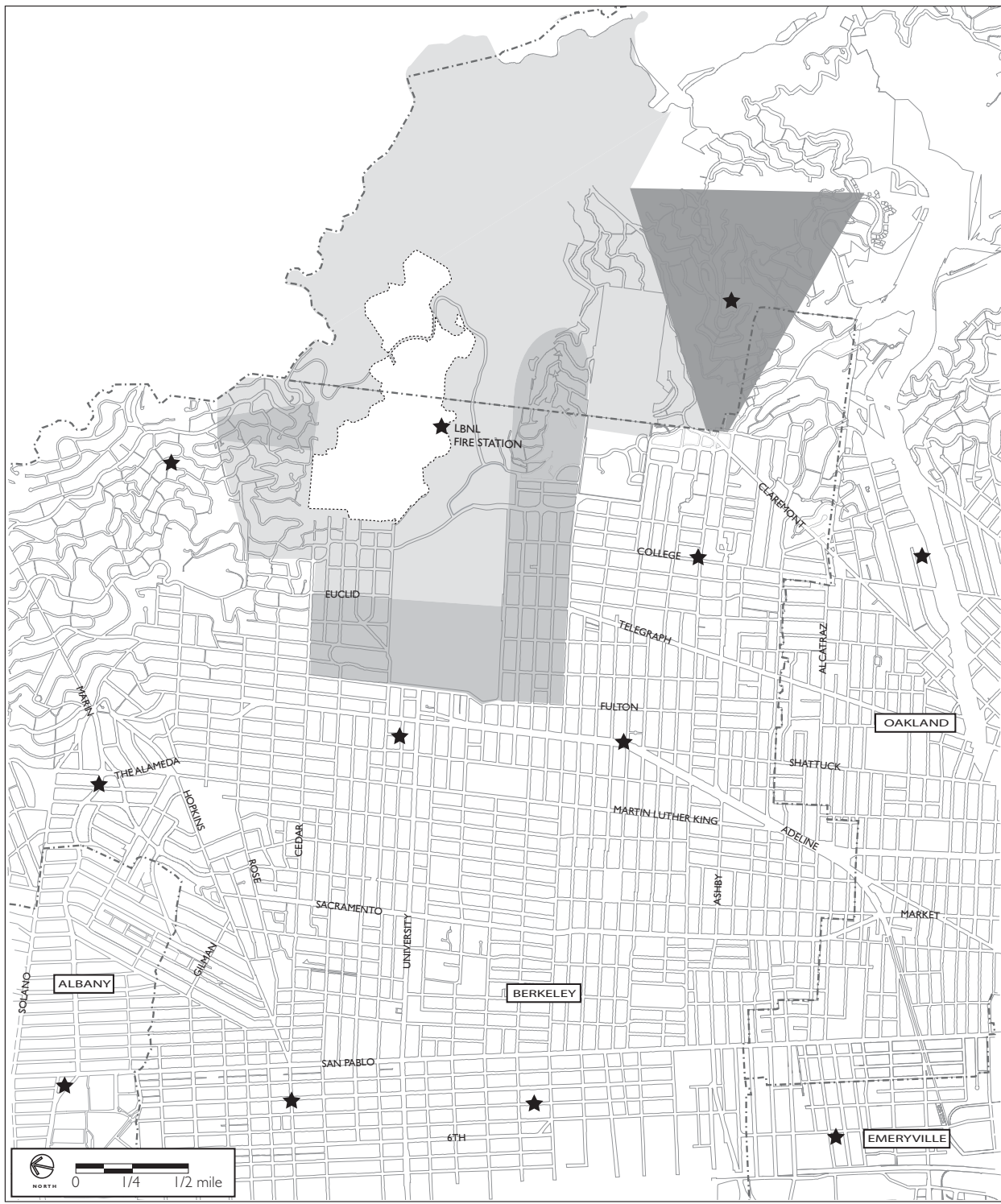
FIRE AND EMERGENCY MEDICAL SERVICE. BFD provides fire protection and emergency medical services to the western half of the Campus Park and to the Adjacent Blocks and Southside. Primary response to the campus area from BFD comes from Station Number 2 at 2129 Berkeley Way. Stations 3 and 5 at 2710 Russell Street and 2680 Shattuck Avenue, respectively, offer supplemental support. The average BFD response time throughout the city is four minutes.²⁷

In January 2002, the City of Berkeley completed its Final EIR for a new Hills Fire Station, to be located at 3000 Shasta Road, to replace the existing fire station at Shasta and Queens Roads. The new Hills Station will have the capacity for four fire response vehicles, compared to the single fire response vehicle housed at the existing station.²⁸

The BFD services include fire fighting and rescue and emergency response services for immediate threats to life, as well as fire prevention and training and hazardous materials control. In 1999, the BFD had 124 full-time professional fire fighters, including 33 certified paramedics. In 1999, the BFD responded to 10,875 calls, 62 percent of which were EMS calls (life support ambulance services provided by paramedics). Average response time for priority one non-EMS calls is four minutes.²⁹

The University and the City partner to ensure adequate fire and emergency service levels are maintained. Since 1990, UC Berkeley has funded purchase by BFD of a hazardous materials response vehicle, contributed funds toward purchase of a pumper truck and a wildland fire-fighting vehicle, and paid for annual trainings for BFD staff.

Since August 2002, the Alameda County Fire Department (ACFD) has been responsible for first response to calls on the eastern half of the Campus Park, as part of its contract for service to LBNL.³⁰ ACFD Station #19 at LBNL operates one fire engine, one reserve engine, one grass patrol vehicle, and one hazardous materials response truck. Four ACFD personnel are located at Station #19 (one captain, one engineer, and two fire fighters), with at least one of the personnel being a paramedic. Average ACFD response time to the Campus Park is approximately three to four minutes.³¹ ACFD and the BFD have an automatic aid agreement, establishing the geographic area of first response for each agency. Figure 4.11-1 shows the first response area for the ACFD unit at LBNL.



Source: LBNL/Berkeley Fire Department, Automatic Aid District Map, no date; personal communication with Don Bell, LBNL, March 30 & 31, 2004.

RESPONSE AREAS FOR LBNL FIRE STATION

- First Response**
- Second Response**
- Third Response**
- City Limit Line**
- Lawrence Berkeley National Laboratory Boundary**
- ★ **Fire Station**

FIGURE 4.11-1
**RESPONSE AREAS FOR
 LBNL FIRE STATION**

UC Berkeley directly employs fire marshals who are responsible for fire prevention activities, including fire and life safety inspections of campus buildings for code compliance, fire and evacuation drills, and development of self-help educational materials for use by residence halls and campus departments. Fire marshals also assist in arson investigations and also serve as liaisons between responding agencies at the local, state and federal levels.³²

HAZARDOUS MATERIALS EMERGENCY RESPONSE. The UC Berkeley Environmental Health and Safety Department Emergency Response Team (ERT), staffed by health and safety professionals, hazardous materials technicians, and licensed hazardous materials drivers, responds to most hazardous materials incidents reported on campus. Currently, the ERT is able to respond to an incident within 15 minutes. In the infrequent cases when outside assistance is required, the ERT may request assistance from other nearby agencies, including the BFD and ACFD, or from emergency response contractors.

HILL CAMPUS

The Hill Campus is a largely unimproved wildland. Due to its fire-ecology vegetation and topography, this urban-edge area is subject to wildfire dangers.³³ UC Berkeley works to proactively address fire fuel risk management in the Hill Campus,³⁴ and it also participates in the Hills Emergency Forum, a multi-agency organization which coordinates fuel management, emergency preparedness, and evacuation planning in this portion of the East Bay Hills. The Forum includes the California Department of Forestry, the Cities of Berkeley, Oakland and El Cerrito, East Bay Municipal Utility District, East Bay Regional Park District, Lawrence Berkeley National Laboratory, and UC Berkeley.

The ACFD, described above, provides emergency fire and medical protection services for the Hill Campus. Although the cities of Oakland and Berkeley are technically responsible for that portion of the Hill Campus located in each of their jurisdictions, ACFD Station #19 is the first responder to calls in the Hill Campus because of its proximity. Current average response times for ACFD are two minutes in the Hill Campus.

LRDP HOUSING ZONE

Fire protection and emergency medical services for the portion of the LRDP Housing Zone located in Berkeley are furnished by the BFD, as described above.

Fire protection and emergency medical services for the portion of the LRDP Housing Zone located in Oakland are furnished by the City of Oakland Fire Department. The fire stations that are the first responders to fire or EMS calls for the portion of the LRDP Housing Zone located in Oakland are³⁵:

- Station #5, located on 34th Street between Market Street and San Pablo Avenue.
- Station #8, located at 51st Street near Telegraph Avenue.
- Station #19, located at Miles Avenue near College Avenue.

These stations have a total of five vehicles and 17 staff, including a minimum of one paramedic at each station.³⁶ Response time ranges from three to five minutes per call in the Oakland portion of the LRDP Housing Zone. The Oakland Fire Department responds to over 55,000 calls for service per year, 75 percent of which are EMS-related.³⁷

4.11.2.5 STANDARDS OF SIGNIFICANCE

The significance of the potential impacts of the 2020 LRDP and Tien Center on fire protection and emergency services was determined based on the following standards:

Standard: Would the project expose people or structures to a significant risk of loss, injury or death involving wildland fires?

Standard: Would the project impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?

Standard: Would the project result in the provision of new or altered fire or emergency services facilities in order to maintain acceptable service ratios or other established performance objectives, the construction of which could cause significant environmental impacts?

Standard: Would the project result in inadequate emergency access?

4.11.2.6 POLICIES AND PROCEDURES GUIDING FUTURE PROJECTS

This section describes existing policies and procedures that would help to minimize fire and emergency services impacts of development under the 2020 LRDP. It describes both the policies in the 2020 LRDP itself and other University agreements affecting fire protection and emergency services.

2020 LRDP

Review of individual projects under the 2020 LRDP would influence public services impacts by guiding the location, scale, form and design of new University projects. Four of the Objectives described in Chapter 3.1 are particularly relevant to public services:

- **Provide the housing, access, and services we require to support a vital intellectual community and promote full engagement in campus life.**
- **Stabilize enrollment at a level commensurate with our academic standards and our land and capital resources.**
- **Plan every new project to respect and enhance the character, livability, and cultural vitality of our City Environs.**
- **Maintain the Hill Campus as a natural resource for research, education, and recreation, with focused development on suitable sites.**

In addition to the above Objectives, the 2020 LRDP includes the following specific Hill Campus policies related to fire protection that would direct project specific review:

- Manage the Hill Campus landscape to reduce fire risk and restore native vegetation.
- Establish a management authority for the Ecological Study Area in the Hill Campus.

One role of this authority, as stated in the LRDP, would be to collaborate with other campus service units to implement management practices that both reduce fire risk and help restore a mosaic of native vegetation.

CAMPUS POLICIES AND PROCEDURES

PLAN REVIEW AND CONSTRUCTION INSPECTION. The Office of Environmental Health and Safety Fire Prevention Division participates in the pre-planning of new structures to incorporate necessary fire prevention measures and to implement fire prevention guidelines. The Fire Prevention Division uses trained campus fire marshals who approve building plans and inspect construction activities on campus. Campus fire marshals also grant final occupancy to buildings when they are substantially complete in accordance with approved plans. Under this program, campus fire marshals work closely with campus units and outside contractors to ensure that campus construction complies with State fire and building codes.

All projects at UC Berkeley require consultation with the Campus Fire Marshal through the Campus Fire Prevention Division's Project Review Process.³⁸ In the Hill Campus, landscaping plans are also reviewed for appropriate vegetation management and fire buffers by the Campus Fire Marshal in accordance with Title 19 of the California Code of Regulations.

CAMPUS WILDLAND FIRE PREVENTION PROGRAM. The Campus Wildland Fire Prevention Program has been managed by the Physical Plant Campus Services Department since 1991. The Director of Emergency Preparedness in UCPD oversees actions prescribed by the Hill Area Fire Fuel Management Program. The focus of this program is fire prevention through fuel reduction and fire hazard minimization in the Hill Campus wildland area.

CAMPUS FIRE MITIGATION COMMITTEE. The mission of the campus Fire Mitigation Committee is to coordinate the actions of campus units with regard to fire hazard management; recommend policy and strategies to reduce fire hazards in the wildland/urban interface areas; recommend measures to reduce fire hazards in the Hill Campus; and verify that the program is implemented and is effective in reducing fire hazard risks.³⁹

4.11.2.7 2020 LRDP IMPACTS

This section describes the potential fire protection and emergency services impacts of the 2020 LRDP based on the Standards of Significance, whether they are significant or less than significant, and whether any significant impacts can be mitigated to less than significant levels.

LESS THAN SIGNIFICANT IMPACTS

LRDP Impact PUB-2.1: Implementation of the 2020 LRDP would result in limited new development in the Hill Campus, but would not expose people or structures in the Hill Campus to a significant risk of loss, injury or death involving wildland fires.

As shown in Table 3.1-3, over 95 percent of the projected development under the 2020 LRDP is allocated to urbanized areas not subject to wildland fires. However, development under the 2020 LRDP could include up to 100,000 GSF and up to 100 units of housing suitable for faculty, staff, and visiting scholars in or near wildland areas in the Hill Campus.

2020 LRDP development in the Hill Campus would be concentrated on sites already served by existing roads and infrastructure, adjacent to already developed sites, in the areas designated as ‘Research’, ‘H1’ and ‘H2’ in Figure 3.1-10. Some very limited construction may also occur in the Botanical Garden and Strawberry Canyon Recreation Area to expand or replace existing facilities.

UC Berkeley has a number of ongoing activities to reduce the risk of wildfires in the Hill Campus which are enumerated below as Continuing Best Practices.⁴⁰

Continuing Best Practice PUB-2.1-a: UC Berkeley would continue to comply with Title 19 of the California Code of Regulations, which mandates firebreaks of up to 100 feet around buildings or structures in, upon or adjoining any mountainous, forested, brush- or grass-covered lands.⁴¹

Continuing Best Practice PUB-2.1-b: UC Berkeley would continue ongoing implementation of the Hill Area Fire Fuel Management program.

Continuing Best Practice PUB-2.1-c: UC Berkeley would continue to plan and implement programs to reduce risk of wildland fires, including plan review and construction inspection programs that ensure that campus projects incorporate fire prevention measures.

Continuation of these fire prevention activities would result in a *less than significant* impact with regard to wildland fires.

LRDP Impact PUB-2.2: Implementation of the 2020 LRDP would not impair or interfere with an adopted emergency response plan or emergency evacuation plan.

The campus Office of Emergency Preparedness has prepared a multi-hazard disaster response plan and handbook, and regularly conducts trainings and updates rosters to maintain readiness in the event of an emergency. Most of the disaster response program is structured at a campus-wide level, and organizes people and departments to respond, regardless of the number or location of individual buildings. As required by the California Building Code, new buildings would be planned to include adequate egress capability, and evacuation areas proximate to building load for decanting. Therefore, development under the 2020 LRDP would not impair or interfere with campus emergency response or emergency evacuation plans.

New development under the 2020 LRDP would occur in areas which are within the service range of the campus ERT and other emergency response agencies, and adjacent to other developed sites. Because the nature of the on-site activities that could trigger emergency response would not represent a substantial change relative to current activities, and control programs to avoid and reduce the potential for emergencies would continue, implementation of the 2020 LRDP would not exceed emergency response capabilities.⁴²

LRDP Impact PUB-2.3: Implementation of the 2020 LRDP could increase the demand for fire and emergency services, but is not anticipated to result in construction of new or altered facilities.

The 2020 LRDP could have both direct and indirect effects on the need for fire and emergency services. Direct effects may occur as a result of new University facilities and the people they accommodate. Indirect effects may occur through employment-related growth and the resulting increase in regional population. Direct effects would be confined to the cities of Berkeley and Oakland, in which all new University projects under the 2020 LRDP would be located.

BFD. The Berkeley General Plan EIR indicates that projected future development in the City of Berkeley, which includes an allowance for development at UC Berkeley,⁴³ could increase demand for fire and emergency services: it projects an increase of 708 calls, or 6.5 percent, by 2020 as a result of growth projected under the Berkeley General Plan.⁴⁴ The Berkeley General Plan EIR mitigates this increased demand by requiring an annual evaluation of BFD staffing levels and development trends to determine whether additional staffing or impact fees are needed to support fire services.⁴⁵

In January 2002, the City of Berkeley completed its Final EIR for a new Hills Fire Station, to be located at 3000 Shasta Road, to replace the existing fire station at Shasta and Queens Roads. The new Hills Station will have the capacity for four fire response vehicles, compared to the single fire response vehicle housed at the existing station.⁴⁶

The construction anticipated under the 2020 LRDP would increase both the number of jobs in Berkeley and the number of Berkeley residents. However, in both instances the growth is only a fraction of that anticipated by the Berkeley General Plan EIR. Compared to its projected citywide increase of 10,895 jobs by 2020,⁴⁷ the 2020 LRDP anticipates up to 2,870 new UC Berkeley jobs, or 26 percent.

Growth in Berkeley residents due to the 2020 LRDP is harder to predict, since it depends on the dynamics of the housing supply as well as demand. As explained in 4.10, the increase in Berkeley residents due directly to University student housing constructed under the 2020 LRDP could be as much as 2,500. With respect to job-related growth, 25 percent of UC Berkeley employees currently reside in Berkeley. Should this pattern continue, at the regional average household size of 2.7 the 2020 LRDP could result in up to 1,937 new Berkeley residents ($2,870 \times .25 \times 2.7$), for a total increase of up to 4,437, or 64 percent, of the projected citywide increase of 6,955 residents by 2020 in the Berkeley General Plan.⁴⁸

However, these figures overstate the actual likely impact, since a substantial percentage of job-related growth is likely to be absorbed within the pool of existing residents. They also assume each new employee represents a potential new household: this also overstates the actual likely impact, since it does not account for households with more than one UC Berkeley employee.

The growth in Berkeley jobs and residents directly resulting from the 2020 LRDP, therefore, would account for at most only a fraction of the citywide growth in service demand projected in the Berkeley General Plan EIR, and is thus not in itself likely to require the construction of new or altered fire or emergency service facilities, particularly since a portion of the demand caused by the 2020 LRDP would be served by ACFD.

ACFD. ACFD's services to LBNL are provided on a contract basis. ACFD would not add staff, expand facilities, or purchase new equipment in response to future campus growth alone. ACFD would only provide additional services to the campus if these were requested by LBNL. Any new staff or equipment made necessary by additional service requests by LBNL would be addressed in the contract for services.⁴⁹

Implementation of the 2020 LRDP could place additional service demands on the BFD and/or ACFD. However, service demands are not anticipated to require new or altered facilities. The following Continuing Best Practice would ensure the impacts under this Standard of Significance are *less than significant*.

Continuing Best Practice PUB-2.3: UC Berkeley would continue its partnership with LBNL, ACFD, and the City of Berkeley to ensure adequate fire and emergency service levels to the campus and UC facilities.

OFD. The fire department in the City of Oakland indicated that the development under the 2020 LRDP would not require construction of additional fire facilities.⁵⁰

OTHER CITIES. As explained in chapter 4.10, the projected UC Berkeley employment related growth under the 2020 LRDP is 7,750 individuals: 2,870 employees times the average regional household size of 2.7. Together with the projected increase in regular terms enrollment of 1,650 students, the 2020 LRDP could cause a net increase of up to 9,400 in the regional population. If this entire increment is assumed to represent a net increase in population, it would account for less than 0.1 percent of additional growth beyond the year 2020 estimate by ABAG Projections 2003 for the 9-county Bay Region. However, this figure overstates the actual likely impact, since some employment related growth is likely to be absorbed within the pool of existing Bay Region residents.

As described above, roughly 25 per cent of the employment-related increment could reside in Berkeley and another 16 percent in Oakland and Piedmont. Another 17 percent of this increment, or up to 1,318 individuals, could reside in Albany, Alameda, El Cerrito, Emeryville, Kensington and Richmond, equal to 0.5 percent of additional growth beyond year 2020 estimates. The balance of 2020 LRDP employment-related growth, up to 3,254 individuals, would be distributed throughout the balance of the Bay Region. Except as noted above, these increments in themselves are not anticipated to result in construction of new or altered fire or emergency services facilities.

SIGNIFICANT IMPACTS AND MITIGATION MEASURES

LRDP Impact PUB-2.4: Implementation of the 2020 LRDP could temporarily result in emergency access constraints, but the mitigations described below would reduce this impact to *less than significant*.

As discussed in Chapter 4.12, the increase in campus population related to the 2020 LRDP would increase roadway congestion compared to existing conditions. Without mitigation, degraded levels of service at intersections serving the campus could result in inadequate emergency access. Proposed mitigation measures for these impacts are described in detail in Chapter 4.12, and include the University working with the City of Berkeley to design and install signals and change lane configurations at the affected intersections. Construction-related road closures could also influence emergency access.

The following mitigation measures and best practice would be implemented to reduce this impact to a *less than significant* level.

LRDP Mitigation Measure PUB-2.4-a: In order to ensure adequate access for emergency vehicles when construction projects would result in temporary lane or roadway closures, campus project management staff would consult with the UCPD, campus EH&S, the BFD and ACFD to evaluate alternative travel routes and temporary lane or roadway closures prior to the start of construction activity. UC Berkeley will ensure the selected alternative travel routes are not impeded by UC Berkeley activities.

LRDP Mitigation Measure PUB-2.4-b: To the extent feasible, the University would maintain at least one unobstructed lane in both directions on campus roadways at all times, including during construction. At any time only a single lane is available due to construction-related road closures, the University would provide a temporary traffic signal, signal carriers (i.e. flagpersons), or other appropriate traffic controls to allow travel in both directions. If construction activities require the complete closure of a roadway, UC Berkeley would provide signage indicating alternative routes.

Continuing Best Practice PUB-2.4: To the extent feasible, for all projects in the City Environs, the University would include the undergrounding of surface utilities along project street frontages, in support of Berkeley General Plan Policy S-22.

4.12.2.8 TIEN CENTER IMPACTS

This section describes the potential fire and emergency service impacts of the Chang Lin Tien Center for East Asian Studies based on the Standards of Significance, whether they are significant or less than significant, and whether any significant impacts can be mitigated to less than significant levels. Chapter 4.0 includes further explanation about this project-level analysis as it relates to CEQA and the 2020 LRDP.

EFFECTS FOUND NOT TO BE SIGNIFICANT

The Tien Center would be located in the Campus Park, which has minimal risk of wildland fire. The Initial Study⁵¹ found that no additional analysis of the Tien Center project would be necessary with respect to the following threshold:

Would the project expose people or structures to a significant risk of loss, injury or death involving wildland fires?

LESS THAN SIGNIFICANT IMPACTS

Tien Center Impact PUB-2.1: As a project implementing the 2020 LRDP, the Tien Center project would not result in the need for new or physically altered fire or emergency medical services facilities.

No additional analysis of the above impact is required since the Tien Center would fall within the overall development parameters of the 2020 LRDP.

Tien Center Impact PUB-2.2: As a project implementing the 2020 LRDP, the Tien Center project would not impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan.

The Tien Center would not be sited in a location that would interfere with evacuation routes from campus. The Tien Center would be required to comply with the campus Disaster Response Plan, which includes developing a Building Emergency Plan for each campus building.

Tien Center Impact PUB-2.3: As a project implementing the 2020 LRDP, the Tien Center project would not result in inadequate emergency access.

The Tien Center would be constructed to meet the requirements of the California Building Code. Additionally, the Campus Fire Marshal would review the building and site plans, in collaboration with the BFD, to ensure that adequate emergency access is provided, both to the Tien Center itself and to the interior of the Campus Park.

4.11.3 SCHOOLS

The section describes existing conditions and potential impacts relating to schools in the 2020 LRDP area. The Tien Center project would not have any impacts on schools.

4.11.3.1 ANALYTICAL METHODS

Impacts on schools were determined by analyzing the projected increase in the demand for schools as a result of development under the 2020 LRDP and comparing the projected increase with the existing capacity at local schools to determine whether new or altered facilities would be required. On average, the Oakland Unified School District (OUSD) estimates that each new household unit produces the need to accommodate 0.53 students. The Berkeley Unified School District (BUSD) does not have estimates of the number of students generated by each new housing unit. BUSD suggested use of the pupil generation rate developed for Kensington by the West Contra Costa Unified School District as an approximation: 0.5 students per housing unit.⁵²

4.11.3.2 REGULATORY FRAMEWORK

There are no federal or state regulations pertaining to schools applicable to the 2020 LRDP.

4.11.3.3 LOCAL PLANS AND POLICIES

Although the University is constitutionally exempt from local regulations when using its property in furtherance of its educational purposes, it is University policy to evaluate proposed projects for consistency with local plans and policies. Therefore, this section outlines the plans and policy goals of the cities of Berkeley and Oakland related to schools.

BERKELEY GENERAL PLAN

The Berkeley General Plan contains policies that encourage joint-use agreements between the City of Berkeley and BUSD, and encourage the BUSD to maintain and improve its historic properties.⁵³

FINDINGS OF THE BERKELEY GENERAL PLAN EIR

The Berkeley General Plan EIR concluded that policies encouraging increased residential development in the Downtown as well as higher-density housing and commercial development in commercial and mixed use districts and along transit corridors could result in increased demand for school facilities and educational services in some parts of the city. Mitigation for this impact included coordination between the City of Berkeley and the BUSD to evaluate impacts of new development on BUSD facilities.⁵⁴ No other school-related impacts were identified.

OAKLAND GENERAL PLAN

The Oakland General Plan does not contain policies regarding schools.

4.11.3.4 EXISTING SETTING

CAMPUS PARK, ADJACENT BLOCKS AND SOUTHSIDE

There are no public schools located on the Campus Park, in the Adjacent Blocks or Southside. These areas are served by the BUSD, described in more detail below.

HILL CAMPUS

Since portions of the Hill Campus are located in both the City of Berkeley and the City of Oakland, the Hill Campus is served by the BUSD as well as OUSD. Children living in the portion of the Hill Campus located in the City of Oakland would attend Henry J. Kaiser School for elementary and middle school grade levels and Oakland Technical High School for high school.⁵⁵

LRDP HOUSING ZONE

BUSD. The portion of the LRDP Housing Zone located in Berkeley is served by the BUSD. There are 20 educational program schools in the BUSD. They consist of eleven elementary schools (grades K-5), three middle schools (grades 6-8), one high school (grades 9-12), four child development programs and one adult school.⁵⁶ Total BUSD enrollment for 2001-2002 school year was 9,370 students,⁵⁷ compared to a district-wide capacity of 13,774.⁵⁸ Berkeley also has 19 private elementary and secondary schools. Private school enrollment varies by income level, but in general BUSD assumes that 10-20 percent of Berkeley parents send their children to private schools.⁵⁹

Surveys indicate that roughly 25 percent of UC Berkeley employees live in the City of Berkeley.⁶⁰ Using the Kensington pupil generation rate, as suggested by BUSD, this implies that current UC Berkeley households generate demand for about 1,615 students, or about 17 percent of current BUSD enrollment. Since the LRDP Housing Zone extends through many portions of Berkeley, students living in new housing built in Berkeley under the 2020 LRDP might attend any of several BUSD schools. The BUSD commissioned a facilities study to provide information pertaining to spatial planning and capacity in the district. The current enrollment and classroom capacity of the BUSD is shown in Table 4.11-1a.

OUSD. The portion of the LRDP Housing Zone located in Oakland is served by the OUSD, which has 63 elementary schools, 16 middle or junior high schools, and six high schools. In addition, it has one alternative middle school, six alternative high schools, eight charter schools and one special education academy. OUSD enrollment in 2003-2004 was 45,808⁶¹ students, compared to a district-wide capacity of 53,474.⁶²

While the district as a whole is operating at little more than 80 percent capacity, some individual schools are operating over capacity: Chabot Elementary and Henry J. Kaiser, both in the LRDP Housing Zone, are two such schools.⁶³ OUSD is currently developing a policy of consolidation that would better utilize the District's existing capacity and minimize overcrowding at specific locations. Current OUSD enrollment and capacity figures are shown in Table 4.11-1b.

The California Department of Education estimates that in the 2002-2003 school year, Oakland also has 52 private schools with a total enrollment of 8,787 children.⁶⁴ Assuming that this number approximates the number of Oakland students attending private school, then about 16 percent of students residing in Oakland attend private school.

Surveys indicate roughly 16 percent of UC Berkeley employees live in the City of Oakland or Piedmont.⁶⁵ Assuming that the vast majority of these employees reside in Oakland, and using OUSD's average student generation rate of 0.53 students per household, this implies that current campus employee households generate about 1,100 students, or about two percent of OUSD's current enrollment.

In Oakland, children in family-suitable units would be served by the OUSD. Children would attend Chabot, Henry J. Kaiser, Santa Fe, Washington or Peralta Y.R. Schools for elementary grade levels. Middle school-aged children would attend Henry J. Kaiser or Claremont Schools. All children would attend Oakland Technical High School for high school.

4.11.3.5 STANDARDS OF SIGNIFICANCE

The significance of the potential impacts of the 2020 LRDP and Tien Center on schools was determined based on the following standard:

Standard: *Would the project result in the provision of new or altered school facilities in order to maintain acceptable service ratios or other established performance objectives, the construction of which could cause significant environmental impacts?*

TABLE 4.11-1A
CAPACITY AND ENROLLMENT COMPARISON IN THE BUSD⁶⁶

School	Capacity ⁶⁷	Enrollment (2001-2002)	Available Capacity
Cragmont Elementary	400	395	5
Emerson Elementary	370	313	57
Jefferson Elementary	340	334	6
Le Conte Elementary	415	363	52
Malcolm X Elementary	705	402	303
John Muir Elementary	265	231	34
Oxford Elementary	325	291	34
Rosa Parks Elementary	425	364	61
Thousand Oaks Elementary	450	407	43
Washington Elementary	500	394	106
Magnet Elementary	444	390	54
<i>Elementary Subtotal</i>	4,639	4,077	562
<i>All Middle Schools⁶⁸</i>	2,733	1,964	769
<i>Berkeley High School⁶⁹</i>	4,532	3,397	1,135
K-12 Totals	11,904	9,439	2,466

TABLE 4.11-1B
CAPACITY AND ENROLLMENT COMPARISON IN THE OUSD⁷⁰

School	Capacity ⁷¹	Enrollment (2003-2004)	Available Capacity
Chabot Elementary	418	461	(-43)
HJ Kaiser (K-8) Elementary	188	243	(-57)
Peralta Elementary	230	200	30
Santa Fe Elementary	375	283	92
Washington Elementary	311	183	128
Claremont Middle	547	506	41
Oakland Technical High	2,220	1,584	636
K-12 Totals	53,474	45,808	7,666

Schools listed individually are those most likely to be attended by new students as a result of the 2020 LRDP.

4.11.3.6 POLICIES AND PROCEDURES GUIDING FUTURE PROJECTS

Review of individual projects under the 2020 LRDP would influence public services impacts by guiding the location, scale, form and design of new University projects. Four of the Objectives described in Chapter 3.1 are particularly relevant to public services:

- Provide the housing, access, and services we require to support a vital intellectual community and promote full engagement in campus life.
- Stabilize enrollment at a level commensurate with our academic standards and our land and capital resources.
- Plan every new project to respect and enhance the character, livability, and cultural vitality of our City Environs.
- Maintain the Hill Campus as a natural resource for research, education, and recreation, with focused development on suitable sites.

These 2020 LRDP objectives indirectly affect the University's impacts on schools, but there are no specific policies regarding schools.

4.11.3.7 2020 LRDP IMPACTS

This section describes the potential schools impacts of the 2020 LRDP, based on the Standards of Significance, whether they are significant or less than significant, and whether any significant impacts can be mitigated to less than significant levels.

LESS THAN SIGNIFICANT IMPACTS

LRDP Impact PUB-3.1: Implementation of the 2020 LRDP could increase the demand for schools, but is not anticipated to create a need for new or altered facilities.

The 2020 LRDP, as proposed, does not include any new University housing suitable for student families with children. Any new University student family housing would be constructed at University Village Albany, which is outside the scope of the 2020 LRDP and subject to separate CEQA review. However, the 2020 LRDP could result in an increase in schools demand from new University faculty-staff housing, and from other households formed by new employees.

The 2020 LRDP proposes up to 100 new faculty-staff housing units in the Hill Campus, on sites within the OUSD, that would create direct demand on OUSD school facilities. The 2020 LRDP also proposes up to 100 new faculty-staff housing units in the LRDP Housing Zone, which could be in either the OUSD or BUSD, creating additional demand on these school districts. The maximum potential number of new University faculty-staff units under the 2020 LRDP, therefore, would be 200 in the OUSD and 100 in the BUSD.

The 2020 LRDP anticipates an increase of up to 2,870 UC Berkeley employees. However, this figure overstates the actual likely impact, since a substantial percentage of this employment related growth is likely to be absorbed within the pool of existing Bay Region residents. The analyses below assume each new employee represents a potential new household: this also overstates the actual likely impact, since it does not account for households with more than one UC employee.

As described in Chapter 4.10, based on current residential patterns roughly 25 per cent of this increment, or 718 households, could reside in Berkeley, and another 16 percent, or 460 households, in Oakland and Piedmont. Another 17 percent of this increment, or up to 488 households, could reside in Albany, Alameda, El Cerrito, Emeryville, Kensington and Richmond. The balance of 2020 LRDP employment-related growth, up to 976 households, would be distributed throughout the balance of the Bay Region.

BUSD. Using the Kensington student generation rates suggested by the BUSD, development under the 2020 LRDP would be expected to generate as many as 359 students for the BUSD. Children would attend one of the eleven elementary schools and three middle schools, described above, as assigned by BUSD. All children would attend Berkeley High School for high school. As noted above, BUSD currently has excess capacity for 2,466 students, so the addition of 359 students would not require new or physically altered facilities.

TABLE 4.11-2

POTENTIAL INCREASED SCHOOLS DEMAND

	Total Net New Employees	Distribution ⁷²	New HH	Per HH	New Students
Berkeley	2,870 x	25%	718	0.5	359
Oakland/Piedmont	2,870 x	16%	460	0.53	244
Other Neighboring Cities	2,870 x	17%	488	0.5	244
San Francisco	2,870 x	8%	230	0.5	115
Other	2,870 x	34%	976	0.5	488

Other neighboring cities include Albany, Alameda, El Cerrito, Emeryville, Kensington, and Richmond.

OUSD. Using the OUSD’s student generation rates of 0.53 students per housing unit, the 200 units that could be built in Oakland under the 2020 LRDP would be expected to generate 244 students for the OUSD. Children would attend one of six elementary schools and three middle schools, as assigned by OUSD according to their home address. All high school-age children would attend Oakland Technical High School.

As noted above, OUSD is currently operating at about 80 percent capacity in all grade levels, and thus has adequate district-wide capacity to serve these students, although Chabot and Kaiser Schools already are above capacity and may experience a greater imbalance of capacity and demand due to the 2020 LRDP. This potential increased demand at elementary schools already above capacity would not result in new facilities because OUSD intends to consolidate schools to address capacity issues.

OTHER DISTRICTS. Based on current residential patterns, the balance of the potential new schools demand generated by the 2020 LRDP would be distributed among other school districts. Some of these districts, such as the West Contra Costa County Unified School District, may experience capacity problems which would be exacerbated by the 2020 LRDP. The WCCUSD enrollment projections through 2006-2007 indicate the school district may need to accommodate up to 35,190 students,⁷³ compared to a current capacity of 30,873.⁷⁴

However, the magnitude of additional demand generated by the 2020 LRDP is not in itself likely to significantly affect the need for new school facilities in relation to current projected demand. For example, even if the entire increment of the growth projected for Albany, Alameda, El Cerrito, Emeryville, Kensington, and Richmond, 244 children, occurs within the WCCUSD (which serves a portion of this area), this increment would only represent an increase of 0.7 percent over its projected 2006-2007 enrollment.

4.11.3.8 TIEN CENTER IMPACTS

The Initial Study concluded that the Tien Center project would not result in a significant impact to school services because it would accommodate existing UC Berkeley staff, and it would not support and is not associated with an increase in enrollment.⁷⁵

4.11.4 RECREATIONAL SERVICES

The section describes existing conditions and potential impacts relating to recreation in the 2020 LRDP area. This includes a discussion of recreation facilities on the Campus Park as well as the other 2020 LRDP land use zones. The Tien Center project would not have impacts on recreational services beyond those expected for the LRDP as a whole.

4.11.4.1 ANALYTICAL METHOD

To assess the impact of implementation of the 2020 LRDP and the Tien Center project on recreation, potential demand associated with increased population under the 2020 LRDP was contrasted with existing recreation programs and facility capacity.

4.11.4.2 REGULATORY FRAMEWORK

There are no federal or state policies relevant to the review of recreation facilities.

4.11.4.3 LOCAL PLANS AND POLICIES

Although the University is constitutionally exempt from local regulations when using its property in furtherance of its educational purposes, it is University policy to evaluate proposed projects for consistency with local plans and policies. Therefore, this section outlines the plans and policy goals of the cities of Berkeley and Oakland related to recreation.

BERKELEY GENERAL PLAN

The Berkeley General Plan contains policies to preserve existing open space; direct maintenance and repair of recreation facilities; encourage community involvement and volunteering; encourage coordination with other agencies for open space and recreational planning; provide guidance for serving disadvantaged groups; guides open space access improvements; encourages development of new open space including plazas, community gardens, waterfronts and regional open space; and encourages the City to pursue a variety of funding sources.⁷⁶

FINDINGS OF THE BERKELEY GENERAL PLAN EIR

The Berkeley General Plan EIR found that the population increase projected in the General Plan would increase demand for recreational and open space facilities. However, even without additions to the recreational and open space inventory contemplated under the General Plan, the EIR found that “the parks to population ratio would not drop below the 2.0 acres of parks per 1,000 persons” criterion established in the 1977 City of Berkeley Master Plan.⁷⁷ The General Plan EIR concluded that growth anticipated in the General Plan would not result in a significant impact on recreation and open space.

UC Berkeley manages 28.7⁷⁸ acres of recreational space, not included in the inventory prepared for the Berkeley General Plan EIR, though the General Plan EIR does acknowledge that many of UC Berkeley properties serve as popular open space resources for the Berkeley community.

OAKLAND GENERAL PLAN

The Oakland General Plan contains policies that establish park land level of service standards; follow a systematic process for allocating funding; consider a range of factors when siting new recreational facilities; promote joint-use of facilities; provides for ongoing park maintenance; encourage public-private partnerships; pursue sites for open space in park-deficient areas; provide a diverse set of recreational activities; continue to implement park fees or land dedication for new development; and conserve undeveloped areas of high value.⁷⁹

TABLE 4.11-3

CAMPUS RECREATIONAL FACILITY MEMBERSHIP⁸⁶	Total Members	% of Sub-Population
Students	25,239	79% all students
Faculty/Staff	1,763	14% all faculty/staff
Alumni	414	n/a
Emeriti	155	n/a
Community	1,296	n/a
Total	28,867	

4.11.4.4 EXISTING SETTING

UC BERKELEY

UC Berkeley manages over 28.7 acres⁸⁰ of recreational space, which translates to 0.62 acres per 1,000 campus headcount population.⁸¹ Campus recreational facilities serve both the university and the wider community. Membership of campus recreational facilities is detailed in Table 4.11-3.

CAMPUS PARK. The Campus Park includes numerous athletics and recreational facilities. The main athletic/recreation facility complex is located on Bancroft Way near Dana Street, and includes:⁸²

- Recreational Sports Facility (gymnasiums, racquetball, exercise rooms and equipment)
- Evans Diamond (baseball)
- Edwards Stadium and Goldman Field (track and field, soccer)
- Haas Pavilion (basketball)
- Spieker Pool (swimming and water polo)
- Hellman Courts (tennis)

A second cluster of athletics and recreation facilities is accessible from Bancroft Way at Bowditch Street, and includes:⁸³

- Hearst Gymnasium and Pools
- Hearst North Field
- Bancroft Tennis Courts

ADJACENT BLOCKS AND SOUTHSIDE. UC Berkeley recreational facilities in the Adjacent Blocks include:⁸⁴

- La Loma Tennis Courts, La Loma and Hearst Avenues
- Maxwell Family Field (formerly Kleeberger Field), Gayley Road at Centennial Drive
- Memorial Stadium, Piedmont Avenue north of Bancroft Way

UC Berkeley recreational facilities located in the Southside include:⁸⁵

- Channing Tennis Courts, Ellsworth Street and Channing Way
- Golden Bear Tennis Courts, Clark Kerr Campus
- Golden Bear Fields, Clark Kerr Campus
- Golden Bear Recreation Center, Clark Kerr Campus (track, gymnasium, pool)

Additionally, the University owns the 2.3-acre People's Park located in the Southside. The park, staffed by UC Berkeley's Office of Community Relations, contains open lawns, basketball courts and community gardens.⁸⁷

HILL CAMPUS. UC Berkeley operates several recreation facilities in the Hill Campus, including Strawberry Canyon Recreation Area, accessible from Centennial Drive. The SCRA facility includes two outdoor swimming pools (one currently closed), a fitness center and a clubhouse.⁸⁸ Two additional UC Berkeley athletics facilities are located in the Hill Campus: Levine Fricke Field and Witter Rugby Field, both accessible from Centennial Drive.⁸⁹

CITY OF BERKELEY

There are five City parks in or adjacent to the portion of the LRDP Housing Zone located in the City of Berkeley. The latter three are school parks, which consist of playgrounds, where BUSD and the City have formed joint-use agreements:⁹⁰

- Civic Center Park, 2134 Martin Luther King, Jr. Way.
- Willard Park, Hillegass Avenue at Regent Street.
- John Muir School, Claremont Avenue near Tunnel Road.
- King School, Hopkins Street at Colusa Avenue.
- Washington, Martin Luther King Jr. Way at Bancroft Way.

The City of Berkeley has a parks per population ratio of 2.24 acres of parkland per 1,000 residents.⁹¹ If University facilities were included in the calculation, including such amenities as Strawberry Canyon Recreation Area or the open spaces of the Campus Park, the ratio of parkland to population would be higher.

CITY OF OAKLAND

Recreational services in Oakland are provided by the City of Oakland. There are more than 130 City parks and sport fields in Oakland, ranging from undeveloped open spaces to intensely developed plazas and urban parks. The parks per capita for North Oakland, where the LRDP Housing Zone is located, is 1.18 acres of parkland per 1,000 population.⁹²

There is only one park, Bushrod Park, on 59th Street and Shattuck Avenue, located adjacent to the portion of the LRDP Housing Zone located in Oakland. Two other small parks, Colby and Hardy, are located 3 to 4 blocks from portions of the LRDP Housing Zone.⁹³

EAST BAY REGIONAL PARK DISTRICT

The Hill Campus is bordered by two regional open spaces, lower Claremont Canyon and Tilden Regional Park, both managed by the East Bay Regional Park District (EBRPD):

- Claremont Canyon includes 205 acres and is bordered by Clark Kerr Campus to the west and undeveloped areas of the Hill Campus to the north and east. Access is from Stonewall Road and the east end of Dwight Way. The park is kept in a natural state and contains no developed facilities.⁹⁴
- Tilden Regional Park includes 2,077 acres, and offers a wide variety of facilities and activities. Tilden Park is accessible from Grizzly Peak Boulevard in Berkeley.⁹⁵

4.11.4.5 STANDARDS OF SIGNIFICANCE

The significance of the potential impacts of the 2020 LRDP and Tien Center on recreational services was determined based on the following standards:

Standard: Would the project increase the use of existing neighborhood and regional parks or other public recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?

Standard: Would the project result in the provision of new or altered parks or recreational facilities in order to maintain acceptable service ratios or other established performance objectives, the construction of which could cause significant environmental impacts?

Standard: Would the project include recreational facilities or require the construction or expansion of recreational facilities that might have an adverse physical effect on the environment?

4.11.4.6 POLICIES AND PROCEDURES GUIDING FUTURE PROJECTS

This section describes existing policies and procedures that would help to minimize recreational resource impacts of development under the 2020 LRDP. It discusses both the policies in the 2020 LRDP itself and other University agreements affecting recreational resources.

2020 LRDP

Review of individual projects under the 2020 LRDP would influence public services impacts by guiding the location, scale, form and design of new University projects. Four of the Objectives described in Chapter 3.1 are particularly relevant to public services:

- **Provide the housing, access, and services we require to support a vital intellectual community and promote full engagement in campus life.**
- **Stabilize enrollment at a level commensurate with our academic standards and our land and capital resources.**
- **Plan every new project to respect and enhance the character, livability, and cultural vitality of our City Environs.**
- **Maintain the Hill Campus as a natural resource for research, education, and recreation, with focused development on suitable sites.**

The 2020 LRDP includes two specific policies regarding recreational facilities:

- Preserve existing recreational fields, and restore the fields lost since 1990.
- Preserve and enhance recreational aquatics facilities.

The Campus Park Framework also contains policies that indirectly affect recreational use of the campus, mainly through passive recreation in open space. These policies preserve and protect natural areas and open spaces, and implement strategic investment programs to restore and renew Campus Park landscape and open spaces.

The Hill Campus Framework contained in the 2020 LRDP would guide future use of the Hill Campus. The Framework recognizes the Hill Campus as a regional recreational resource and prescribes the following policy to support the above objective:

- Establish a management authority for the Ecological Study Area [which would] implement strategies to improve coexistence of recreation, education and research.

4.11.4.7 2020 LRDP IMPACTS

This section describes the potential recreation impacts of the 2020 LRDP based on the Standards of Significance, whether they are significant or less than significant, and whether any significant impacts can be mitigated to less than significant levels.

LESS THAN SIGNIFICANT IMPACTS

LRDP Impact PUB-4.1: Implementation of the 2020 LRDP would increase the campus population, but would not increase demand for recreation facilities to an extent that could result in substantial physical deterioration of parks and recreational facilities or the need for new or expanded facilities to maintain acceptable service ratios.

LRDP Impact PUB-4.2: Implementation of the 2020 LRDP is not anticipated to create a need for new or altered parks and recreational facilities.

UC BERKELEY. New UC Berkeley students and employees would have access to UC Berkeley recreational facilities and services. Although no specific new recreational facilities are identified in the 2020 LRDP, the 2020 LRDP does propose the restoration of Hearst Field West to recreational use once the current temporary buildings are removed, and also proposes improvements to campus aquatics facilities. Moreover, the replacement of the Underhill parking structure, analyzed in the 2000 Underhill Area Projects EIR, is planned to include recreational facilities on its top deck.

The increase of the campus headcount from 45,940 to 51,260 by 2020, as anticipated in the 2020 LRDP, would reduce the current service ratio of UC Berkeley facilities from the 0.62 acres per 1,000 campus headcount cited above to 0.56 acres per 1,000, a decrease of roughly 10 percent. However, the restoration of Hearst West Field, as proposed in the 2020 LRDP, plus the provision of new recreational facilities to replace the demolished Underhill Field, as proposed in the Underhill Area Projects EIR, would increase the UC Berkeley acreage from 28.7 to roughly 32.1 acres.⁹⁶ This would raise the service ratio back up to its current level of 0.62 acres per 1,000. Thus, no increased physical deterioration of UC Berkeley facilities due to increased use is anticipated, and as a result this impact is *less than significant* for UC Berkeley facilities.

CITY AND REGIONAL FACILITIES. Since the 2020 LRDP, as proposed, would accommodate the increase in campus headcount at roughly the same level of recreational facilities as current levels, no substantial increase in *student* use of non-University facilities is anticipated. However, the employment-related growth anticipated under the 2020 LRDP could result in an increase in recreational demands due to an increase in regional population.

As explained in chapter 4.10, the projected UC Berkeley employment-related growth under the 2020 LRDP is 7,750 individuals: 2,870 employees times the average regional household size of 2.7. If this entire increment is assumed to represent a net increase in population, it would account for less than 0.1 percent of additional growth beyond the year 2020 estimate by ABAG Projections 2003 for the 9-county Bay Region. Note this figure overstates the actual likely impact, since some percentage of this employment-related growth is likely to be absorbed within the pool of current Bay Region residents.

As described in 4.10, based on current residential patterns roughly 25 per cent of this increment, or up to 1,937 individuals, could reside in Berkeley and another 16 percent, or up to 1,240 individuals, in Oakland and Piedmont. These are respectively equal to 1.7 percent and 0.3 percent of additional growth beyond year 2020 estimates. Another 17 percent of this increment, or up to 1,318 individuals, could reside in Albany, Alameda, El Cerrito, Emeryville, Kensington and Richmond, equal to 0.5 percent of additional growth beyond combined year 2020 estimates. The balance of 2020 LRDP employment-related growth, up to 3,254 individuals, would be distributed throughout the balance of the Bay Region.

These increments, in themselves, are not anticipated to create a need for new recreational facilities, nor significantly increase the use of existing facilities to an extent that results in substantial deterioration. The only city in which the increment of growth due to the 2020 LRDP is likely to be greater than one percent above year 2020 projections is Berkeley. However, any impact of the 2020 LRDP on City of Berkeley recreational facilities would be mitigated by the fact UC Berkeley personnel would be eligible to use campus facilities, which is expected to absorb a substantial amount of the new recreational demand due to proximity and convenience. As explained above, under the 2020 LRDP campus facilities would be adequate to accommodate new students and employees at current levels of service.

Moreover, the Berkeley General Plan EIR found the projected citywide growth assumed for the Berkeley General Plan would not result in any significant open space and recreation impacts.⁹⁷ As explained in 4.11.2.7, the growth in Berkeley jobs and residents directly resulting from the 2020 LRDP would account for at most only a fraction of the citywide growth projected in the Berkeley General Plan EIR.

LRDP Impact PUB-4.3: Implementation of the 2020 LRDP could include construction or expansion of recreational facilities, but continuing best practices would ensure this impact is *less than significant*.

Although no specific new recreational facilities are identified in the 2020 LRDP, UC Berkeley may propose new recreational facilities during the timeframe of the 2020 LRDP. The 2020 LRDP does, however, propose the restoration of Hearst Field West to recreational use once the current temporary buildings are removed, and also proposes improvements to the pool complex at Strawberry Canyon to restore or replace the closed east pool. Moreover, the replacement of the Underhill parking structure, analyzed in the 2000 Underhill Area Projects EIR, is planned to include recreational facilities on its top deck. Continuing Best Practices described below would mitigate potential impacts from these new facilities.

Continuing Best Practice PUB-4.3: Any new UC Berkeley recreation facilities would be developed in accordance with design principles and guidelines established in the 2020 LRDP. All relevant 2020 LRDP mitigation measures and continuing best practices would be incorporated into the design and construction of new facilities. For each individual project, the University would evaluate potential environmental impacts and prepare all required documents in full accordance with CEQA.

SIGNIFICANT IMPACTS AND MITIGATION MEASURES

LRDP Impact PUB-4.4: Implementation of the 2020 LRDP could result in the unanticipated loss of some University owned recreational facilities, which could result in increased use leading to the physical deterioration of remaining facilities, but the mitigation measures described below would reduce this impact to *less than significant*.

Since 1990, UC Berkeley has lost or changed a number of its recreational facilities. Table 4.11-4 and 4.11-5 provide an overview of these changes since 1990. Five facilities have been lost with no plans for replacement. Two other facilities, representing a combined total of 3.6 acres of sport field space, have been temporarily lost: one, Underhill Field, due to the demolition of the underlying parking structure to reduce seismic hazard, and the other, Hearst Field West, due to placement of temporary buildings to support the campus seismic improvement program.

The 2020 LRDP does not specifically propose the demolition of any recreational facilities. On the contrary, as mentioned above it includes policies to preserve existing recreational fields and aquatics facilities, and restore those lost since 1990. However, implementation of the 2020 LRDP could result in some as yet unanticipated temporary or permanent changes in University owned recreational facilities. The following Mitigation Measure would reduce this impact to less than significant levels:

LRDP Mitigation Measure PUB-4.4: Before implementing any change to the use of any existing recreational facility, UC Berkeley will conduct a study to ensure that the loss of recreational use would not result in increased use at other facilities to the extent it would result in the physical deterioration of those facilities. If such deterioration is found to have the potential to occur, then the University will build replacement recreation facilities or take other measures to minimize overuse and deterioration of existing facilities in connection with removal of or reduction in use at the recreation facility in question.

4.11.4.8 TIEN CENTER IMPACTS

The Initial Study concluded the Tien Center project would not result in significant impacts to recreation because the facility would house primarily existing UC Berkeley staff and would entail a net increase of only five new employees.⁹⁸

TABLE 4.11-4

FACILITIES LOST SINCE 1990 ⁹⁹	Approximate Square Feet	Type of Loss	Date Removed
Bancroft Courts (basketball, volleyball, tennis)	48,389	Permanent	1990
Underhill Field	85,000	Temporary	1993
Strawberry Canyon Tennis Courts	45,000	Permanent	1994
Street Hockey/Basketball Court	7,750	Permanent	1995
Hearst Athletic Field West	72,000	Temporary	1998
Scenic Tennis Court	33,200	Permanent	2003
Skateboard Park	10,000	Permanent	2003
Total Square Feet	366,139		

Prior to temporary closure, Hearst Field West was only used two percent of the time for recreational programs. The remaining 98 percent of the time, it was used by PE and Intercollegiate Athletics.

TABLE 4.11-5

USE CHANGES SINCE 1990 ¹⁰⁰	Approx Square Feet	Previous Facility/Field	% Rec Current	% Rec Previous	Date of Change
Golden Bear Soccer Field	72,000	Same	7%	100%	1993
Witter Rugby Field	128,000	Strawberry Field	5%	60%	1994
Levine-Fricke Softball Field	38,000	Tennis Courts	12%	100%	1994
Haas Pavilion Arena	15,073	Harmon Gym	6%	5%	2000

4.11.5 CUMULATIVE IMPACTS

This section evaluates whether the 2020 LRDP, in combination with other University and non-University projects which are reasonably foreseeable, would result in significant cumulative impacts on public services.

This analysis considers cumulative growth as represented by the implementation of municipal general plans, implementation of the proposed Lawrence Berkeley National Laboratory 2004 LRDP, the proposed redevelopment of University Village Albany, and implementation of the 2020 LRDP, as described in 4.0.5. The analysis also includes growth anticipated by the City of Berkeley General Plan EIR and by previously certified UC Berkeley EIRs, including the Northeast Quadrant Science and Safety Projects (SCH 2001022038), Seismic Replacement Building 1 (SCH 99122065), and the Underhill Area Projects (SCH 99042051).

The geographic context for this analysis of cumulative public services impacts includes the City of Berkeley and the areas of the City of Oakland within the scope of the 2020 LRDP, plus other jurisdictions that provide services that may be affected by the 2020 LRDP and other projects, as described below.

The potential impacts of the planned expansion of University facilities at University Village Albany and other projects are addressed in a Draft EIR published in January 2004. The UVA EIR found the potential impacts of this planned expansion would have no significant impacts on police, fire and emergency services, schools, or recreation within the City of Albany or Albany Unified School District at either the project or cumulative level.¹⁰¹

POLICE, FIRE AND EMERGENCY SERVICES

For police, fire and emergency services, the context includes the cities of Berkeley and Oakland. For fire and emergency services, this analysis also considers impacts on the Alameda County Fire District, which serves Lawrence Berkeley National Laboratory. Under the 2020 LRDP and the Lawrence Berkeley National Laboratory 2004 LRDP, new projects may be constructed in these jurisdictions which are exempt from local land use controls and exactions.

Employment growth caused by the 2020 LRDP and other reasonably foreseeable projects may also increase residential population, and thus the demand for police, fire and emergency services, in these and other jurisdictions. However, this analysis has assumed any such increase, above and beyond the University housing constructed under the 2020 LRDP, would be accommodated in private sector housing built under the auspices of the relevant city or county as CEQA lead agency, and in conformance with the city or county general plan and other relevant plans and policies. As such, any potential impacts of employment-driven private sector housing are assumed to already be anticipated in those plans and policies, and would be evaluated and, as necessary, mitigated through CEQA project review.

The Berkeley General Plan EIR includes evaluation of a new fire station to be located on a site not identified in the Berkeley Hills. The EIR states, “Completion of this project would result in a net benefit to community services by providing faster response times to fires and emergencies in the hills. Construction of the fire station could have direct environmental impacts, which would be evaluated according to the appropriate level of environmental review as part of the city’s review and approval procedures for any new plans for public buildings constructed in Berkeley.”¹⁰² The city has since completed an EIR for a proposed Hills Fire Station in 2002.¹⁰³

SCHOOLS AND RECREATION

For schools and recreation, the context includes the cities of Berkeley and Oakland, which are coterminous with the Berkeley and Oakland Unified School Districts. Under the 2020 LRDP and the Lawrence Berkeley National Laboratory 2004 LRDP, new projects could be constructed in these jurisdictions which are exempt from local land use controls and exactions.

Employment growth caused by the 2020 LRDP and other reasonably foreseeable projects may also increase residential population, and thus schools demand, in these and other jurisdictions. However, this analysis has assumed any such increase, above and beyond the University housing constructed under the 2020 LRDP, would be accommodated in private sector housing built under the auspices of the relevant city or county as CEQA lead agency, and in conformance with the city or county general plan and other relevant plans and policies. Under the provisions of California Government Code Section 65996, new private sector housing development may be required to pay impact fees to the school districts that serve it. These provisions establish a base amount of allowable developer fees and, under CEQA, payment of these impact fees is deemed to provide full and complete school facilities mitigation.¹⁰⁴

The same potential employment-driven increase in residential population may also result in increased recreation demands in those jurisdictions. As with schools, this analysis has assumed any such increase, above and beyond the University housing constructed under the 2020 LRDP, would be accommodated in private sector housing built under the auspices of the relevant city or county as CEQA lead agency, and in conformance with the city or county general plan and other relevant plans and policies. Under the provisions of California Government Code Section 66477, the Quimby Act, California municipalities may require developers of new residential subdivisions to dedicate parkland or to pay fees in lieu of parkland dedication.¹⁰⁵ While the Quimby Act itself only applies to residential projects involving land subdivision, many jurisdictions also charge in-lieu park fees for multifamily rental projects.¹⁰⁶

As stipulated in CEQA Guidelines Section 15130, an EIR may determine that a project's contribution to a significant cumulative impact would be rendered less than cumulatively considerable and thus would not be significant. A project's contribution is less than cumulatively considerable if the project is required to implement or fund its fair share of mitigation measures designed to alleviate the cumulative impact.¹⁰⁷ Since all projects outside the cities of Berkeley and Oakland are presumed to be subject to the aforementioned local plans and exactions, their contribution to schools and recreation impacts would not be cumulatively considerable.

The significance of potential cumulative public service impacts was determined based on the following standards:

Standard: *Would the project result in the provision of new or altered facilities for schools, for parks and recreation, or for police, fire, or emergency services, in order to maintain acceptable service ratios or other established performance objectives, the construction of which could cause significant environmental impacts?*

Standard: *Would the project increase the use of existing neighborhood and regional parks or other public recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?*

Standard: *Would the project expose people or structures to a significant risk of loss, injury or death involving wildland fires?*

Standard: *Would the project impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?*

Standard: *Would the project result in inadequate emergency access?*

The question posed in this section is twofold:

- Is the potential *cumulative* impact of the 2020 LRDP *and* other reasonably foreseeable projects below these standards significant?
- Is the contribution of the 2020 LRDP to these impacts cumulatively considerable?

Cumulative Impact PUB-1: The 2020 LRDP, in combination with other reasonably foreseeable projects, may result in construction of new public service facilities, but these facilities are not anticipated to have significant environmental impacts.

Cumulative Impact PUB-2: The 2020 LRDP, in combination with other reasonably foreseeable projects, is not anticipated to increase the use of recreation facilities to an extent that could result in their substantial physical deterioration.

For police services, the analysis in section 4.11.1.7 found the 2020 LRDP itself would require no new facilities within the cities of Oakland and Berkeley, and therefore its contribution to cumulative impacts in those cities would not be cumulatively considerable. Growth at Lawrence Berkeley National Laboratory under its 2004 LRDP could increase the need for on-site police services. These police services are provided by a combination of an interagency service agreement with UCPD and a private security company.¹⁰⁸ LBNL and UCPD have indicated they can accommodate the amount of growth anticipated, so the contribution to cumulative impacts would also not be cumulatively considerable.

For fire and emergency services, the analysis in section 4.11.2.7 found the 2020 LRDP would contribute to fire and emergency services demands within the city of Berkeley; but is not anticipated to require new or altered facilities. While the 2020 LRDP itself would not require new facilities in Oakland,¹⁰⁹ the Oakland General Plan does indicate the need to expand and retrofit existing facilities,¹¹⁰ to which the 2020 LRDP and other reasonably foreseeable projects may contribute. However, construction or expansion of new fire or emergency services facilities would be unlikely to result in significant environmental impacts, given the existing urbanized environment. Moreover, any new or altered facility would receive its own environmental review by the relevant service provider as CEQA lead agency.

For schools, the analysis in section 4.11.3.7 found the 2020 LRDP itself would require no new or altered facilities within the geographic context. The 2020 LRDP, in combination with other reasonably foreseeable projects, may cause an increase in residential population, and thus in potential schools demand, in Berkeley, Oakland or elsewhere, but CEQA project review and the existing funding mechanisms described above in **Geographic Context** would serve to mitigate any such impacts.

For recreation, the analysis in section 4.11.4.7 found the 2020 LRDP itself would require no new or altered facilities within the geographic context, and would not result in the physical deterioration of park and recreational existing facilities. The 2020 LRDP, in combination with other cumulative projects, may cause an increase in residential population, and thus in potential recreation demands, in Berkeley or Oakland, but CEQA project review and the existing funding mechanisms described above in **Geographic Context** would serve to mitigate any such impacts.

Cumulative Impact PUB-3: The 2020 LRDP, in combination with other reasonably foreseeable projects, could expose people or structures in the East Bay Hills to a risk of loss, injury, or death involving wildland fires, but the current plans and practices of UC Berkeley and other jurisdictions would ensure this risk is *less than significant*.

The analysis in section 4.11.2.7 found the impact of the 2020 LRDP itself would not cause a significant impact with regard to wildland fires. Cumulative development in the East Bay Hills, including projects implemented under the Lawrence Berkeley National Laboratory 2004 LRDP as well as other private or public sector projects, however, could result in a cumulative wildland fire hazard.

The NOP for the Lawrence Berkeley National Laboratory 2004 LRDP proposes a considerably larger development program in the East Bay Hills than the 2020 LRDP: a net increase of 800,000 gsf. However, in addition to ongoing fire risk management programs within the developed portion of its site, the NOP also proposes a “vegetation management area” which “...would be located entirely along the perimeter of the site and would provide an open space buffer to neighboring land uses ... vegetation in these areas would continue to be managed to reduce wildland fire risk.”¹¹¹

The general plans and land use controls of the cities of Oakland, and Berkeley limit development in hill areas at risk for wildland fires, and include various policies to reduce fire hazards. Moreover, individual projects in such areas would be subject to review by the relevant city as lead agency, to ensure they comply with the cities’ general plans and land use regulations and are adequately served by fire and emergency services.

Potential cumulative impacts are further managed through the Hills Emergency Forum, described above. The Forum’s mission is “...to coordinate the collection, assessment, and sharing of information on the East Bay Hills fire hazards and, further, to provide a forum for building interagency consensus on the development of fire safety standards and codes, incident response and management protocols, public education programs, multi-jurisdictional training, and fuel reduction strategies.”¹¹² This ongoing collaboration among regulators and fire and emergency service providers, in terms of both land use regulations and emergency response logistics, should ensure the impact on future wildland fire risk by future cumulative development is *less than significant*.

Cumulative Impact PUB-4: The 2020 LRDP, in combination with other reasonably foreseeable projects, would not impair nor interfere with an adopted emergency response plan or emergency evacuation plan.

The analysis in 4.11.2.7 found the 2020 LRDP itself would not impair nor interfere with such plans, and thus its contribution to cumulative impacts would not be cumulatively considerable.

Cumulative Impact PUB-5: The 2020 LRDP, in combination with other reasonably foreseeable projects, could temporarily result in emergency access constraints, but the ongoing implementation of mitigations described above, as well as of policies in the Berkeley General Plan, would ensure such constraints are *less than significant*.

The analysis in 4.11.2.7 found the 2020 LRDP itself could result in temporary emergency access constraints, mitigated by construction management techniques and capital improvements to intersections to ensure continuing safe access. The specific measures regarding roadway circulation are described in Chapter 4.12. For all projects in the City Environs, the University will, to the extent feasible, include the undergrounding of surface utilities along project frontages, in support of Berkeley General Plan Policy S-22.

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4.12 TRANSPORTATION AND TRAFFIC

This chapter assesses the effects of the 2020 LRDP and the Chang-Lin Tien Center for East Asian Studies on transportation and traffic in and around UC Berkeley and the 2020 LRDP area.

The assessment covers the full range of transportation modes, including vehicle traffic circulation, parking, public transit use, pedestrian circulation and bicycle circulation. The analysis also responds to a number of comments received in the scoping process, including comments from the City of Albany, the State of California Department of Transportation (Caltrans), AC Transit, and the Alameda County Congestion Management Agency (ACCMA). These comments included the following key issues:

City of Albany – Consider the impacts of University traffic on Marin Avenue / Buchanan Street, including the effects of the planned lane reduction project from 4 to 3 lanes on Marin; also determine what percentage of University traffic uses this route.

City of Berkeley – Use current conditions as baselines for traffic analyses; make certain analyses extend a sufficient distance from campus to capture impacts; give special consideration to Panoramic Hill access; assess the traffic impacts of satellite facilities; include consideration of enhanced residential parking permit enforcement; and analyze the potential effects of travel mode shifts induced by incentive programs on parking demand. A number of potential mitigation measures for both construction-period and ongoing traffic impacts are also suggested for consideration.

Caltrans – Review and consider the Department’s *“Guide for the Preparation of Traffic Impact Studies”* in scoping the transportation analysis; include “backfill” employment in the project-specific analysis of the Tien Center; clearly describe the regional and local roadway network, trip generation, distribution and assignment assumptions; show average daily traffic (ADT), AM and PM peak hour volumes; use the LOS C/D threshold for impact evaluation on all state facilities; evaluate consistency with the City General Plan and Alameda County Congestion Management Plan; describe mitigation measures fully, including fair share contributions, scheduling, and implementation responsibilities; note trip reduction measures related to mixed use development, transit measures and bicycle/pedestrian measures; and, use the 2000 Highway Capacity Manual LOS methodology.

AC Transit – Include information on the planned Bus Rapid Transit project for the Telegraph corridor and describe how the University can coordinate development in its housing zone with the BRT project; analyze the effect of University expansion on bus ridership; identify current and expected future travel mode splits for various University populations; consider the impact of increased congestion on bus travel times; consider a reduced parking alternative.

Alameda County CMA – prepare traffic analysis using the CMA’s Countywide Transportation Demand Model; address 2010 and 2025 conditions, on both the CMP designated system and the Metropolitan Transportation System (MTS); discuss funding of proposed mitigation measures; ensure consistency of mitigation measures with the CMP Capital Improvement Program (CIP); discuss adequacy of all mitigation measures relative to CMA criteria; analyze project’s impact on transit level of service using the CMP’s criteria; consider trip reduction strategies as mitigation for traffic impacts, including participating in the CMA’s Financial Incentives Program and Guaranteed Ride Home Program.

4.12.1 ANALYTICAL METHODS

2020 LRDP

The analysis methodology for the traffic and circulation impact analysis in this EIR utilizes the Alameda County Countywide Travel Demand Model along with trip generation and distribution data developed uniquely for the UC Berkeley campus, thereby incorporating both regional and campus-specific characteristics into the analysis. AM and PM peak hour **traffic counts** were conducted in November 2002 at 74 intersections in Berkeley and Albany. Appendix F.1 contains further explanation about count methodology.

The **traffic impact analysis** was performed as follows: traffic volumes for the Year 2020 Without Project condition were forecast using the Alameda County Countywide Travel Demand Model. Maintained by the Alameda County Congestion Management Agency, the Countywide Travel Demand Model is used to assess project impacts on the Congestion Management Program (CMP) Designated Roadway System and on the Metropolitan Transportation System (MTS), which includes more roadways than the CMP system. In addition, the Countywide Travel Demand Model is the best tool available for forecasting regional traffic growth. Thus the Countywide Model was used to develop baseline intersection turning movements for the Year 2020 Without Project scenario.

The current version of the model is based on the Association of Bay Area Governments (ABAG) Projections 2002 land use database, and provides 2005 (to be used as existing conditions), 2010 and 2025 forecasts. In consultation with the CMA staff, it was determined that the 20-year time span between 2005 and 2025 was appropriate to assess 2020 conditions, as it represents just two additional years of regional growth, relative to the 2002 – 2020 time span covered by the 2020 LRDP analysis. (A sensitivity analysis was performed to confirm that the two additional years represents negligible differences at individual intersections).

However, during the initial preparation of this traffic impact analysis in mid-2003, revised Projections 2002 land use data were released by ABAG, causing the CMA and many member cities to reconsider the accuracy of the land use distributions within the cities (citywide totals did not change). The CMA began the process of revising the model to better reflect the revised Projections 2002 data, but the revised model was not ready in time for the analysis in this EIR. Therefore, for this EIR, the 2025 model is used to represent 2020 Without Project conditions, with the following modifications:

The model land uses by zone were adjusted by Hausrath Economic Group (HEG), in consultation with the City of Berkeley, to provide a more accurate land use distribution in the southside and downtown areas. This resulted in citywide population and employment totals that slightly exceed the previous totals in the model. To reflect these totals, in consultation with the CMA, a modified April 2003 model incorporating the HEG land use adjustments was used to prepare the analysis for this document.

Subsequent to the completion of the DEIR analysis, a new updated model was released by CMA in March 2004. The updated March 2004 model results were compared to the model results used for the DEIR analysis. The citywide population and employment totals used by CMA are about 3% less than the model used for analysis in this section. The major modification to the model is the redistribution of employment throughout

the City of Berkeley. The employment redistribution is applied to both 2005 and 2025 models, thus the net 2005 to 2025 land use growth has not changed. Since the forecasted traffic volumes used for this analysis are based on the growth between 2005 and 2025 models, the forecasted traffic volumes presented in the analysis would be consistent with the latest updated CMA model.

To obtain intersection turning movement forecasts, the existing volumes were adjusted using an iterative process that incorporates the Countywide Travel Demand Model forecasted 2005 to 2025 growth at each intersection approach and departure. This process is called “furnessing”. This process was used at the major (arterial/arterial) intersections, and then the growth at those intersections was distributed to the rest of the study intersections, in a process called volume balancing. Note the year 2005 Travel Demand Model was used in this process as an approximation of existing conditions.

The traffic generated by growth currently envisioned for the Lawrence Berkeley National Laboratory 2004 LRDP was added to the model forecast volumes in a separate step, in order to ensure consistency with the traffic forecasts being prepared by Lawrence Berkeley National Laboratory. The volumes were added to each intersection, using a TRAFFIX software-based model prepared by the Lawrence Berkeley National Laboratory traffic consultant, Wilbur Smith Associates. The Lawrence Berkeley National Laboratory 2004 LRDP envisions a growth in the Average Daily Population (defined as full-time equivalent staff plus 40% guests) of 1,200 from 2003 to 2025.¹

Since the UC Berkeley LRDP EIR projects traffic only to 2020, LBNL’s projected growth of 1,200 by 2025 was reduced to 900, using straight-line interpolation. The corresponding trip generation growth for Lawrence Berkeley National Laboratory, as calculated by Wilbur Smith Associates and reduced by Fehr & Peers to reflect 2003 - 2020 growth only, is 131 AM peak hour trips and 140 PM peak hour trips. These trips were assigned to the roadway network in the above-noted TRAFFIX model, and Fehr & Peers took the assigned volumes and added them to the UC Berkeley LRDP 2020 traffic projections, to produce final Cumulative Without Project 2020 traffic volumes.

The University recently completed the Subsequent Draft Environmental Impact Report (DEIR) for the University Village and Albany/NW Berkeley Properties Master Plan Amendments. The project, which consists of 738 student residential units, 31 faculty residential units, and 73,000 square feet of retail, is estimated to generate 359 AM peak hour trips and 652 PM peak hour trips. The University Village estimated trip generation and trip distribution was factored into the analysis in this section, to provide consistent analysis in the area common to both studies.

Appendix F.4 contains the Countywide Travel Demand Model’s land use by zone for Berkeley, for 2005, 2010 and 2025, as modified (see above).

The estimated **person-trips and vehicle-trips** generated by the growth in the 2020 LRDP were defined using travel surveys conducted by the University along with traffic counts at UC Berkeley parking garage driveways. For purposes of analysis, parking proposed under the 2020 LRDP was distributed into hypothetical parking clusters, illustrated in Appendix Figure F.1-2, and used to assign project trips in the vicinity of the

Campus Park. Vehicle trips were assigned to each cluster proportional to the proposed number of parking spaces within the cluster.

The **parking impact analysis** compared the proposed future parking supply to the projected demand, which was based on past studies by the University and additional analysis. The impacts of unserved parking demand on non-UC parking facilities and surrounding on-street parking supply, including in the Residential Permit Parking Zones surrounding campus, were identified.

The **pedestrian and bicycle impact analysis** provided estimates of pedestrian and bicycle travel demand generated by both commuters (including walking trips between the university and the various parking facilities) and residents in new UC Berkeley housing. The analysis determined whether the demands of the increased trips on infrastructure (e.g. pedestrian paths and sidewalks, pedestrian activation at high-pedestrian volume signals, continuity of bike routes, provision of bike racks) and services (e.g. nighttime escort services, campus shuttle routes/stops) were significant, based on the potential to create unsafe conditions for bicyclists or pedestrians.

The **transit impact analysis** projected the future demand for transit service, based on the person-trip generation estimate and the transit mode share identified in the University surveys of faculty, staff and students. The analysis compared the growth in transit demand to the adopted plans, policies and programs relating to transit service (both of the University and of the transit providers) to determine whether the growth in transit demand can be met by expected future transit service.

TIEN CENTER

The Tien Center transportation impact evaluation focuses on the local effects of the new construction, including on-campus pedestrian and bicycle circulation; local vehicular circulation for service vehicles and special needs parking; and the impact on adjacent transit routes. Construction period effects are also assessed. Quantitative vehicle and parking impacts are not assessed due to the very small number of net new staff and students associated with the building.

4.12.2 REGULATORY FRAMEWORK

This section assesses regulations of outside agencies that affect UC Berkeley's transportation planning and programs.

ALAMEDA COUNTY CONGESTION MANAGEMENT PROGRAM

The Alameda County Congestion Management Agency (CMA) prepares and maintains the Congestion Management Program (CMP), working cooperatively with the Metropolitan Transportation Commission (MTC), transit agencies, local governments, Caltrans, and the Bay Area Air Quality Management District. The CMP, updated in 2001, describes benchmarks and strategies to address congestion problems in the County.

The two CMP elements that most directly affect the UC Berkeley LRDP update are the five-year Capital Improvement Program, which defines planned improvements in Berkeley and throughout Alameda County; and the Land Use Analysis Program, under

which the CMA reviews the transportation impacts of developments requiring general plan amendments and/or EIRs. The 2020 LRDP is a project requiring CMA review, since an EIR has been prepared for the LRDP. The CMA has three primary criteria it uses to evaluate the adequacy of DEIR project mitigation measures:

- Project mitigation measures must be adequate to sustain CMP service standards for roadways and transit;
- Project mitigation measures must be fully funded to be considered adequate;
- Project mitigation measures that rely on state or federal funds directed by or influenced by the CMA must be consistent with the project funding priorities established in the Capital Improvement Program (CIP) section of the CMP or the Regional Transportation Plan (RTP).

The following projects within the City of Berkeley are recommended for the 2002 State Transportation Improvement Program in the 2001 CMP:

- AC Transit Major Investment Study (MIS), Phase 2, Berkeley – Oakland – San Leandro Corridor. This includes the Telegraph Avenue Bus Rapid Transit (BRT) Study, currently underway.
- Installation of Priority and Video Detection Equipment, San Pablo Avenue.
- Interstate 80 Bike/Pedestrian Overcrossing: Access Improvements and Enhancements.
- Interstate 80 Sound Barrier near Berkeley Aquatic Park.

In addition, the following projects are programmed in the 2000 State Transportation Improvement Program and the last three years of the Transportation Efficiency Act, or are otherwise identified in the CMP as needed to maintain or improve the performance of the CMP network:

- San Pablo Bus Rapid Transit/MIS, Oakland – Berkeley
- Adeline Corridor Pedestrian/Bicycle Improvements
- Berkeley Rail Stop and Transit Plaza
- Bicycle/Pedestrian Over-crossing, Interstate 80 at University (complete)
- San Pablo Avenue Corridor Bicycle Path
- Berkeley Bayshore Bikeway.

CALTRANS

The California Department of Transportation (Caltrans) is responsible for the maintenance and operation of State routes and highways. In Berkeley, Caltrans' facilities include Highway 13 (Ashby Avenue/Tunnel Road), Highway 123 (San Pablo Avenue), and Interstate 80. Caltrans maintains a volume monitoring program and reviews local agencies' planning documents (such as this EIR) to help forecast future volumes and congestion points. In its response to the Notice of Preparation for this EIR, Caltrans requested that its *Guidelines for the Preparation of Traffic Impact Studies* be reviewed and used in the analysis. The traffic analysis generally conforms to the guidelines, in the range of the study area, the level of detail presented, and the travel forecasting and traffic operations methodologies used. However, three key elements of the guidelines are not included, for the reasons noted below. They are:

- Use the 2000 Highway Capacity Manual methodology for analysis on all state facilities: this method is used for the intersections along State Route 13 (Ashby Avenue) and State Route 123 (San Pablo Avenue), but not for the I-80, I-580 and SR 24 freeways, because the freeways are assessed using the CMA-required v/c methodology. This methodology is adequate for the assessment of these facilities, due to the high, in many cases over-capacity, volumes, which render the HCM methodology unable to produce a meaningful result.
- Use the LOS C/D threshold for assessment of state facilities: This EIR uses the LOS standards established by the local jurisdictions: CMA LOS standards for the CMA designated system, calculated using the v/c method, along with the citywide intersection LOS significance criteria as calculated with the 2000 HCM methodology (see Standards of Significance). This is the more standard analytical method in this area.
- Evaluate existing plus project conditions, along with cumulative conditions: the existing plus project case is not evaluated, because the project is a long-range plan which will take 15 or more years to build out.

4.12.3 LOCAL PLANS AND POLICIES

Although the University is constitutionally exempt from local regulations when using its property in furtherance of its educational purposes, it is University policy to evaluate proposed projects for consistency with local plans and policies. Therefore, this section outlines the plans and policy goals of the cities of Berkeley and Oakland related to transportation and traffic.

CITY OF BERKELEY

BERKELEY GENERAL PLAN

The Transportation Element of the City of Berkeley General Plan contains maps of the citywide transit network, vehicular circulation network, bicycle circulation network, and emergency access and evacuation network. It also contains 53 policies that together are intended to achieve the following six objectives:

- Maintain and improve public transportation services throughout the City.
- Reduce automobile use and vehicle miles traveled in Berkeley, and the related impacts by providing and advocating for transportation alternatives and subsidies that facilitate voluntary decisions to drive less.
- Improve the quality of life in Berkeley neighborhoods by calming and slowing traffic on all residential streets.
- Maintain and improve the existing infrastructure and facilities for the movement of people, goods, and vehicles within and through the City.
- Improve the management of public parking to better serve the needs of residents, businesses and visitors.
- Create a model bicycle and pedestrian-friendly city where bicycling and walking are safe, attractive, easy and convenient forms of transportation and recreation for people of all ages and abilities.

Virtually all of the City's transportation policies have a bearing on University faculty, staff, students and visitors, due to UC Berkeley's central location within the City. However, five policies (see Table 4.12-1) directly address issues related to UC Berkeley trans-

portation planning. In addition, Policy T-18 directs the City, when considering transportation impacts under the California Environmental Quality Act, to consider how a plan or project affects all modes of transportation, including transit riders, bicyclists, pedestrians and motorists to determine the transportation impacts of a plan or project. The policy includes an action to develop a multi-modal level of service to facilitate the above evaluations, but the City has not yet developed this tool.

FINDINGS OF THE BERKELEY GENERAL PLAN EIR

Over conditions current at the time of the General Plan (approximately year 2000), the City of Berkeley General Plan EIR assumed a net increase in Berkeley households of 3,176 (approximately 3,340 housing units); an increase in population of 6,955 people²; an increase of 10,895 jobs³ and a city-wide increase in automobile trips generated of approximately 5.1 percent.⁴ The City of Berkeley General Plan Final EIR assumed an increase of 3,284 new jobs in the period 2000 to 2020 for the immediate area of the Berkeley Campus Park and LBNL⁵ and an additional increase of 2,351 jobs in the larger area bounded by Hearst Avenue/Shattuck Avenue/Dwight Way/eastern City limits (3,284 plus 2,351 equals 5,635 in the larger area).⁶

Four impacts were identified in the City of Berkeley General Plan EIR related to traffic and transportation:

- The EIR found that certain Draft General Plan policies could result in significant traffic congestion, including: promoting transit first; implementing traffic calming measures; and creation of a multi-modal transportation impact evaluation methodology that allows traffic impacts to be deemed as mitigated where improvements occur in other travel modes.
- The EIR noted the potential for transit demand to exceed planned transit capacity as a result of the Draft General Plan's transit-related policies, to be mitigated by joint City/AC Transit monitoring of ridership and joint City/BART monitoring of ridership, and by City adoption of a Transportation Impact Fee (T-6).
- The EIR noted the potential for parking demand to exceed supply and thus impact transit services and residential parking supplies. This was addressed by Policy T-39, which deemed projects with below-standard or no parking less than significant for CEQA purposes, "based on the elasticity concept and the overriding desire to reduce traffic growth."
- The EIR noted that significant traffic volume growth on certain streets in the City could occur with build out under the General Plan. Despite mitigation and policies encouraging alternative transit modes, this impact was anticipated to remain significant and unavoidable.⁷

TABLE 4.12-1

BERKELEY GENERAL PLAN: POLICIES RELATED TO UC BERKELEY TRANSPORTATION PLANNING

T-13	Major Public Institutions. Work with other agencies and institutions, such as the University of California, the Berkeley Unified School District, Lawrence Berkeley Laboratory, Vista Community College, the Alameda County Court, and neighboring cities to promote Eco-Pass and to pursue other efforts to reduce automobile trips. <i>(Also see Land Use Policy LU-39.)</i>
T-16	Access by Proximity. Improve access by increasing proximity of residents to services, goods, and employment centers. <i>(Also see Land Use Policies LU-13 and LU-23, Housing Policy H-16, and Environmental Management Policy EM-41 Action B.)</i>
T-17	Transportation Planning. Involve local residents, businesses and institutions in all stages of transportation planning. <i>(Also see Citizen Participation Policies CP-1 through CP-5 and CP-8 through CP-10.)</i>
T-18	Level of Service. When considering transportation impacts under the California Environmental Quality Act, the City shall consider how a plan or project affects all modes of transportation, including transit riders, bicyclists, pedestrians, and motorists, to determine the transportation impacts of a plan or project. Significant beneficial impacts on air quality, noise, visual quality, or safety in residential areas, may offset or mitigate a significant adverse impact on vehicle Level of Service (LOS) to a level of insignificance. The number of transit riders, pedestrians, and bicyclists potentially affected will be considered when evaluating a degradation of LOS for motorists.
T-37	University of California and Large Employer Parking. Encourage large employers, such as the University of California and Berkeley Unified School District, to allocate existing employee parking on the basis of a) need for a vehicle on the job, b) number of passengers carried, c) disability, and d) lack of alternative public transportation. <i>(Also see Land Use Policy LU-39.)</i>
T-38	Inter-Jurisdictional Coordination. Establish partnerships with adjacent jurisdictions and agencies, such as the University of California and the Berkeley Unified School District, to reduce parking demand and encourage alternative modes of transportation.

BERKELEY BICYCLE PLAN

The City's *Bicycle Plan* was adopted in January 1999 with the goal "to make Berkeley a model bicycle-friendly city where bicycling is a safe, attractive, easy, and convenient form of transportation and recreation for people of all ages and bicycling abilities."⁸ The *Bicycle Plan* establishes bicycle-related policies covering five main areas of importance to bicycle transportation: Planning, Network and Facilities, Education and Safety, Promotion and Implementation.⁹ The *Bicycle Plan* also identifies a bicycle network for the City, which includes planned and existing UC Berkeley bikeways.¹⁰ The *Bicycle Plan* is a policy document which has been incorporated into the updated General Plan.¹¹

CITY OF OAKLAND

OAKLAND GENERAL PLAN

The City of Oakland Land Use and Transportation Element begins with the identification of transportation challenges and responses. The Element then identifies eight objectives for transportation and twelve objectives for neighborhoods, with specific poli-

cies for each objective. The objectives address safety, alternative transportation modes and traffic circulation. The objectives also encourage transit-oriented development and higher density housing and sound land use planning in order to take advantage of the existing circulation system. The Element contains 43 transportation policies and 69 neighborhood land-use policies that are intended to achieve these objectives. The Element also contains maps of the citywide roadway and transit network.

Some of Oakland's transportation policies may affect planning efforts by UC Berkeley. Three policies under Neighborhood Objective N2 for civic and institutional uses (N2.4, N2.5, and N2.8) address issues related to UC Berkeley, including locating new uses outside of residential areas, and balancing City and local benefits.

4.12.4 EXISTING SETTING

This section describes existing conditions in the 2020 LRDP area for roadway and intersection operations; construction activity; commute travel modes; parking conditions; bicycle circulation; pedestrian circulation; and transit service. The 2020 LRDP area includes all of Berkeley and portions of North Oakland. Figure 4.12-1 illustrates the roadway and freeway network in this area and the intersections included in the intersection analysis. Appendix F.1 includes descriptions of the regional and local roadway network serving the site.

ROADWAY AND INTERSECTION OPERATIONS

ANALYSIS LOCATIONS

Existing traffic conditions were studied at 74 intersections within the 2020 LRDP area, as shown in Figure 4.12-1.¹² These intersections were selected because they are either in the immediate vicinity of the Campus Park area, or along the main corridors providing access to the Campus Park. Table 4.12-1 contains a numbered list of these intersections, which corresponds to the numbered intersections in Figure 4.12-1.

Peak period turning movement counts were conducted from 7:00 to 9:00 a.m. and from 4:00 to 6:00 p.m. at the 74 study intersections. The counts were conducted during November and early December 2002, while UC Berkeley and local elementary, middle, and high schools were in session. Extensive field observations were also performed during the count periods to aid in understanding the existing area-wide traffic operations. As no major development or major change in city traffic volumes and patterns have occurred in the interim between the counts and publication of this EIR, the counts remain valid for this analysis.

The turning movement counts revealed that the peak traffic hour during the morning peak period for the study intersections at locations near the Campus Park is from 7:45 to 8:45 a.m. Intersections along most of the major streets within the LRDP area, including Shattuck Avenue, Ashby Avenue, University Avenue, portions of Oxford Street, and Fulton Street were found to peak from 8:00 to 9:00 a.m.

During the evening peak period, intersections along Oxford Street, Hearst Avenue, and Bancroft Way adjacent of the Campus Park were found to peak from 5:00 to 6:00 p.m., while Gayley Road and Piedmont Avenue peak between 4:00 and 5:00 p.m. Most inter-

sections south of Bancroft Way and east of Shattuck Avenue peak from 4:45 to 5:45 p.m. Shattuck Avenue and intersections north of Bancroft Way peak from 5:00 to 6:00 p.m.

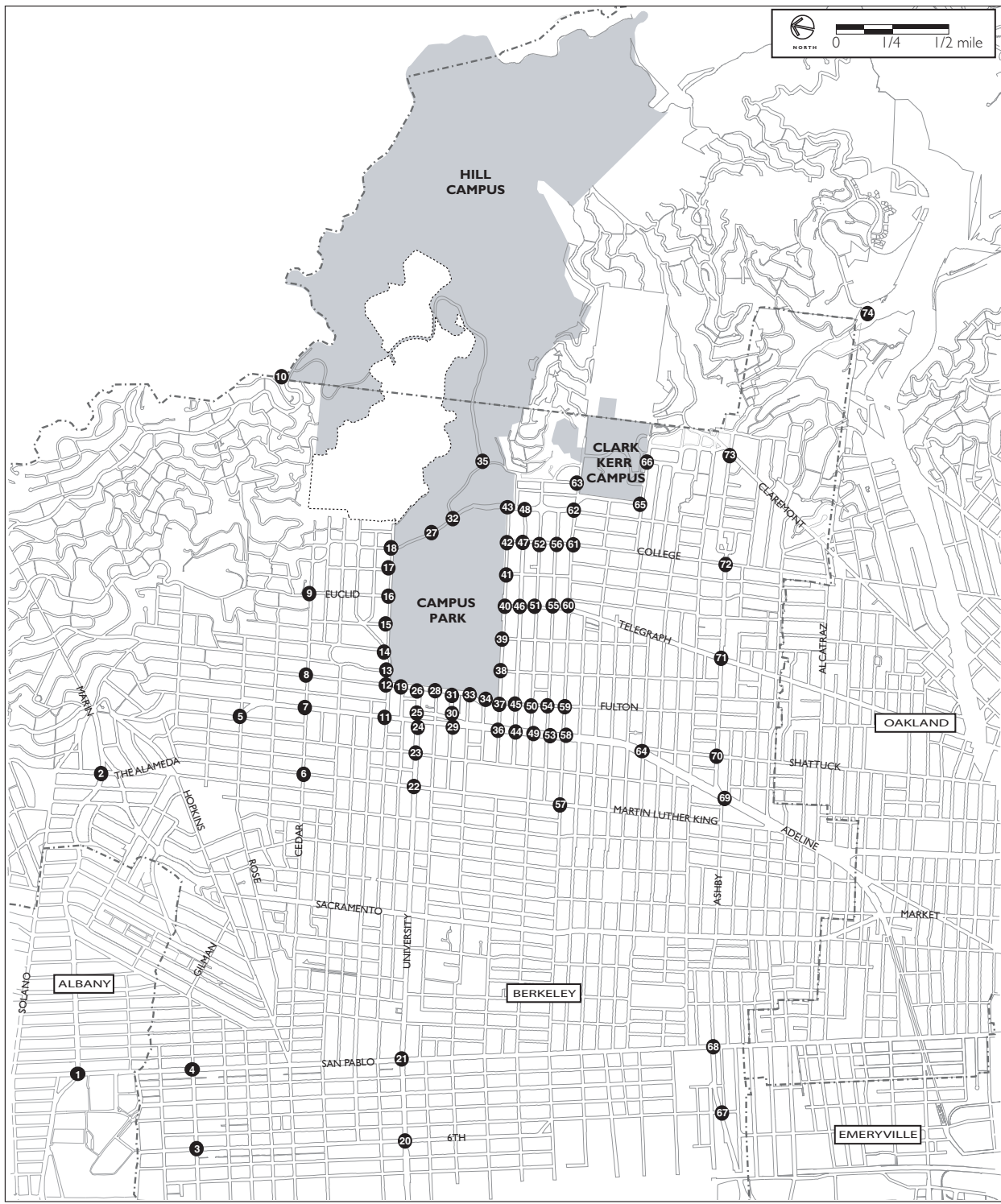
Appendix F.2 includes figures illustrating the existing peak hour intersection volumes and intersection lane configurations and intersection controls used in this report. Detailed existing AM and PM peak hour intersection turning movement counts are also included in Appendix F.2. The collected count data near five locations noted in Appendix F.1, section G.4, were adjusted to reflect previous count data and field observations.

INTERSECTION ANALYSIS METHODOLOGY

To measure and describe the operation of a local roadway network, transportation engineers and planners commonly use a grading system called Level of Service (LOS). The LOS grading system qualitatively characterizes traffic conditions associated with varying levels of traffic.¹³

LOS varies from LOS A, indicating free flow traffic conditions with little or no delay; to LOS F, representing over-saturated conditions where traffic flows exceed design capacity, resulting in long queues and delays. The LOS grading system is applied to the signalized and unsignalized intersection analysis. Level of service grades are described in Table F.1-1 through F.1-3 in Appendix F.1.

The City of Berkeley does not maintain a traffic LOS standard, but has adopted a policy in the General Plan that requires development of a multi-modal level-of-service measurement that treats all travel modes equitably. The most commonly applied LOS standard in other Bay Area and California jurisdictions is LOS D; i.e. LOS A-D are acceptable levels of operations and LOS E-F are not. Also common is the application of a standard that measures additional degradation in service if an intersection is already LOS E or F. The City of Oakland does not have LOS standards stated in its General Plan.



- Study Intersections
- UC Berkeley Campus
- - - City Limit Line
- Lawrence Berkeley National Laboratory Boundary

FIGURE 4.12-1
STUDY INTERSECTIONS

Note: Numbered study intersections correspond to intersections numbered and listed in Table F.3-1.

EXISTING INTERSECTION OPERATIONS

Figures 4.12-2 and 4.12-3 summarize the existing intersection level of service analysis results. Detailed calculation work sheets are provided in Appendix F.5. Under existing conditions, all but five study intersections operate at LOS D or better during the morning peak hour. Intersections operating at LOS E or LOS F during the morning peak hour include:

- The signalized **San Pablo Avenue/Marin Avenue** intersection, which operates at LOS E. Field observations indicate that the major problem with this intersection occurs on southbound San Pablo Avenue during the morning peak hour where the queue extends to the upstream intersection and does not clear at the end of each cycle.
- **University Avenue/Sixth Street** is a signalized intersection operating at LOS F during the morning peak hour. The worst delay occurs on eastbound University Avenue as traffic travels from Interstate 80 to destinations in Berkeley.
- **University Avenue/San Pablo Avenue** is a signalized intersection operating at LOS F during the morning peak hour. The worst delays are experienced by the heavy eastbound and southbound movements.
- **Bancroft Way/Piedmont Avenue**, a stop-controlled intersection, operates at LOS F due to the combination of traffic volumes on Piedmont Avenue traveling through the intersection and turning onto Bancroft Way, along with heavy pedestrian crossings of Piedmont Avenue and, to a lesser extent, Bancroft Way.
- The **Derby Street/Warring Street** intersection is an all-way stop-controlled intersection that operates at LOS F. The delay is experienced by vehicles on westbound Derby Street turning right to Warring Street to reach destinations north or Downtown, and on southbound Warring Street turning left to Derby Street by vehicles from locations north and Downtown heading toward Highway 13 and Highway 24.

During the evening peak hour, all but six study intersections operate at LOS D or better. Intersections operating at LOS E or LOS F during the evening peak hour include:

- The signalized **Gilman Street/Sixth Street** intersection operates at LOS E due to the heavy northbound left turn.
- The **University Avenue/Sixth Street** intersection operates at LOS F. Delay at the University/Sixth Street intersection is caused by the heavy southbound right, northbound left, and westbound through movements, which cause queues blocking upstream intersections.
- The **University Avenue/San Pablo Avenue** intersection operates at LOS F. At the University Avenue/San Pablo Avenue intersections, delays are caused by heavy southbound through, northbound left, and eastbound through movements, which cause queues extending to upstream intersections.
- The **Bancroft Way/Piedmont Avenue** intersection operates at LOS F due to the combination of traffic volumes on Piedmont Avenue traveling through the intersection and turning onto Bancroft Way, along with heavy pedestrian crossings of Piedmont Avenue and, to a lesser extent, Bancroft Way.
- The **Derby Street/Warring Street** intersection operates at LOS F due to the high volume of traffic turning left from southbound Warring Street to east-

bound Derby Street. These vehicle flows include commute traffic from Berkeley traveling to regional routes such as Highway 13 and Highway 24, as well as to local streets such as Claremont Avenue.

- The **Kittredge Street/Oxford Street** intersection is stop-controlled at the eastbound Kittredge Street approach. Thus, delay occurs only on the Kittredge Street approach, since the Oxford Street approaches are not controlled.

The 2000 HCM methodology for unsignalized intersections does not take pedestrian activity into account. When pedestrian activity is considered, the following changes to LOS would occur:

- **Bancroft Way/Piedmont Avenue.** Traffic operations at this all-way stop-controlled intersection are impeded by high pedestrian volumes crossing Piedmont Avenue. Based on observations, the intersection operates at LOS F during both morning and evening peak periods. Queues on the northbound Piedmont Avenue approach can spill back to Derby Street during the peak morning and evening commute times.
- **Other Intersections.** High pedestrian volumes at the stop-controlled Bancroft Way/College Avenue, Bancroft Way/Bowditch Street, and Hearst Avenue/Le Roy Avenue intersections also interfere with traffic operations. However, all three intersections were observed to operate at acceptable service levels during both morning and evening peak hours.

Based on field observations, it appears that additional congestion also occurs on some roadway segments but is not reflected in the intersection service level analysis. This was observed at the following locations:

- **Northbound College Avenue** south of Ashby Avenue during the morning peak hour.
- **Westbound Ashby Avenue** between Claremont Avenue and Shattuck Avenue during the evening peak hour.
- **Northbound Telegraph Avenue** between Dwight Way and Bancroft Way during the evening peak hour.
- **Northbound Shattuck Avenue** between Dwight Way and University Avenue during the evening peak hour.
- **Eastbound Gilman Street**, west of San Pablo Avenue during the evening peak hour.



Source: Fehr and Peers, November 2002.

LEVELS OF SERVICE

- A Free traffic flow, little or no vehicle movement or speed limitations.
- B Steady traffic flow, slight delays in vehicle movement & speed.
- C Reasonably steady, high-volume traffic flow, some movement & speed limitations.
- D Traffic nears unstable flow, short queues.
- E Slow movement, frequent stopping, long queues, blocked intersections.
- F Unsatisfactory stop-and-go traffic, "traffic jams", long stoppages.

----- Lawrence Berkeley National Laboratory Boundary

FIGURE 4.12-2
**EXISTING INTERSECTION
 LEVELS OF SERVICE AM PEAK HOUR**



Source: Fehr and Peers, November 2002.

LEVELS OF SERVICE

- Ⓐ Free traffic flow, little or no vehicle movement or speed limitations.
- Ⓑ Steady traffic flow, slight delays in vehicle movement & speed.
- Ⓒ Reasonably steady, high-volume traffic flow, some movement & speed limitations.
- Ⓓ Traffic nears unstable flow, short queues.
- Ⓔ Slow movement, frequent stopping, long queues, blocked intersections.
- Ⓕ Unsatisfactory stop-and-go traffic, "traffic jams", long stoppages.

..... Lawrence Berkeley National Laboratory Boundary

FIGURE 4.12-3
**EXISTING INTERSECTION
 LEVELS OF SERVICE PM PEAK HOUR**

TABLE 4.12-2
EXISTING (2002) LEVEL OF SERVICE SUMMARY CMP DESIGNATED SYSTEM

Route	From	To	LOS Standard	Standard Violated ^{2a}	Year 2002 PM Peak Hour LOS F Locations
Interstate 80	Contra Costa County line	Interstate 80 / 580 Split	E/F ^b	No	Both directions, except for westbound east of University
Interstate 580	Interstate 80 / 580 Split	Harrison Street	E/F ^c	No	None
Highway 24	Interstate 980	Contra Costa County line	E/F ^d	No	Eastbound between Interstate 580 and Fish Ranch Road
Highway 123 (San Pablo Avenue)	Contra Costa County line	Emeryville City limit	E	No	None
University Avenue	Interstate 80	Shattuck Avenue	E	No	None
Shattuck Avenue	University Avenue	Derby Street	E	No	None
Adeline Street	Derby Street	MLK Jr. Way	E	No	None
MLK Jr. Way	Adeline Street	Highway 24	E	No	None
Highway 13 (Ashby Avenue)	Interstate 80	Tunnel Road	E/F ^e	No	None
Highway 13 (Tunnel Road)	Ashby Avenue	Highway 24	E	No	None

^a Based on the 2002 p.m. peak hour monitoring.

^b Standard is F for both directions, except for westbound east of University Avenue.

^c Standard is F for eastbound between Interstate 80 and Harrison Street.

^d Standard is F for eastbound between Interstate 580 and Fish Ranch Road.

^e Standard is F for the following segments: westbound between Telegraph Avenue and Martin Luther King, Jr. Way, and eastbound between College Avenue and Domingo Street.

Source: 2002 *Level of Service Monitoring for the Alameda Congestion Management Agency*, November 2002.

CONGESTION MANAGEMENT PLAN AND METROPOLITAN TRANSPORTATION SYSTEM ROUTES

The Alameda County CMA monitors conditions on the CMP System, which in Berkeley includes the freeways, State routes, and several major arterials, shown in Figure 4.12-4. The CMA has determined that the acceptable LOS for all system routes is LOS E, except for segments which operated at LOS F in 1991, the first year of the CMP. The exempt segments with an LOS F standard within the LRDP area are as follows:

- **Interstate 80 westbound** from University Avenue to the Interstate 80/580 split.
- **Interstate 80 eastbound** from the Emeryville city limits to the Albany city limits.
- **Highway 24 eastbound** from Interstate 580 to Fish Ranch Road
- **Ashby Avenue (Highway 13) westbound** from Telegraph Avenue to Martin Luther King, Jr. Way.
- **Ashby Avenue (Highway 13) eastbound** from College Avenue to Domingo Street.

As shown in Table 4.12-2, the *2002 Level of Service Monitoring Report* shows all CMP routes in the LRDP area as meeting the standards.

CONSTRUCTION ACTIVITY

Baseline analysis for the 2020 LRDP EIR was conducted during a period of intensive building construction in Berkeley and at the UC Berkeley campus. Traffic counts and parking conditions analyses for this section were primarily conducted in the fall of 2002 and spring of 2003. In the fall of 2002, UC Berkeley projects under construction included the Jean Hargrove Music Library; 2195 Hearst Avenue; the central dining and office facility on the campus southside; LHS Forces that Shape the Bay exhibit; seismic retrofit projects at Wurster Hall, Barker Hall and the Archaeological Research Facility. Projects underway in the City of Berkeley included the housing project at 1370 University Avenue and building construction at Berkeley High School. In the spring of 2003, projects under construction also included infill housing at Units 1 and 2 on the southside of campus, and Channing-Bowditch housing.

COMMUTE TRAVEL MODES

A faculty/staff survey completed in 2001 indicates that 51% of faculty and staff drive alone to work at UC Berkeley. The percentage of campus commuters choosing transit increased slightly between 1996 and 2001, to approximately 18%. As distances between home and work have increased since 1996, fewer faculty and staff are walking to work. Only 37% of individuals who live within 5 miles of campus drive alone to work.

The primary commute mode for students, according to student survey completed in 2000, was walking, with some 52% arriving at campus on foot. More than 80% of students live within 5 miles of campus; approximately 10% of students drive alone.

PARKING CONDITIONS

This section describes existing parking supply and capacity for off-street parking facilities owned by the University and other entities, and for on-street parking.

UNIVERSITY PARKING

The University operated parking supply is scattered through the Campus Park and adjacent neighborhoods. The parking supply is controlled by permit regulations determined

by the Parking and Transportation Department, and are generally enforced by the University during weekday business hours (7:00 a.m. to 5:00 p.m.). Most University-operated parking facilities are open to the public for a fee during nights and weekends.

Table 4.12-3 lists the University's parking supply by permit category in the vicinity of the Campus Park. There are currently about 6,094 marked parking spaces and an additional 1,057 stacked attendant spaces for a total of 7,151 University-operated parking spaces, of which 250 are motorcycle spaces. About 82 percent of vehicle parking spaces are allocated to commuters, while the remaining spaces are assigned to residence halls (3.5 percent), visitors (5.5 percent), service/delivery (2.5 percent), department reserve (3.5 percent) and other (3 percent). Most commuter parking spaces are concentrated in parking garages adjacent to or within a five-minute walk to the Campus Park. Table 4.12-4 summarizes the parking supply in the major garages for University use only. This is a subset of the parking supply indicated in Table 4.12-3. Figure 4.12-5 shows the major (50+ spaces) parking facility locations in the vicinity of the Campus Park.

The University faculty/staff and student transportation surveys indicate that approximately 800 commuting faculty/staff and 3,000 commuting students currently drive and regularly park in non-University parking facilities. Most employees parking in non-University facilities are part-time employees, and not all the parking occurs at the same time.¹⁴

Despite the University's efforts to promote alternative commute modes¹⁵ and control parking demand, the University's current parking supply is insufficient to meet current parking demand. As a result, most commuter parking facilities operated by the University are at or near capacity during most of the day. In general, permit ratios are 1.2 permits per space for faculty and staff, and 2.6 permits per space for students.¹⁶ Consequently, parking permits do not guarantee a parking space.

The University parking facility demands peak at about 11:30 a.m. when 94 percent of parking spaces (including attendant parked spaces) in the major commuter facilities are occupied.¹⁷ This level of parking occupancy is considered the "practical capacity" of the system because the remaining 6 percent of spaces (170 spaces) are dispersed throughout several parking areas and are therefore difficult for users to find.

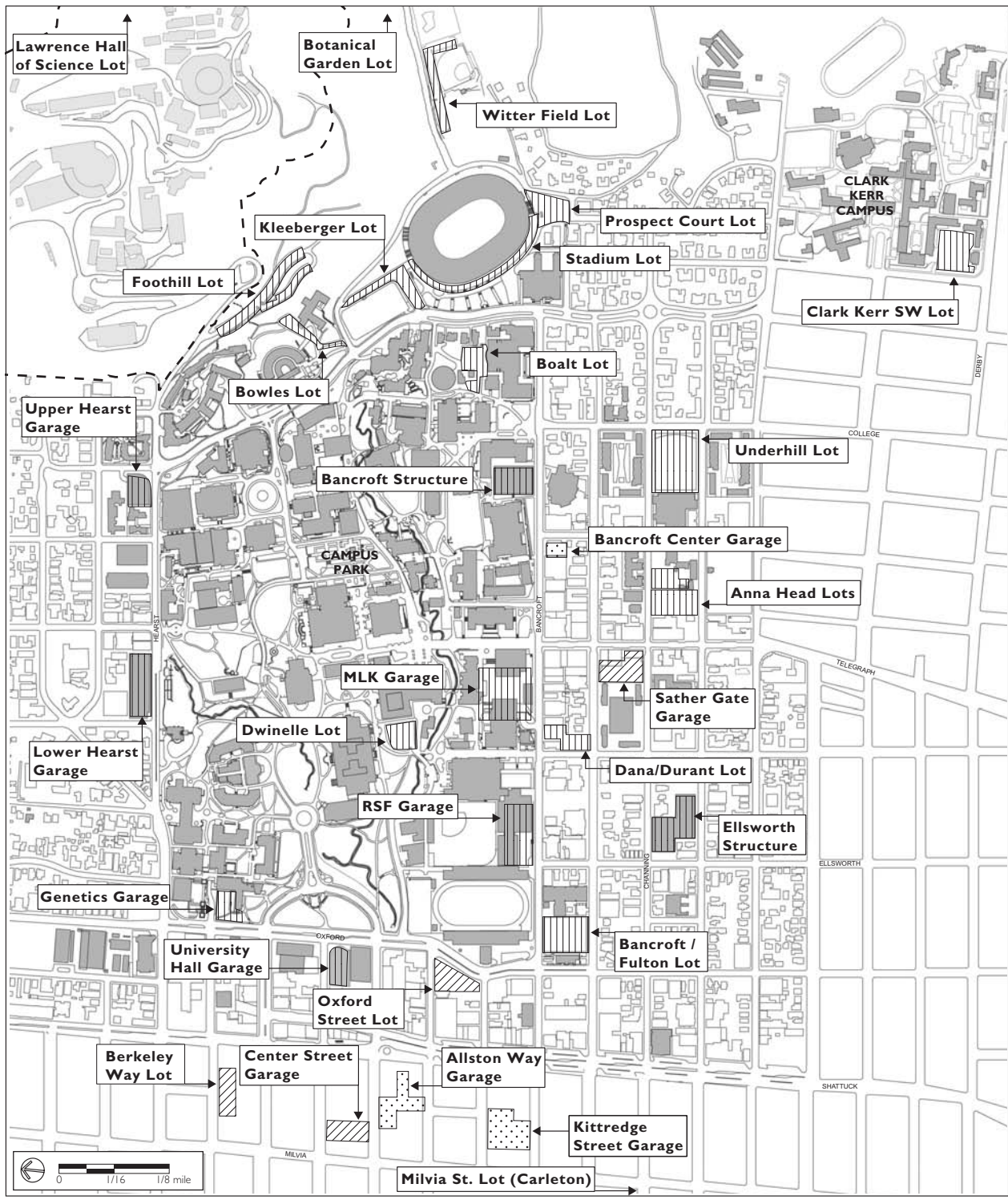
The total peak parking demand for parking at the University is estimated at about 11,465 parking spaces during the weekday critical midday period.¹⁸ The calculated demand assumes a suburban environment in which all users have access to adequate and strategically located parking spaces at current prices. The difference between the theoretical demand of 11,465 parking spaces and the existing parking supply of 7,151 spaces represents "latent demand," which refers to those users who do not currently park at the University because of constrained parking supply and other factors, but would drive and park in University parking facilities if more parking spaces at current prices were provided on or in close proximity to the Campus Park.



Source: Alameda County Congestion Management Agency, Congestion Management Program, 2001.

- - - State Highway (CMP & MTS)
- == Principal Arterial (CMP & MTS)
- MTS Routes
- - - - City Limit Line
- Lawrence Berkeley National Laboratory Boundary

FIGURE 4.12-4
**CONGESTION MANAGEMENT PROGRAM DESIGNATED SYSTEMS
 AND METROPOLITAN TRANSPORTATION SYSTEM ROUTES**



Sources: Downtown/Southside TDM Study, 2001;
 UC Berkeley Office of Public Safety & Transportation, January 2003.




-  **University-Owned**
-  **City-Owned**
-  **Privately-Owned**
- - - Lawrence Berkeley National Laboratory Boundary**

FIGURE 4.12-5
**PARKING FACILITIES WITH
 AT LEAST 50 SPACES**

**TABLE 4.12-3
EXISTING UC BERKELEY PARKING SUPPLY BY PERMIT TYPE**

Parking Facility	Regular Spaces	Attendant Parking
Commuter		
<i>Campus Park</i>	1,255	190
<i>Faculty-Staff</i>	1,467	365
<i>General Fee Lot</i>	1,066	205
<i>Student Fee Lot</i>	544	297
<i>Disabled Person</i>	192	0
<i>Carpool</i>	53	0
Subtotal	4,577	1,057
Visitor		
<i>Metered</i>	78	0
<i>Public Parking</i>	317	0
Subtotal	395	0
Service/Delivery		
<i>Service/Maintenance</i>	72	0
<i>Plant Operations (PPCS)</i>	47	0
<i>Loading/Unloading</i>	57	0
Subtotal	176	0
Department Reserve	245	0
Residence Hall	238	0
Special Area	16	0
Other	197	0
Total Vehicle Spaces	5,844	1,057
Motorcycle spaces	250	0
Total Parking Spaces	6,094	1,057

Source: UC Berkeley, Parking and Transportation, Parking Space Inventory, July 2002.

**TABLE 4.12-4
MAJOR COMMUTER PARKING FACILITIES IN THE UC BERKELEY PARKING SUPPLY**

Parking Facility	Regular Spaces	Attendant Parking
Bancroft/Fulton Lot	231	75
Ellsworth Structure	271	112
Foothill Lot	218	90
Genetics Garage	325	0
Lower Hearst Garage	489	210
RSF Garage	249	67
Underhill	222	85
University Hall Garage	311	83
Upper Hearst Garage	357	120
Total Parking Supply	2,673	842

This is a partial list of all commuter parking facilities. Only facilities with more than 200 commuter spaces are listed.

Source: UC Berkeley, Parking and Transportation, Parking Space Inventory, July 2002.

UC Berkeley Extension does not provide parking facilities for students at its Berkeley locations. Public and private parking facilities are available near all of the facilities. On-street parking also accommodates some students at or near all Berkeley sites. A Fall 2003 UC Berkeley Extension student transportation survey, which returned over 1,000 responses, indicates that just over half of the students (51.4%) drive or carpool to class. The remaining 43.5% use public transit, other personal transportation devices, or walk to class. Just under 5% of the students use bicycles as their mode of transportation.

NON-UNIVERSITY OFF-STREET PARKING

In addition to the University's parking facilities, about 3,000 City or privately-owned parking spaces are located in major commercial and non-University employment areas. These facilities, listed in Table 4.12-5, can be attractive to those students and visitors who need access to campus for short time periods. They are less attractive for employees and others who stay on campus for extended periods due to the higher fees charged for long-term parking.

The parking supply and demand at the major non-University parking facilities are summarized in Table 4.12-5. During the weekday afternoon peak period, the parking occupancy at most non-University parking facilities is at or near capacity. With the exception of the City operated Oxford Street Lot, typical weekday night and weekend parking demand is substantially lower than the weekday afternoon peak period. Lower demand occurs because University parking supplies are available to the public on nights and weekends and on-street parking time limit restrictions are not enforced.

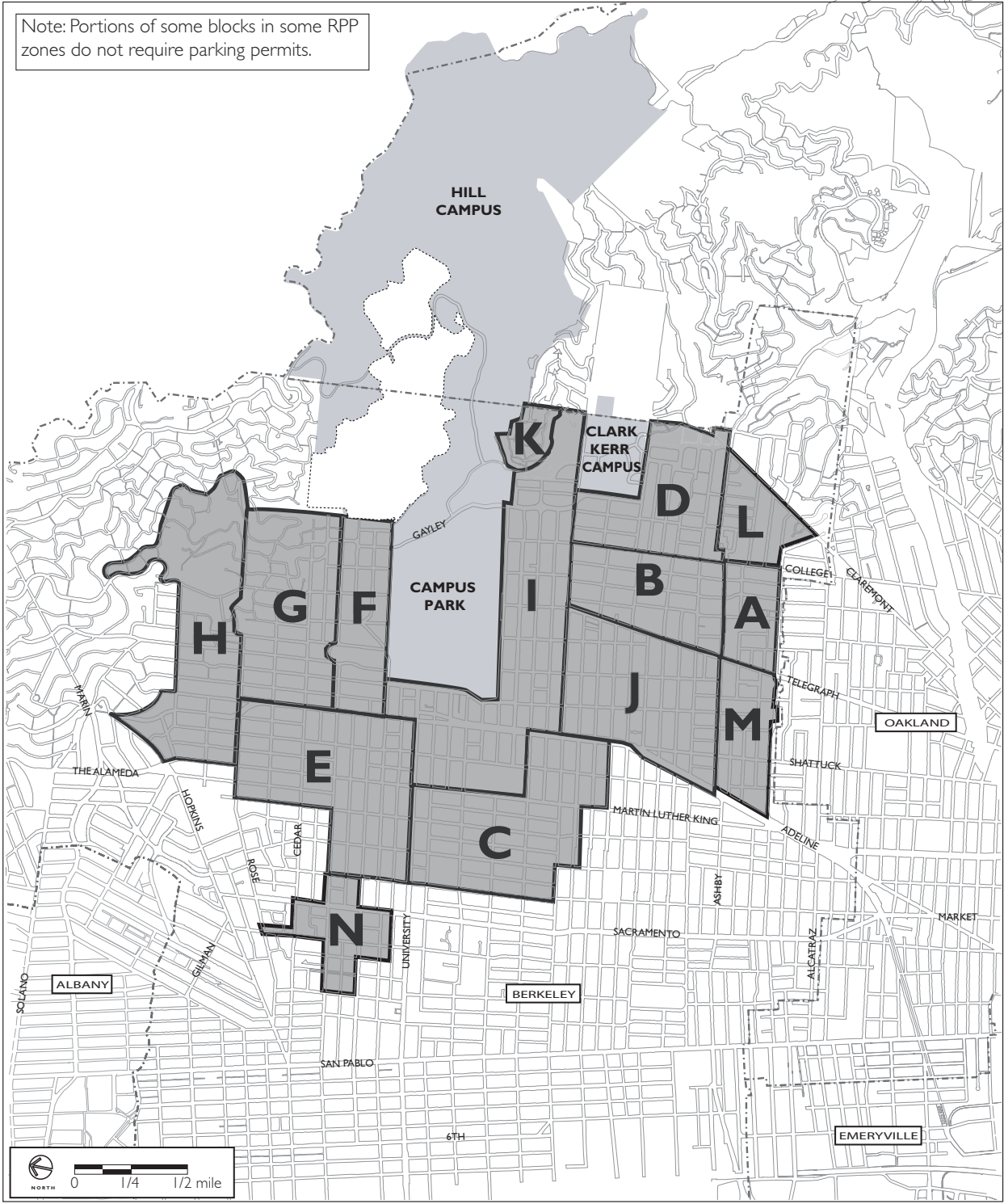
ON-STREET PARKING

Most of the on-street parking in the vicinity of the Campus Park (except in the Hill Campus) is limited to two hours or less for visitors, either due to Residential Permit Program (RPP) zones or to meters or signs which limit parking duration. The City's RPP program established zones surrounding Downtown, the University, Alta Bates Hospital and the North Berkeley and Ashby BART Stations. Residents of those zones buy permits to park on the streets, and non-resident parking is generally limited to two hours between 8:00 a.m. and 7:00 p.m. on weekdays and in some locations on Saturdays.

The RPP Program has generally been successful in improving parking availability for residents; however, based on the transportation consultant's observations of on-street parking occupancy levels at various times of day within the Adjacent Blocks and Southside, on-street parking is typically used to capacity. Figure 4.12-6 shows the RPP zones in the vicinity of the Campus Park.

Parking meters installed in the commercial districts generally limit parking for up to two hours between 9:00 a.m. and 6:00 p.m. on weekdays and Saturdays. Time limits and enforcements are intended to discourage all-day use of on-street parking by commuters and employees. As a result of the RPP and the parking meters, there are no all-day on-street parking spaces available in the vicinity of Campus Park. Parking meters are not a viable option for most University faculty, staff, students and visitors because of the high on-street parking occupancy levels and the 30-minute, one-hour and two-hour time limitations of the meters, which do not allow enough time for typical stays on campus.¹⁹

Note: Portions of some blocks in some RPP zones do not require parking permits.



Source: <http://www.ci.berkeley.ca.us/finance/residentialparking.html>, January 2004.

- A** Residential Permit Parking
- - - - - City Limit Line
- Lawrence Berkeley National Laboratory Boundary

FIGURE 4.12-6
RESIDENTIAL PERMIT PARKING
ZONES IN BERKELEY

TABLE 4.12-5
PARKING SUPPLY AND DEMAND AT MAJOR NON-UNIVERSITY PARKING FACILITIES

Parking Facility	Parking Supply	Weekday Demand		Saturday
		Afternoon ^a	Night ^b	Afternoon Demand ^c
Berkeley Way Lot	113	94%	76%	68%
Center Street Garage	435	89%	31%	41%
Allston Way Garage	630	95%	42%	24%
Kittredge Street Garage	362	76%	51%	51%
Oxford Street Lot	132	91%	93%	95%
Sather Gate Garage	441	100%	N.A.	N.A.

^a Based on data collected by Fehr & Peers Associates on November 6, 2001 between 2:00 p.m. and 3:00 p.m. for all parking facilities except Sather Gate Garage. Parking occupancy for the Sather Gate Garage is from the Downtown/Southside TDM Study.

^b Based on data collected by Fehr & Peers Associates on April 10, 2002 between 7:00 p.m. and 8:00 p.m..

^c Based on data collected by Fehr & Peers Associates on April 13, 2002 between 2:00 p.m. and 3:00 p.m.

Source: Fehr & Peers Associates, January 2003.

BICYCLE CIRCULATION

In general, City of Berkeley has a high rate of bicycling compared to Alameda County as a whole, with about five percent of Berkeley’s employed residents regularly commuting to work by bicycle, compared to one percent for all of Alameda County.²⁰

Figure 4.12-7 shows the Berkeley Bicycle Plan’s recommended bikeway network in the vicinity of the Campus Park. Not all of the segments have been completed, and the location of some proposed bikeways may change. On City streets surrounding the Campus Park, bike boulevards were recently added to Channing Way, Virginia Street, Bowditch Street/Hillegass Avenue, and Milvia Street. Bike lanes (Class II routes) near the campus are on Hearst Avenue (between California and Arch), Oxford/Fulton Streets (between Hearst and Dwight), Center Street (between Milvia and Shattuck), and Dana Street (between Bancroft and Dwight). The Bicycle Plan is further discussed in Section 4.12.5, Future 2020 Baseline Conditions.

Although not explicitly designated, bicycle riding is permitted in most areas of the Campus Park, except at the specified “dismount area”. Figure 4.12-7 shows the recommended campus bicycle routes. Bicycle parking is provided near most of the major buildings on campus.

Figure 4.12-8 provides bicycle volumes at select intersections in the vicinity of the Campus Park. Aspects of the City’s layout, such as the grid street network and the neighborhood automobile traffic diversion system, enhance bicycle mobility. However, high traffic volumes/speeds on major streets, area topography, physical roadway conditions, and one-way streets detract from bicycling safety and convenience.

In March 2000, the City of Berkeley Bicycle and Pedestrian Safety Task Force prepared an extensive evaluation and made recommendations to improve intersection operations for pedestrians and bicyclists.

**TABLE 4.12-6
INTERSECTIONS WITH HIGHEST PEDESTRIAN AND BICYCLE COMBINED COLLISIONS (1994-1998)**

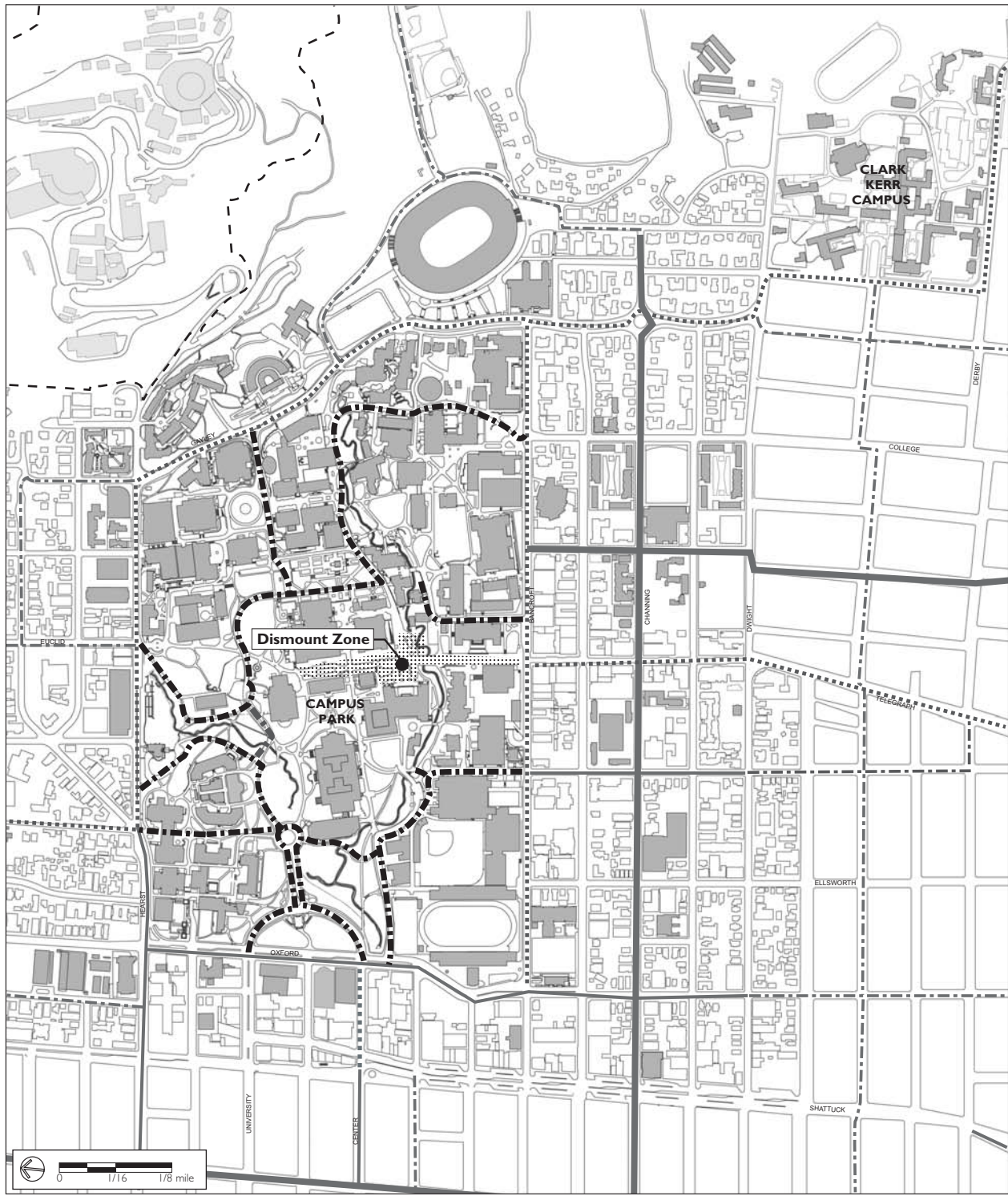
Intersection	Combined Pedestrian and Bicycle Collisions
Shattuck/University	29
Durant/Telegraph	15
Ashby/Sacramento; Oxford/University; and Gilman/San Pablo (tied).	13 each
Allston/Shattuck; Ashby/MLK; San Pablo/ University; and Bancroft/Bowditch (tied).	12 each
Ashby/San Pablo; Bancroft/Dana; College/Russell; Hearst/Oxford; Milvia/University; and MLK/University (tied).	11 each

Source: City of Berkeley Bicycle and Pedestrian Safety Task Force Evaluation and Recommendations Final Report, March 2000.

PEDESTRIAN CIRCULATION

Figure 4.12-9 shows pedestrian volumes at intersections in the vicinity of the Campus Park, as reported in the 2001 *Southside/Downtown TDM Study*. As expected, pedestrian volumes are heaviest on Telegraph Avenue in the five blocks approaching the Campus Park, and on Shattuck Avenue in the vicinity of the Berkeley BART Station.

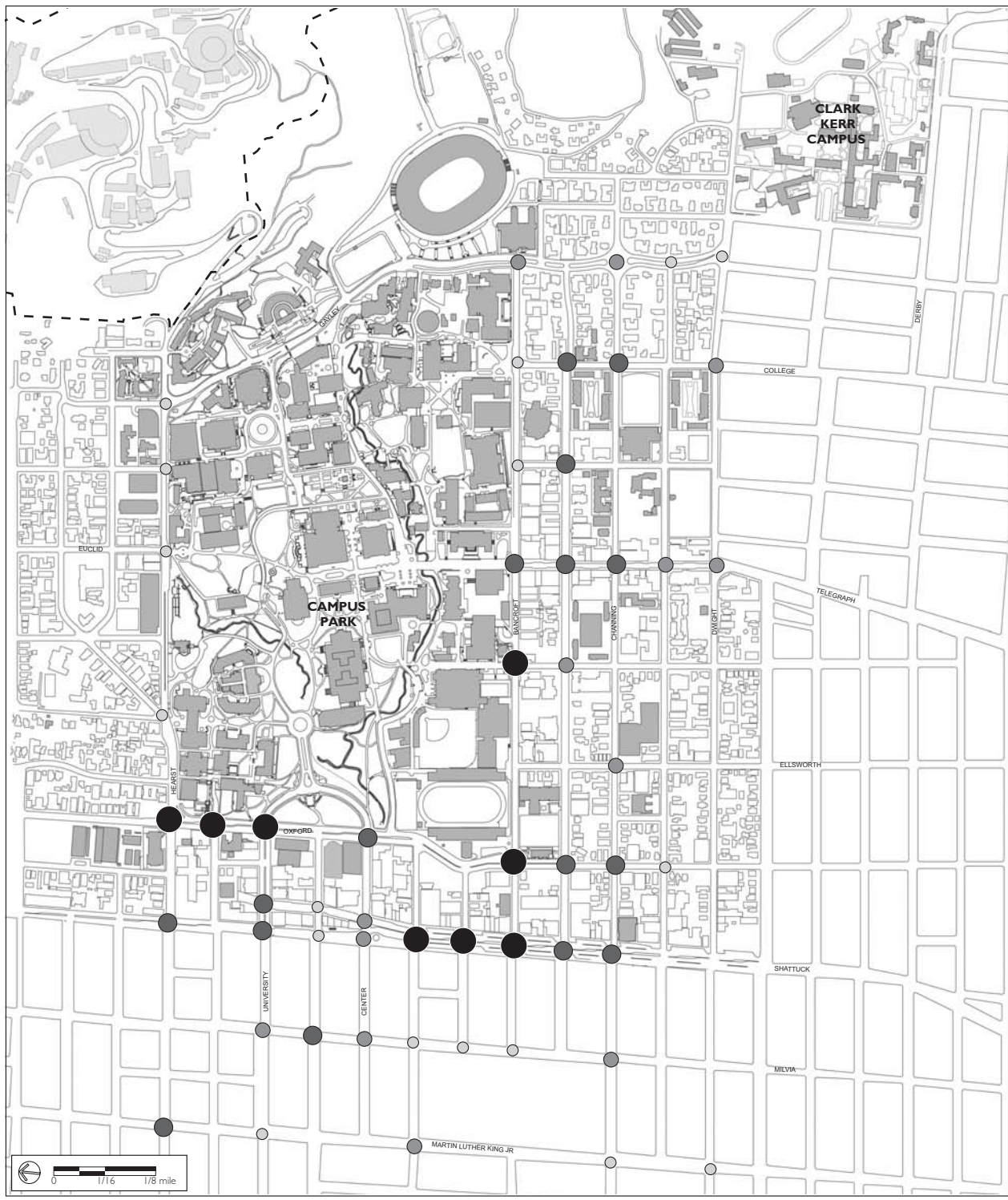
The majority of reported pedestrian accidents take place within a one-quarter mile radius of elementary, middle, or high schools.²¹ In the Downtown area, a disproportionate number of pedestrian collisions involve victims in the 18-24 age group, indicative of the nearby University related activities. On Ashby Avenue, a disproportionate number of pedestrian collisions involve victims in the 5-9 age group. A disproportionate number of bicycle accidents include victims in the 18-24 age group.²² Table 4.12-6 presents the intersections with the highest combined pedestrian and bicycle collisions.



Sources: UC Berkeley Office of Public Safety & Transportation, January 2004; Berkeley Bicycle Plan, Adopted April 2000.
 NOTE: Some bike plan segments are not yet complete.

- ■ ■ ■ Campus Routes (recommended)
- Boulevards (bicycle priority street)
- Class 2 (striped lanes and signs)
- Class 2.5 (upgraded bike route)
- - - - Class 3 (signs, no striped lanes)
- - - Lawrence Berkeley National Laboratory Boundary

FIGURE 4.12-7
**CAMPUS BICYCLE ROUTES AND BERKELEY
 RECOMMENDED BIKEWAY NETWORK**



Sources: Downtown/Southside TDM Study, 2001;
 Intersection Counts by Fehr and Peers Associates, 1998-2002.

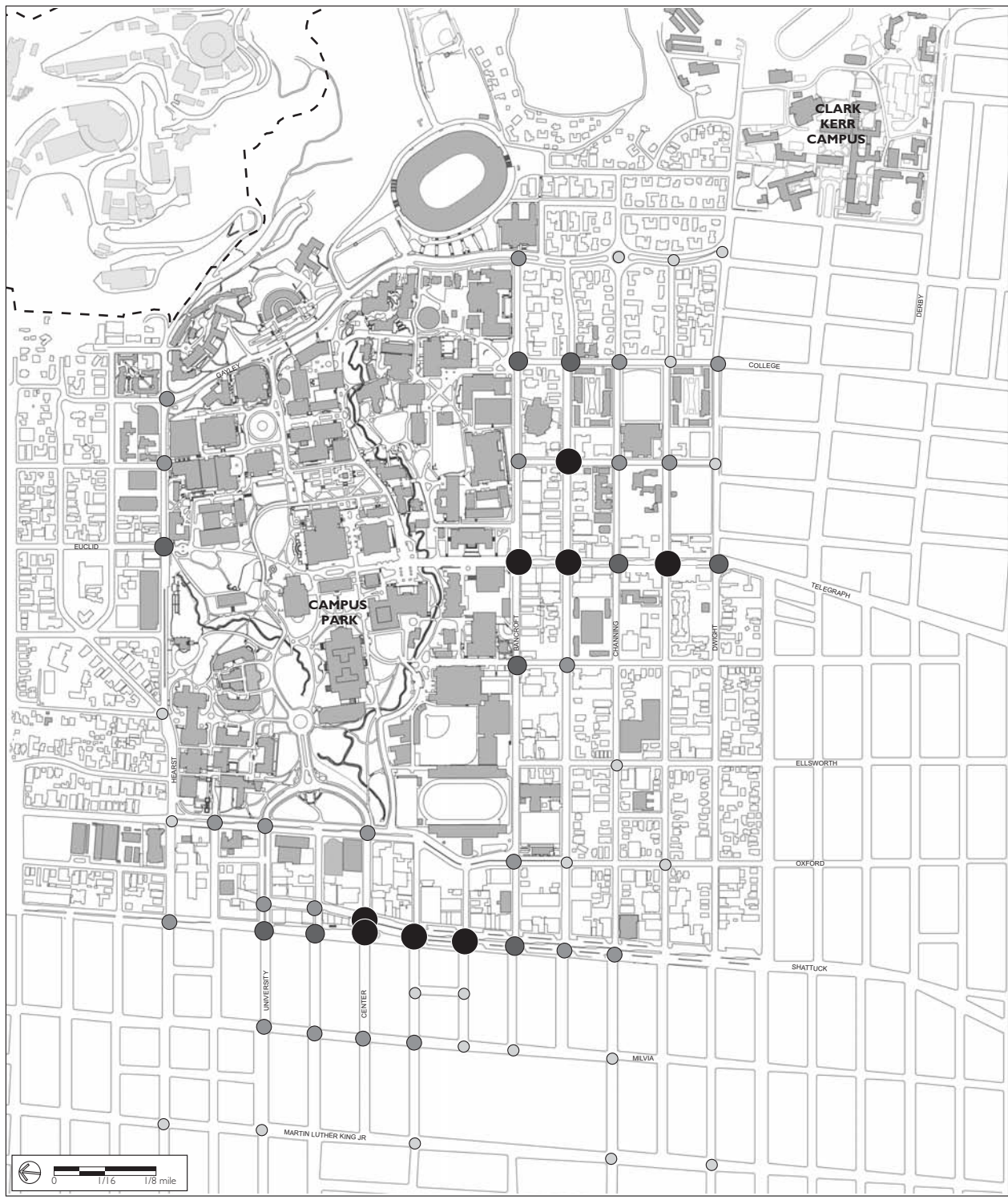
PEAK HOUR BICYCLE VOLUME* - ALL DIRECTIONS

- 1 - 75
- 76 - 100
- 101 - 150
- Above 150

*Note: Peak hour varies among intersections and represents the highest volumes that were observed for the total intersection. Volume is the number of bicycles passing through the intersection during the peak hour.

--- Lawrence Berkeley National Laboratory Boundary

**FIGURE 4.12-8
 EXISTING BICYCLE VOLUMES**



Sources: Downtown/Southside TDM Study, 2001;
 Intersection Counts by Fehr and Peers Associates, 1998-2002.

PEAK HOUR PEDESTRIAN VOLUME* - ALL DIRECTIONS

- 1 - 500
- 501 - 1000
- 1001 - 1500
- Above 1500

*Note: Peak hour varies among intersections and represents the highest volumes that were observed for the total intersection. Volume is the number of pedestrian passing through the intersection during the peak hour.

--- Lawrence Berkeley National Laboratory Boundary

**FIGURE 4.12-9
 EXISTING PEDESTRIAN VOLUMES**

TRANSIT SERVICE

Transit service in the vicinity of the project site is provided by BART (Bay Area Rapid Transit), AC Transit (Alameda-Contra Costa Transit), and the UC Berkeley shuttle service.

BART

BART provides regional commuter rail transit in Alameda, Contra Costa, San Francisco, and San Mateo counties. Currently, BART trains operate on weekdays from 4:00 a.m. to midnight, on Saturdays from 6:00 a.m. to midnight, and on Sundays from 8:00 a.m. to midnight. The nearest BART station to the Campus Park is the Downtown Berkeley Station located one block west of the Campus Park at the Center Street/Shattuck Avenue intersection.

Approximately 23,000 weekday, 9,400 Saturday, and 7,600 Sunday entries and exits were recorded at the Downtown Berkeley BART Station in July 2001. About 8,700 weekday, 3,800 Saturday, and 2,500 Sunday entries and exits were recorded at the Rockridge BART Station.²³

Table 4.12-7 provides average peak hour load factors for the BART lines serving the Campus Park. Load factor is defined as the ratio of passengers to seating capacity. Based on BART ridership data, the system's peak load factors generally occur on BART trains in the Transbay Tube. However, none of the BART lines is operating at practical operating capacity.

Effective January 1, 2004, the minimum BART fare increased by 10%, from \$1.15 to \$1.25. Ticket to Go vendors around the bay area will continue to sell BART's blue high value tickets at a 6.25% discount. A 75% discount is still available to seniors, disabled persons, and children aged 5 to 12 while children up to the age of four ride free.

AC TRANSIT

Local bus service in Berkeley is provided by AC Transit. Within the City of Berkeley, at least one AC Transit route provides service within walking distance (1/4 miles) of nearly every resident in the City. Twelve bus routes provide service to the Campus Park. Figure 4.12-10 illustrates the existing AC Transit routes throughout Berkeley, and Figure 4.12-11 shows the routes in the vicinity of the Campus Park. All routes, except routes F/FS, provide service between downtown Berkeley, local Berkeley neighborhoods and other nearby cities. Routes F/FS provide service to and from the Transbay Terminal in San Francisco.²⁴

Table 4.12-8 summarizes morning and evening peak hour service frequency and ridership levels for each route serving the Campus Park vicinity. For several routes, the most recent data are from 1997-1998, while for other routes (15, 40, 43, 51, 64 and F/FS) data are available from both 1997-1998 and 2002-2003. For the older data, the average AM and PM peak hour ridership along the entire route is given, by direction. These data indicate peak hour load factors (ratio of occupied seats over total seats) ranging from 0.06 to 0.47. (Seating capacity is generally 40).

For the 2002-2003 data, average peak hour load factors are given for the single peak hour of the day, in some cases the morning commute hour, and in others the evening commute hour. These load factors range from 0.37 (on route 64) to 0.77 (on route 43).

The 2002-2003 data is indicated with brackets in Table 4.12-8. The stop-by-stop data indicate that routes 15, 51, and 40L have short periods (a few stops on one to three buses during the peak hour) of standing-room only operation in the Southside area. However, the maximum ridership recorded at any given stop is 47 occupants, well below the 150% of seating capacity that is considered the maximum load by AC Transit.²⁵

UC Berkeley student fees include an AC Transit Class Pass which provides unlimited ridership during the semester. A survey of University students regarding the use of the Class Pass was conducted in January 2001 and January 2002. The survey findings are summarized below:

- About 85 percent of all students use the Class Pass to ride AC Transit buses at least once a week.
- About 21 percent of all students use the Class Pass to ride AC Transit buses at least once a day.
- The most popular bus routes are 51 (25 percent of all Class Pass users), 52 (11 percent), 7 (10 percent), 40 (10 percent), and 52L (10 percent).
- About 42 percent of all Class Pass users use AC Transit to commute between home and school and about 44 percent use AC Transit for shopping, recreation, or social purposes.
- About 31 percent of Class Pass users are graduate students, 40 percent are upper division students, and 29 percent are lower division students.

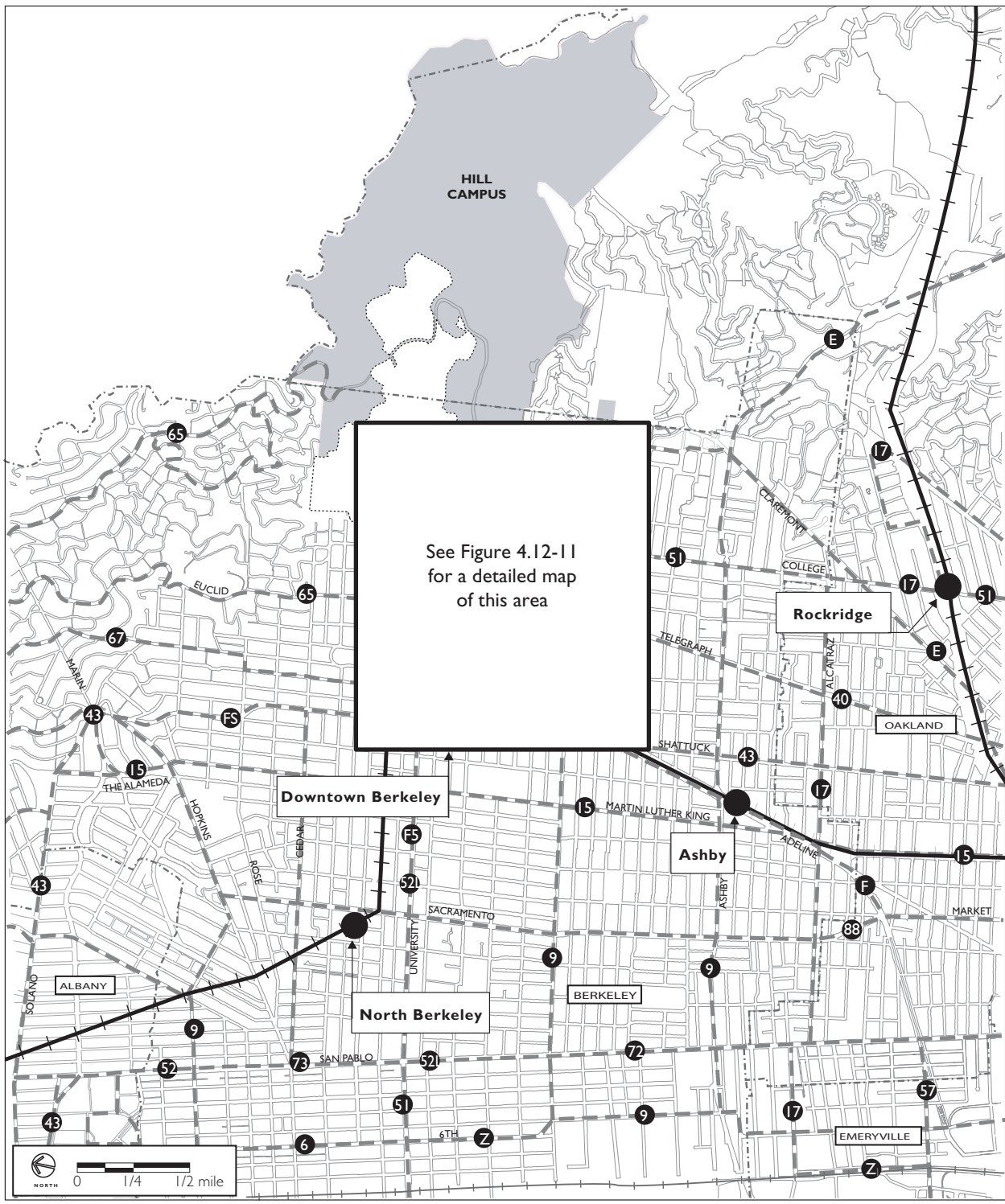
In conjunction with the City of Berkeley, AC Transit established the Eco Pass program. The City program provides a free AC Transit bus pass to benefited City employees. The annual cost to the City is not to exceed \$100,000. According to a September 2003 summary update on the Eco Pass, in 2003 passes were distributed to all eligible employees with their paychecks. The Berkeley City Council also approved a two-year contract extension, allowing the program to run through the end of 2005.

Effective June 29, 2003, AC Transit made the following service reductions to transit lines serving the UC Berkeley campus:

- Line 8: Discontinued. Some portions covered by Line 65.
- Line 9: Less frequent service. Some portions discontinued.
- Line 51: Service in City of Alameda discontinued.
- Line 64: Discontinued.
- Line 65: Less frequent service.

Effective September 1, 2003, AC Transit made the following fare changes due to budget constraints:

- BART Plus tickets no longer accepted on AC Transit buses
- Price increase for 10-ride and 31-day tickets
- Transfers good for 1 ½ hours and one use only
- Day passes and transbay youth/senior/disabled passes eliminated
- Price increase for senior/disabled monthly sticker
- Annual Youth Pass program for middle and high school students discontinued



Sources: Fehr and Peers, 2003; AC Transit Bus System and Transit Map, 2003.

- +—+—+ Amtrak Capitol Corridor
- +—+—+ BART Line
- BART Station
- # AC Transit Bus Route Number
- AC Transit
- - - - - City Limit Line
- Lawrence Berkeley National Laboratory Boundary

FIGURE 4.12-10
BART LINE AND AC TRANSIT
BUS ROUTES



Sources: Downtown/Southside TDM Study, 2001; AC Transit Bus System and Transit Map, 2003; UC Berkeley Office of Public Safety & Transportation, January 2003.

- BART Station
- +— BART Line
- - - AC Transit
- # AC Transit Bus Route Number
- - - - Lawrence Berkeley National Laboratory Boundary

FIGURE 4.12-11
**AC TRANSIT BUS ROUTES
 CAMPUS PARK AND CITY ENVIRONS**

**TABLE 4.12-7
BART PEAK HOUR LOAD FACTORS FALL 2002**

Line	AM Peak Hour		PM Peak Hour	
	Peak Load Factor ^a	Load Factor	Peak Load Factor ^a	Load Factor
		Near Campus Park ^b		Near Campus
Richmond – Fremont	1.09	0.92	0.93	0.83
Daly City / Colma – Richmond	1.12	0.92	1.07	0.83
Daly City / Colma – Concord	1.16	1.14	1.14	1.01

^a Peak load factor on the entire line.

^b Peak hour load factor at the Downtown Berkeley Station for the Richmond - Fremont and Daly City / Colma – Richmond lines and at the Rockridge Station for the Daly City / Colma – Concord line.

Source: Bay Area Rapid Transit District, January 2003

**TABLE 4.12-8
AC TRANSIT AVERAGE PEAK HOUR LOAD FACTORS^a**

Bus Line	AM Peak Hour ^a		PM Peak Hour ^a	
	Riders	Load Factor	Riders	Load Factor
7 Northbound	9	0.31	14	0.47
7 Southbound	10	0.33	12	0.40
8 Northbound	2	0.13	6	0.46
8 Southbound	4	0.30	2	0.13
9 Eastbound	8	0.66	4	0.30
9 Westbound	3	0.24	6	0.50
15 Eastbound	11	0.24	9	0.19
15 Westbound	14 [19]	0.29 [0.48]	7	0.15
40 Northbound	20 [29]	0.49 [0.73]	11	0.27
40 Southbound	8	0.20	11	0.27
43 Northbound	14 [31]	0.36 [0.77]	13	0.34
43 Southbound	12	0.29	13	0.32
51 Southbound	14	0.35	10	0.26
51 Northbound	15 [26]	0.37 [0.65]	14	0.36
52 Northbound	1	0.01	10	0.85
52 Southbound	5	0.42	2	0.17
52L Northbound	1	0.03	7	0.17
52L Southbound	13	0.33	3	0.06
65 Eastbound	4	0.14	8	0.26
65 Westbound	5	0.17	4	0.14
67 Northbound	2	0.19	1	0.11
67 Southbound	1	0.08	3	0.24
F/FS Eastbound	n.a.	n.a.	n.a. [16]	n.a. [0.39]
F/FS Westbound	n.a.	n.a.	n.a.	n.a.

^a Except for bracketed data, numbers reflects the average number of on-board passengers for the entire bus line for 1997-1998 conditions. AM peak hour is between 7:00 a.m. and 9:00 a.m., and p.m. peak hour is between 4:00 p.m. and 6:00 p.m. Bracketed numbers reflect peak hour peak direction load factors for selected routes in 2002-2003.

Source: AC Transit Research and Planning Department.



Source: UC Berkeley of Public Safety and Transportation, January 2003.

- — — UC Shuttle Route - Day
- UC Shuttle Route - Night
- - - - Lawrence Berkeley National Laboratory Boundary

FIGURE 4.12-12
**UC BERKELEY BEAR TRANSIT
 CAMPUS SHUTTLE ROUTES**

BEAR TRANSIT

BEAR Transit, operated by UC Berkeley, primarily serves the UC Berkeley community, providing service between the Campus Park, surrounding neighborhoods, and select destinations, as shown in Figure 4.12-12. In general, the daytime shuttles operate on a fixed route and schedule between 7:00 a.m. and 9:00 p.m. The night shuttles operate on a fixed schedule between 9:00 p.m. and 3:00 a.m., and provide door-to-door service throughout the service area between 3:00 a.m. and 6:00 a.m.

BEAR Transit operates at capacity during the AM and PM peak hours, with load factors of 1.39 and 1.25, respectively. This is based on service providing 8-minute headways with 45-seat vehicles during the peak periods.²⁶

The Class Pass allows students to ride all BEAR Transit shuttle buses, except the Richmond Field Station shuttle line. The cost for the Richmond Field Station Shuttle for all riders is \$1.00 and \$0.50 per ride for day shuttles for non-affiliate riders. About 55 percent of all students use their Class Pass to ride BEAR Transit shuttles at least once a week, and about seven percent of all students use their Class Pass to ride BEAR Transit shuttles at least once a day.

4.12.5 FUTURE 2020 BASELINE CONDITIONS

Future baseline conditions were modeled for the LRDP area intersections and CMP/MTS facilities in order to assess projected traffic growth without the projected 2020 LRDP-generated traffic. Appendix F.1 contains a description of the modeling methodology, utilizing the Alameda County CMA Countywide Transportation Demand Model.

BASELINE 2020 INTERSECTION OPERATIONS

The 2020 Without Project AM and PM peak hour intersection turning movement volumes and level of service calculations are presented in Appendix F.5. Summaries of the intersection level of service analysis results are presented in Appendix F.3, Table F.3-1. In addition to those intersections discussed previously in this chapter, these additional intersections are projected to operate unacceptably in 2020 without the 2020 LRDP

- The signalized Gilman Street/San Pablo Avenue intersection would operate at LOS E during the evening peak hour. This service level is caused by high eastbound volume.
- The signalized **Cedar Street / Oxford Street** intersection would operate at LOS E during the morning peak hour. This service level is caused by high eastbound and westbound volumes.
- The signalized **Hearst Avenue / Gayley Road / La Loma Avenue** intersection would operate at LOS E during both morning and evening peak hours. This service level is caused by high eastbound volume in the morning and high westbound volume in the evening.
- The signalized **Ashby Avenue / Seventh Street** intersection would operate at LOS F during the evening peak hour. This service level is caused by high southbound right turn and eastbound right turn volumes.
- The all-way stop controlled **Stadium Rimway / Gayley Road** intersection would operate at LOS F during both morning and evening peak hours. The volume increase is caused by the higher amount of traffic estimated to use

Grizzly Peak Boulevard-Centennial Drive corridor as an alternative to Caldecott Tunnel and Belrose-Derby-Warring-Piedmont Corridor. The intersection would satisfy Caltrans peak hour signal warrants.

- The side-street stopped controlled **East Gate/ Gayley Road** intersections would operate at LOS E during the morning peak hour. The volume increase is caused by the higher amount of north-south through traffic on Gayley Road. The intersection would satisfy Caltrans peak hour signal warrants.
- The side-street stopped controlled **Allston Way / Oxford Street** intersections would operate at LOS E during the evening peak hour. The volume increase is caused by the higher amount of north-south through traffic on Oxford Street. The intersection would satisfy Caltrans peak hour signal warrants.

It should also be noted the Marin Avenue / San Pablo Avenue intersection would continue to operate at unacceptable conditions (LOS F during both morning and evening peak hours). The 2020 service levels for this intersection were calculated using the existing geometry at the intersection, with the assumption that the Marin Avenue narrowing project (from four lanes to two lanes with a center two-way left –turn lane), currently planned by the City of Albany, would not reduce lane capacity at the intersection. The Alameda County CMA Countywide Transportation Demand Model, the source for the 2020 No Project traffic forecasts, does not currently reflect the narrowing project; similarly, the traffic distribution for 2020 LRDP traffic growth was not reduced to reflect the planned lower capacity of this roadway. Thus, the actual traffic volume growth on Marin may be lower than the growth assumed in this EIR.

BASELINE 2010 & 2025 CMP AND MTS ROUTE OPERATIONS

As required by CMA, the 2010 and 2025 Countywide Travel Demand Model results for the CMP and MTS Future Without Project conditions are reported directly, on a link basis, and compared to the model's traffic capacity for each roadway or freeway segment during the PM peak hour. The resulting volume-to-capacity ratio (v/c ratio) corresponds to LOS A through F, with LOS A represented by a ratio of no greater than 0.59, LOS B represented by v/c of no greater than 0.69, etc., and LOS F being associated with a ratio of 1.0 or greater.

Table F.3-2 in Appendix F.3 shows the 2010 and 2025 estimated volumes and v/c ratios for the CMP Designated System and the MTS routes. Relative to the current (2002) CMA monitoring results, the following CMP designated segments are projected to operate at LOS F under both 2010 and 2025 conditions:

- **I-80 westbound**, east of University Avenue
- **I-580 eastbound**, from Harrison Street to I-80 (Does not violate LOS standard)
- **I-580 westbound**, west of SR 24 (2025 only)
- **SR 13** both directions, south of SR 24
- **Ashby Avenue eastbound**, From Telegraph Avenue to Domingo Street (Does not violate LOS standard from College Avenue to Domingo Street)
- **Ashby Avenue eastbound**, from San Pablo Avenue to Adeline Street
- **Ashby Avenue westbound**, from Sacramento Street to San Pablo Avenue (2010 only)
- **Ashby Avenue westbound**, from MLK Jr. Way to Adeline Street
- **Ashby Avenue westbound**, east of Claremont Avenue

- **University Avenue westbound**, from I-80 to MLK Jr. Way (segment from Sixth Avenue to San Pablo Avenue, 2010 only)
- **San Pablo Avenue both directions** from Gilman Street to Ashby Avenue
- **San Pablo Avenue both directions**, south of Ashby Avenue (northbound, 2025 only)
- **Shattuck Avenue both directions**, from Dwight Way to Adeline Street
- **MLK Jr. Way southbound**, south of Adeline Street

The following MTS designated segments are also projected to operate at LOS F:

- **Solano Avenue both directions**, from Colusa Avenue to Sutter Street
- **Sutter Street eastbound**, from Solano Avenue to Henry Street
- **Henry Street both directions**, from Sutter Street to Shattuck Place
- **Shattuck Avenue northbound**, from University Avenue to Shattuck Place
- **Shattuck Avenue southbound**, from Hearst Avenue to University Avenue
- **The Alameda northbound**, from MLK Jr. Way to Marin Avenue
- **MLK Jr. Way northbound**, from University Avenue to The Alameda
- **MLK Jr. Way northbound**, from Ashby Avenue to Dwight Way
- **MLK Jr. Way southbound**, from Cedar Street to Adeline Street (segments north of Hearst Avenue to south of Ashby Avenue, 2025 only)
- **Sacramento Street both directions**, from Ashby Avenue to Cedar Street (southbound segment north of Hearst Avenue, 2025 only)
- **Sixth Street both directions**, from Dwight Way to University Avenue (southbound segment, 2010 only)
- **Seventh Street both directions**, from Ashby Avenue to Dwight Way
- **Telegraph Avenue southbound**, south of Ashby Avenue, 2025 only
- **College Avenue both directions**, from Ashby Avenue to Dwight Way (northbound segment, 2025 only)
- **College Avenue southbound**, south of Ashby Avenue
- **Gilman Street both directions**, from San Pablo Avenue to Sixth Street
- **Hopkins Street both directions**, from Gilman Street to Sacramento Street
- **Dwight Way eastbound**, from MLK Jr. Way to San Pablo Avenue
- **Dwight Way westbound**, from Sacramento Street to Sixth Street (segment east of San Pablo Avenue, 2010 only)

2020 PARKING CONDITIONS

UNIVERSITY PARKING

The University currently has authority to construct a net additional 790 parking spaces, all of which would be assigned to commuter uses, relative to current (2003) conditions. These spaces are part of the Underhill Area Projects (690 net new spaces in the re-built Underhill structure, which was demolished in 1991 due to seismic safety concerns – EIR certified but project not yet approved) and the Northeast Quadrant Science and Safety Projects (100 net new spaces at the Lower Hearst Structure – EIR certified and project approved). These spaces will bring the University’s total *commuter* vehicle parking supply to 5,367 marked spaces and 6,424 total spaces including attendant parking.

NON-UNIVERSITY PARKING

Several projects that could change the downtown parking supply are currently under consideration by the City of Berkeley, and one recent approval, the Vista College expan-

sion, will reduce the supply while increasing parking demand. The Vista College expansion will remove 54 spaces from the downtown supply and add demand for up to 390 mid-day spaces to the downtown area, resulting in a downtown parking deficit. The city is currently investigating ways to mitigate the impacts of these changes, including physically adding capacity, adding capacity through increased attendant parking, and/or reducing demand through more stringent travel demand management measures such as increasing the costs of long-term parking.

Other projects under consideration include the Library Gardens development, which would displace the 362-space Kittredge Street Garage, and the Oxford Street development, which would add commercial and public uses to that site and replace, but not increase, the parking on site. If these projects are implemented, the parking deficit expected to occur with the Vista College expansion may worsen. A proposed downtown hotel, conference and museum complex at Center Street and Shattuck Avenue could also alter the current configuration of parking, through reconfiguration and possible expansion of the current surface and structured private and University parking.

ON-STREET PARKING

No significant changes to the city's management of on-street parking are expected; however, changes to the number and type of spaces block to block can occur due to changes in loading zone needs, driveway re-construction, provision of disabled parking near businesses or residences, etc. In addition, the expansion or addition of RPP zones may occur in response to changing conditions.

BASELINE 2020 BICYCLE CIRCULATION

The City of Berkeley is working to increase bicycle facilities in the city through implementation of the *Berkeley Bicycle Plan*. Adopted in April 2000, the *Berkeley Bicycle Plan* details recommended improvements to the bicycle circulation system and strategies to promote bicycling and provide a safe bicycling environment. The Plan includes an updated network of Class II (striped and signed bicycle lanes) and Class III (signed roadway shared with other vehicles) bikeways, as well as "Bicycle Boulevards" which are intended to provide enhanced on-street bicycling service, and Class 2.5 routes, which are intended to improve upon the lowest-level "bike route" classification, using strategic street improvements where feasible.

Figure 4.12-7 shows the Berkeley Bicycle Plan's recommended bikeway network and the campus' recommended routes on the Campus Park. Several of the Class 2 and Class 2.5 segments in the Campus Park vicinity have not yet been completed. However, all of the bicycle boulevards in the Campus Park vicinity have been signed, and the bike lanes on Oxford between Hearst Avenue and Bancroft Way have been constructed.

BASELINE 2020 PEDESTRIAN CIRCULATION

Pedestrian volumes can be expected to grow in the vicinity of campus, due to new student housing units under construction in the Southside, due to the approved expansion of the University's Lower Hearst structure, the University's proposed Underhill parking structure, and downtown development projects envisioned by the City of Berkeley General Plan. In addition, the Berkeley General Plan contains goals and policies promoting greater reliance on walking, bicycling and transit use for trips to, from and within Berke-

ley, and these policies are linked with policies designed to improve pedestrian safety as travel by all modes grows. In particular, policies T-48 through T-54 address specific pedestrian needs, including T-48, which calls for the creation of a Pedestrian Plan for the purposes of developing additional strategies and policies to make Berkeley safer for pedestrians. Policy T-51 states that pedestrian needs have the highest priority when addressing competing demands for sidewalk space; and Policies T-52 and P-53 address specific ways to improve pedestrian safety at intersection and mid-block crossings.

BASELINE 2020 TRANSIT SERVICE

BART

The BART Strategic Plan, adopted in 1999, lays out the strategy for future BART system expansion and operations. While no route extensions are planned for the Richmond end of the line, other BART extensions will add ridership to trains running through Berkeley, including potential extensions to Warm Springs in Fremont and Antioch in Contra Costa County; a potential extension to San Jose on the Fremont line; and a connection to the Oakland International Airport via an Automated Guideway Transit service, scheduled to open in 2008.

AC TRANSIT

The AC Transit Short Range Transit Plan 2001-2010 does not identify major changes to transit service in the vicinity of the Campus Park. However, the plan does identify increasing service frequency on major corridors such as Shattuck Avenue, Telegraph Avenue, University Avenue, and College Avenue.

AC Transit has been working with other agencies, including the Alameda County Congestion Management Agency, the Contra Costa Transportation Authority, and 24 other agencies including the City of Berkeley, to plan and implement a multi-modal advanced transportation management system along the San Pablo Avenue corridor. The system is the first of several corridors that are part of the overall SMART Corridors project to improve transportation mobility. The SMART Corridors project goal is to allow participating agencies to better manage congestion and incidents along regional routes, and to improve transportation mobility, efficiency and safety, while providing timely and multi-modal transportation information to transportation managers and the general public.

The first phase of the San Pablo Avenue Bus Rapid Transit (BRT) project was opened in June 2003, providing service from San Pablo to Oakland. When complete, Route 72 will include the 72 Rapid Bus Route and will extend 16 miles through seven cities and two counties.

AC Transit has also committed to adding a BRT line along the Telegraph Avenue/International Boulevard/14th Avenue corridor. This corridor connects Downtown Berkeley, the University of California, Downtown Oakland, Downtown San Leandro, and Bayfair Mall. The current local bus lines servicing the corridor carry 40,000 passengers per day. The plan calls for BRT capital improvements that would reduce travel times by up to one third and improve service reliability. AC Transit has undertaken the environmental analysis needed for the BRT project and expects to release a Draft EIR in Fall 2004. The project will have the following features:

- Dedicated bus lanes along arterial streets
- Light-rail-like stations and boarding platforms
- Proof-of-Payment fare verification
- Transit priority signal treatments
- Sleek European-designed low-floor buses

4.12.6 STANDARDS OF SIGNIFICANCE

The significance of the potential impacts of the 2020 LRDP and Tien Center on traffic and circulation was determined based on the following standards:

Standard: Would the project 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? For the purposes of this EIR, the threshold of significance is measured as follows:

- *A reduction in an intersection LOS from D or better to E or worse, based on total intersection delay (2000 HCM methodology); or*
- *At intersections that operate at LOS E or worse without the project, an increase in total traffic volume of 5 percent²⁷ or more, relative to the No Project volume;*

Standard: Would the project exceed, either individually or cumulatively, a level of service standard established by the Alameda County Congestion Management Agency (CMA) for the CMP designated system? For the purposes of this EIR, the threshold of significance is measured as follows:

- *On CMP designated roadway segments that are projected to meet the CMP standard in the future without the project (2025), the impact is significant if the project causes the segment to exceed the standard and adds at least 5 percent to the future peak hour traffic volume;*
- *On CMP designated roadway segments that are projected to exceed the CMP standard in the future without the project (2025), the impact is significant if the project adds at least 5 percent to the future peak hour traffic volume.*

Standard: Would the project substantially increase hazards due to a design feature or incompatible uses, or create unsafe conditions for pedestrians or bicyclists?

Standard: Would the project result in inadequate parking capacity?

Standard: Would the project conflict with adopted policies, plans or programs supporting alternative transportation? For the purposes of this EIR, the threshold of significance is measured as follows:

- *The impact is significant if implementation of the 2020 LRDP would conflict with applicable LRDP policies supporting alternative transportation.*
- *The impact is significant if the project generates new transit demand that cannot be served by the expected future transit service, including improvements planned by UC and non-UC transit agencies (BART, AC Transit, BEAR Transit).*

4.12.7 POLICIES AND PROCEDURES GUIDING FUTURE PROJECTS

This section describes existing policies and procedures that would help to minimize circulation and parking impacts of development under the 2020 LRDP.

2020 LRDP

Review of individual projects under the 2020 LRDP would influence circulation and parking impacts by guiding the location, program, and design of new campus projects. While all the LRDP Objectives described in Chapter 3 bear directly or indirectly on circulation and parking, the following are particularly relevant:

- **Provide the housing, access, and services we require to support a vital intellectual community and promote full engagement in campus life.**
- **Plan every new project to respect and enhance the character, livability, and cultural vitality of our City Environs.**

The 2020 LRDP includes a number of specific policies in support of these Objectives that directly affect circulation and parking:

- Ensure university housing and access strategies are integrated and synergetic.
- Increase the supply of parking to accommodate existing unmet demand and future campus growth.
- Replace and consolidate existing university parking displaced by new projects.
- Reduce demand for parking through incentives for alternate travel modes.
- Collaborate with cities and transit providers to improve service to campus.

While the 2020 LRDP includes up to 2,300 net new parking spaces, to address current unmet demand as well as the need created by future growth, it also includes a number of measures to minimize parking demand. The proposed construction of up to 2,600 net new bed spaces of university housing is expected to have a significant impact on parking demand by enabling students to live close enough to campus to make alternate travel modes preferable to driving: all new university housing built under the 2020 LRDP would be located within a mile radius of Doe Library, or within one block of a transit line providing a trip to Doe Library in under 20 minutes.

While the 1990-2005 LRDP proposed a net increase of over 1,000 parking spaces, in fact the campus parking inventory has declined by roughly 300 spaces since 1990, due to the displacement of parking by building projects. The 2020 LRDP would require the scope and budget of future building projects to include the replacement of displaced spaces, either on site or elsewhere. The replacement parking strategy would be designed not only to replace this parking but also to consolidate it on sites at the perimeter of or adjacent to the Campus Park.

The 2020 LRDP also includes a broad array of incentive programs for alternatives to drive-alone trips, described below. However, the 2020 LRDP also recognizes that, overall, cost is a less important factor in mode choice than convenience and travel time, and significant further reductions in drive-alone trips require major capital investments in new transit systems. Therefore, as part of the policy to collaborate with cities and transit

providers to improve service to campus, the 2020 LRDP commits UC Berkeley to work with AC Transit toward implementation of the bus rapid transit system now under study.

CAMPUS POLICIES AND PROGRAMS

In March 2001, the City of Berkeley and UC Berkeley jointly completed the Southside / Downtown Transportation Demand Management (TDM) study.²⁸ The document's intent is to guide future transportation planning by the City and University within the areas south and west of the Campus Park.

The study considers facilities and programs for automobiles (e.g. parking structures), bicycles (e.g. bicycle parking), pedestrians (e.g. sidewalk improvements), and transit (e.g. expanded transit subsidy programs). The strategies and findings of the TDM Study are designed to inform other plans, including the city's General Plan, the Southside Plan and UC Berkeley's Long Range Development Plan.

The study area for the TDM Study is bounded by Hearst Avenue, Martin Luther King Jr. Way, Dwight Way and Prospect Street. This area includes the Southside, the Downtown, and UC Berkeley. The study area also includes residential areas adjacent to and enclosed within its boundaries. The TDM Study has two goals:

- Improve the livability of Berkeley's core, including the University, Downtown, Southside and surrounding neighborhoods.
- Improve the vitality of Berkeley's core, including its role as a place for living, business, research, teaching, study, worship, shopping, recreation and entertainment.

For each goal, the Study contains objectives and proposed strategies addressing parking, housing, safety, job development, aesthetics, streetscape, traffic, transit, bicycling, walking, and ridesharing.

UC Berkeley offers a comprehensive array of services designed to reduce single-occupant automobile use by students, faculty, staff and visitors. The following services and incentives are provided through the Department of Parking and Transportation:

- **Class Pass** – Allows registered University students to ride AC Transit (including the Transbay lines to San Francisco) and BEAR Transit campus shuttle buses (except the Richmond Field Station shuttle line) all semester.
- **Marketing** including a website with links to BART, AC Transit and other transit service websites and an array of campus transportation publications.
- **“New Directions”** alternative commute program for faculty and staff, offering benefits such as discounted parking, free shuttle rides, emergency rides home, carpool and vanpool programs, transit subsidy program, and pre-tax transit program. Student program also includes subsidies for BART.
- **Bicycle programs and facilities** including over 3000 bicycle parking spaces, secure bicycle parking facilities, campus bicycle routes, bicycle licensing, bike lock subsidies, and bicycle safety classes.
- **Parking pricing** to encourage short-term parking in commercial areas and discourage all-day commuter parking.

In addition to these services, UC Berkeley has funded services to promote transportation alternatives to minimize traffic congestion in the Berkeley community. These services were provided by the Berkeley TRiP commuter store until July 2003. In the 2001-2002 fiscal year, Berkeley TRiP handled over 110,000 transit ticket sales and transactions. Berkeley community members accounted for 80 percent of all Berkeley TRiP transactions, and City of Berkeley employees and University students, faculty and staff accounted for 20 percent of transactions.

Since the closure of TRiP, the City of Berkeley employee commute programs are administered directly by the City, the University commute programs are provided by the campus at the Parking & Transportation Customer Services offices, and the general public has been directed to other transit ticket sales outlets in the area.

4.12.8 2020 LRDP IMPACTS

This section describes the potential transportation and traffic impacts of the 2020 LRDP based on the Standards of Significance, whether they are significant or less than significant, and whether any significant impacts can be mitigated to less than significant levels. The transportation analysis for the 2020 LRDP is described in detail in Appendix F.1.

EFFECTS FOUND NOT TO BE SIGNIFICANT

The Initial Study found that the 2020 LRDP would have no significant impacts in regard to the following threshold:

Would implementation of the 2020 LRDP 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 2020 LRDP or the Tien Center is not anticipated to affect or contribute air traffic to existing patterns. No additional analysis is required.

LESS THAN SIGNIFICANT IMPACTS

BICYCLE IMPACTS

LRDP Impact TRA-1: The 2020 LRDP would not increase hazards to bicyclists due to design features or incompatible uses, nor create unsafe conditions for bicyclists.

For the purposes of this EIR, the impact on bicycle safety is significant if the project obstructs or otherwise conflicts with the existing or planned bicycle routes in the City of Berkeley Bicycle Plan. New bicycle trips for the 2020 LRDP were estimated as part of the project trip generation development described in Appendix F.1. Bicycle trip generation by population group and residence distance from campus was calculated, as shown in Table F.1-10. Note that only commute trips are shown in this table.

Under 2020 LRDP development, approximately 483 additional people are expected to bicycle to the Campus Park on a typical weekday, with 186 AM peak hour trips and 141 PM peak hour trips. Using the existing bicycle distribution characteristics at the major campus entry points, the increased bicycle volume was calculated, as shown in Table

F.1-11. The AM peak hour was used for this comparison, as bicycle volumes are higher in the AM peak hour. Based on this analysis, bicycle volumes are anticipated to increase between 8 and 10 percent on roadways adjacent to the Campus Park.

The Campus Park gateway intersection anticipated to experience the highest increase in bicycle trips is the Oxford Street /University Avenue intersection. This intersection currently serves approximately 680 bicyclists during the AM peak hour. The 2020 LRDP would increase bicycle volumes by approximately 9 percent, or 60 bicycle trips during the AM peak hour.

The policies and planned improvements in the Berkeley Bicycle Plan are designed to accommodate existing and future growth in bicycle volumes, and the General Plan encourages bicycling along with walking and transit as alternatives to auto use. Therefore, this increase in bicycling is foreseen in local plans, and is desirable. Moreover, bicycle volumes, while expected to increase, would not exceed the capacity of available bicycle facilities. Based on this analysis, this impact is *less than significant*. However, continuing best practices as outlined in best practices TRA-1-a and 1-b below, will help minimize the 2020 LRDP's impact on bicycle circulation and safety.

Bicycle impacts from 2020 LRDP construction are addressed in LRDP Impact TRA-3.

Continuing Best Practice TRA-1-a: UC Berkeley will continue in partnership with the City of Berkeley to develop a City program to: (a) maintain the Southside area between College, Dana, Dwight and Bancroft in a clean and safe condition; and (b) provide needed public improvements to the area (e.g. traffic improvements, lighting, bicycle facilities, pedestrian amenities and landscaping).

Continuing Best Practice TRA-1-b: UC Berkeley will continue to do strategic bicycle access planning. Issues addressed include bicycle access, circulation and amenities with the goal of increasing bicycle commuting and safety. Planning considers issues such as bicycle access to the campus from adjacent streets and public transit; bicycle, vehicle, and pedestrian interaction; bicycle parking; bicycle safety; incentive programs; education and enforcement; campus bicycle routes; and amenities such as showers.

PARKING IMPACTS

LRDP Impact TRA-2: University housing development in the 2020 LRDP Housing Zone could increase residential density, but given the provisions of the 2020 LRDP and continuing best practices, is not anticipated to result in inadequate parking capacity.

Development in the Housing Zone would occur in dispersed locations, so the impacts on local parking conditions cannot yet be known. Some increased parking demand may occur in neighborhoods within the LRDP Housing Zone as increased numbers of vehicles compete for on-street parking. Generally, students living in housing built by the University are expected to have relatively few cars, since the housing would be built within a mile of Doe Library or within a block of a transit line providing a 20 minute trip to the Doe Library, and since most residents would be ineligible for campus parking permits, as described in best practice TRA-2, below.

Continuing Best Practice TRA-2: The following housing and transportation policies will be continued:

- Except for disabled students, students living in UC Berkeley housing would only be eligible for a daytime student fee lot permit or residence hall parking based upon demonstrated need, which could include medical, employment, academic and other criteria.
- An educational and informational program for students on commute alternatives would be expanded to include all new housing sites.

LRDP Mitigation Measure TRA-2: The planned parking supply for University housing projects under the 2020 LRDP would comply with the relevant municipal zoning ordinance as of July 2003. Where the planned parking supply included in a University housing project would make it ineligible for approval under the subject ordinance, UC Berkeley would conduct further review of parking demand and supply in accordance with CEQA.

CONSTRUCTION-PERIOD CIRCULATION IMPACTS

LRDP Impact TRA-3: Construction-related activity under the 2020 LRDP would not substantially increase traffic loads or substantially decrease roadway capacity over current conditions. The best practices outlined below would continue to be implemented.

As noted in Chapter 3 construction of 2020 LRDP projects is expected to continue throughout the life of the LRDP, at varying levels of intensity. Impacts related to construction include the effects of construction truck trips to/from campus, construction worker commute trips, worker parking demand, heavy equipment movements, street blockages and closures, and material staging.

The 2020 LRDP states that no more than one million gross square feet of construction will be underway at any one time within the Campus Park, Adjacent Blocks, Southside and Hill Campus areas, which is approximately equal to the level of construction underway at the time the transportation setting data were collected in 2002 and 2003. Thus, the aggregate effects of the maximum level of construction foreseen under the 2020 LRDP are already reflected in the existing setting. The following describes the types of impacts that will occur as projects are constructed over the life of the LRDP.

TRUCK VOLUMES. Construction projects generate truck trips for a variety of purposes throughout the construction schedule, including excavation, material deliveries, concrete pours, etc. The excavation portion of a construction project typically generates the highest daily and peak hour truck volumes. The specific number of excavation truck trips per day is directly related to the amount of material to be removed from the site, the project schedule, and other site factors that may limit the frequency of truck trips. Based on the NEQSS EIR analysis, excavation-related truck trips for a given project are estimated to range from 42 to 75 loads per day, with each load resulting in two trips (one inbound empty trip and one outbound loaded trip). Thus, the total daily excavation truck volume could range from 84 to 150 trips for a single project's excavation phase. Peak hour volumes would range from 10 to 19 trips per hour.

The high end of these ranges is associated with the Stanley Hall Replacement Building, which is planned to provide 285,000 gross square feet. Thus, if 1 million square feet were under construction simultaneously in the 2020 LRDP, and if all were in the excavation phase at once, the truck trips would be projected to reach a maximum of about 525 daily trips and 67 peak hour trips. While all construction projects undergoing excavation simultaneously is extremely unlikely, there may be temporary peaks of excavation-related truck activity that would influence traffic loads and street system capacity around campus and on the truck routes to campus.

CONSTRUCTION WORKER TRIPS AND PARKING. The construction workforce on 2020 LRDP projects will generate primarily auto and transit commute trips. The number of trips will vary with the size and type of project under construction. Construction contractors are required to arrange for workforce parking, and parking on the construction site is not allowed except for workers who require their trucks to access their tools or materials. Contractor parking is sometimes provided in downtown parking garages or in attendant-parked spaces in UC garages, paid for by the contractor. Based on the current level of construction on campus, construction-related commute trips and local parking demand are already reflected in the existing traffic counts and parking demand/supply counts. The local impacts of construction worker trips and parking will vary based on the location of the project. The Construction Management Plan prepared by the prime contractor on each construction project is required to define the amount of worker parking expected and the plan to provide for worker parking.

TEMPORARY TRAFFIC DETOURS AND LANE CLOSURES. Construction projects may periodically require traffic detours to allow heavy equipment movements or to facilitate construction activities directly adjacent to the street. The detours may affect traffic circulation, as well as re-direct pedestrian and bicycle traffic. The Construction Traffic Management Plan prepared for each construction project is required to outline all planned detours and their expected duration, and the Plan requires the preparation of traffic control plans when needed to direct traffic.

Continuing Best Practice TRA-3-a: Early in construction period planning UC Berkeley shall meet with the contractor for each construction project to describe and establish best practices for reducing construction-period impacts on circulation and parking in the vicinity of the project site.

Continuing Best Practice TRA-3-b: For each construction project, UC Berkeley will require the prime contractor to prepare a Construction Traffic Management Plan which will include the following elements:

- Proposed truck routes to be used, consistent with the City truck route map.
- Construction hours, including limits on the number of truck trips during the a.m. and p.m. peak traffic periods (7:00 – 9:00 a.m. and 4:00 – 6:00 p.m.), if conditions demonstrate the need.
- Proposed employee parking plan (number of spaces and planned locations).
- Proposed construction equipment and materials staging areas, demonstrating minimal conflicts with circulation patterns.
- Expected traffic detours needed, planned duration of each, and traffic control plans for each.

Continuing Best Practice TRA-3-c: UC Berkeley will manage project schedules to minimize the overlap of excavation or other heavy truck activity periods that have the potential to combine impacts on traffic loads and street system capacity, to the extent feasible.

Continuing Best Practice TRA-3-d: UC Berkeley will reimburse the City of Berkeley for its fair share of costs associated with damage to City streets from University construction activities, provided that the City adopts a policy for such reimbursements applicable to all development projects within Berkeley.

CONSTRUCTION-PERIOD PARKING IMPACTS

LRDP Impact TRA-4: Construction-related parking demand associated with implementation of the 2020 LRDP would not be anticipated to exceed baseline levels.

During the 2020 LRDP planning horizon, construction of new structures could result in elimination of parking spaces in existing lots and/or structures to provide access to the construction site or space for staging of construction materials. In addition, construction employees would contribute to parking demand. Typically, very few on-site parking spaces are available for construction employees due to site constraints. As noted above, construction activity over the life of the 2020 LRDP is not expected to exceed the level of activity reflected in the baseline conditions. This would be a *less than significant* impact.

TRANSIT SERVICE

LRDP Impact TRA-5: The 2020 LRDP is expected to generate new transit demand, or alter locations where local transit demand occurs. Given the provisions of the 2020 LRDP and campus best practices, however, significant service problems are not anticipated.

For the purposes of this EIR, the impact is significant if the project generates new transit demand that cannot be served by the expected future transit service, including improvements planned by UC and non-UC transit agencies (BART, AC Transit, BEAR Transit).

New transit ridership with development of the 2020 LRDP was developed as part of the trip generation development described in Appendix F.1. Daily, AM and PM peak hour new transit trips by population segment and transit provider are summarized in Table F.1-14. Note that only commute trips are represented in this table.

Approximately 818 new transit trips would be generated per day with implementation of the 2020 LRDP, including 269 AM and 259 PM peak hour trips. The majority of new transit trips would occur on the BART and AC Transit systems. Graduate and undergraduate students are projected to make the most new transit trips.

AC TRANSIT. New AC Transit trips during the AM peak hour were estimated for each line that currently serves the UC Berkeley campus, as described in Appendix F.1 and shown in Table F.1-15. Based on the analysis, Route 51 would experience the greatest increase in ridership with the LRDP, as approximately 35 new AM and 32 new PM peak hour trips would be added to this route. Headways for this route during peak hours are

approximately 10-minutes, resulting in approximately 5-6 new riders per bus during the AM and PM peak hours.

The average peak hour load factors for Route 51 are well below 1.0, as indicated in Table 4.12-8. There are short periods during the peak hours when Route 51 ridership is higher than seating capacity in the Southside area, i.e. a peak of 47 riders with only 40 seats. However, for planning purposes AC Transit uses 150% of seating capacity, or 60 riders, as the approximate maximum occupancy. The additional 5 to 6 riders generated per peak hour bus by the project is thus not projected to cause any peak hour bus to exceed its practical capacity.

BART. New BART trips with LRDP development were added to the routes that serve the Downtown Berkeley BART Station, as described in Appendix F.1. An aggregate load factor for this station area was calculated. As shown in Table F.1-16, the AM and PM peak hour load factors would increase by 0.02, with the resulting load factor less than 1.0. New BART riders could be accommodated on the system as a whole, although some trains during peak hours could experience standing room only conditions. This is a *less than significant* impact.

BEAR TRANSIT. Ridership on BEAR Transit, the campus shuttle, will increase with the growth in campus population. Ridership will grow due to an increase in commute trips (i.e., shuttle trips linked with BART, bus, or auto trips), as well as trips throughout the day for various purposes (i.e., to travel from one end of campus to the other, to travel between campus and downtown, or to commute to or from the campus outside the peak commute times). The peak hour commute trip growth on BEAR Transit is estimated in Table F.1-14; however, many more mid-day trips will be generated as the population grows on campus. Actual trip growth will be monitored by the Department of Parking and Transportation, and service frequency may need to be increased, along with route adjustments, as ridership grows. The shuttle provides a critical link for many who use BART and AC Transit to commute to campus, or for other mid-day trip purposes; therefore, meeting the demand for shuttle service is key to maximizing transit use.

Continuing Best Practice TRA-5: The University shall continue to work to coordinate local transit services as new academic buildings, parking facilities, and campus housing are completed, in order to accommodate changing demand locations or added demand.²⁹

SIGNIFICANT IMPACTS AND MITIGATION MEASURES

INTERSECTION IMPACTS

LRDP Impact TRA-6: The 2020 LRDP would increase vehicle trips and traffic congestion at the intersections listed below, leading to substantial degradation in level of service. The mitigations described below, if implemented with review and approval of the City Traffic Engineer, would reduce these impacts to a *less than significant* level.

LRDP Impact TRA-6-a: The signalized Cedar Street/Oxford Street intersection, which would operate at LOS E during the AM peak hour regardless of the project, and degrade from LOS D to LOS E during the PM peak hour. The project would increase the intersection volume by 7 percent during the AM peak hour, and 7 percent during the PM peak hour.

LRDP Impact TRA-6-b: The all-way stop-controlled Durant Avenue/Piedmont Avenue intersection, which would degrade from LOS D to LOS F during the AM peak hour. The project would increase the intersection volume by 10 percent during the AM peak hour.

LRDP Impact TRA-6-c: The all-way stop-controlled Derby Street/Warring Street intersection, which operates at LOS F during both AM and PM peak hours regardless of the project. The project would increase the intersection volume by 7 percent during the AM peak hour, and 6 percent during the PM peak hour.

LRDP Impact TRA-6-d: The eastbound approach of the side-street stop-controlled Addison Street/Oxford Street intersection from LOS A to LOS E during the AM peak hour and LOS C to LOS E during the PM peak hour. The project would increase the intersection volume by 12 percent during the AM peak hour, and 10 percent during the PM peak hour.

LRDP Impact TRA-6-e: The eastbound approach of the side-street stop-controlled Allston Way/Oxford Street intersection would degrade from LOS D to LOS E during the AM peak hour. The intersection would continue to operate at LOS E during the PM peak hour. The project would increase the intersection volume by 11 percent during the AM peak hour, and 8 percent during the PM peak hour.

LRDP Impact TRA-6-f: The eastbound approach of the side-street stop-controlled Kittredge Street/Oxford Street intersection from LOS C to LOS F during the AM peak hour. The intersection would continue to operate at LOS F during the PM peak hour. The project would increase the intersection volume by 14 percent during the AM peak hour, and 10 percent during the PM peak hour.

LRDP Impact TRA-6-g: The northbound approach of the side-street stop-controlled Bancroft Way/Ellsworth Street intersection would degrade from LOS D to LOS E during the PM peak hour. The project would increase the intersection volume by 19 percent during the AM peak hour, and 10 percent during the PM peak hour.

For the purposes of this EIR, this standard of significance is measured as follows for permanent increases in traffic:

- A reduction in an intersection LOS from D or better to E or worse, based on total intersection delay (2000 HCM methodology); or
- At intersections that operate at LOS E or worse without the project, an increase in total traffic volume of 5 percent or more, relative to the No Project volume.

Project trips are assigned to the study intersections based on the trip distribution presented in Table F.1-8 in Appendix F.1. The 2020 With Project AM and PM peak hour intersection turning movement volumes and LOS calculations are included in Appendix F.5. Table 4.12-9 summarizes the intersection level of service analysis results for intersections projected to operate poorly (LOS E or F) under 2020 with Project Conditions. Table F.3-3 summarizes the intersection level of service analysis results for all study intersections. Detailed calculation work sheets are provided in Appendix F.4. The LOS E and F results are bolded in Table F.3-3 to indicate intersections that are projected to operate at poor or failing service levels under 2020 with Project Conditions. Impact TRA-6, above, summarizes the significant LOS impacts.

LRDP Mitigation Measure TRA-6-a: The University will work with the City of Berkeley to redesign and, on a fair share basis, implement changes to either the westbound or northbound approach of the Cedar Street / Oxford Street intersection to provide a left-turn lane and a through lane. The University will contribute fair share funding for a periodic (annual or biennial) traffic count to allow the City to determine when an intersection redesign is needed. With the implementation of this mitigation measure, the intersection will operate at LOS B during the AM peak hour and LOS D during the PM peak hour.

LRDP Mitigation Measure TRA-6-b: The University will work with the City of Berkeley to design and, on a fair share basis, install a signal at the Durant Avenue /Piedmont Avenue intersection, when a signal warrant analysis shows the signal is needed. The University will contribute fair share funding for a periodic (annual or biennial) signal warrant check at this and other impact intersections, to allow the City to determine when a signal is warranted. With the implementation of this mitigation measure, the intersection will operate at LOS B during both AM and PM peak hours.

LRDP Mitigation Measure TRA-6-c: The University will work with the City of Berkeley to design and, on a fair share basis, install a signal at the Derby Street/Warring Street intersection, and provide an exclusive right-turn lane and an exclusive through lane on the westbound approach. The University will contribute fair share funding for a periodic (annual or biennial) signal warrant check at this and other impact intersections, to allow the City to determine when a signal and the associated capacity improvements are warranted. With the implementation of this mitigation measure, the intersection will operate at LOS A during the AM peak hour and LOS C during the PM peak hours.

TABLE 4.12-9
2020 WITH PROJECT CONDITIONS STUDY INTERSECTION LEVELS OF SERVICE^a

Intersection	Peak Hour	Existing		2020 Without Project		2020 With Project		Impact Significant?
		Delay	LOS	Delay	LOS	Delay	LOS	
Signalized Intersections^b								
1. Marin Avenue / San Pablo Avenue	AM	79	E	>80	F	>80	F	No ^c
	PM	50	D	>80	F	>80	F	
3. Gilman Street / Sixth Street	AM	11	B	16	B	17	B	No
	PM	75	E	>80	F	>80	F	
4. Gilman Street / San Pablo Avenue	AM	41	D	43	D	46	D	No
	PM	42	D	62	E	69	E	
8. Cedar Street / Oxford Street	AM	49	D	58	E	58	E	Yes TRA-6-a
	PM	22	C	41	D	63	E	
18. Hearst Avenue / Gayley Road / La Loma Avenue	AM	23	C	57	E	60	E	No
	PM	25	C	67	E	69	E	
20. University Avenue / Sixth Street	AM	>80	F	>80	F	>80	F	Yes TRA-8
	PM	>80	F	>80	F	>80	F	
21. University Avenue / San Pablo Avenue	AM	>80	F	>80	F	>80	F	Yes TRA-8
	PM	>80	F	>80	F	>80	F	
67. Ashby Avenue / Seventh Street	AM	34	C	54	D	54	D	No
	PM	52	D	>80	F	>80	F	
All-Way Stop-Controlled Intersections^d								
32. Stadium Rim Road / Gayley Road	AM	26	D	>50	F	>50	F	No
	PM	35	D	>50	F	>50	F	
43. Bancroft Way / Piedmont Avenue ^e	AM	>50	F	>50	F	>50	F	Yes TRA-7
	PM	>50	F	>50	F	>50	F	
48. Durant Avenue / Piedmont Avenue	AM	17	C	26	D	>50	F	Yes TRA-6-b
	PM	18	C	27	D	34	D	
65. Derby Street / Warring Street	AM	>50	F	>50	F	>50	F	Yes TRA-6-c
	PM	>50	F	>50	F	>50	F	
Side-Street Stop-Controlled Intersections^f								
27. East Gate / Gayley Road	AM	22 (EB)	C	35 (EB)	E	35 (EB)	E	No
	PM	20 (EB)	C	27 (EB)	D	22 (EB)	D	
28. Addison Street / Oxford Street	AM	10 (EB)	A	11 (EB)	A	35 (EB)	E	Yes TRA-6-d
	PM	17 (EB)	C	18 (EB)	C	45 (EB)	E	
33. Allston Way / Oxford Street	AM	32 (EB)	D	33 (EB)	D	49 (EB)	E	Yes TRA-6-e
	PM	30 (EB)	D	36 (EB)	E	45 (EB)	E	
34. Kittredge Street / Oxford Street	AM	20 (EB)	C	23 (EB)	C	>50 (EB)	F	Yes TRA-6-f
	PM	>50 (EB)	F	>50 (EB)	F	>50 (EB)	F	
38. Bancroft Way / Ellsworth Street	AM	16 (NB)	C	17 (NB)	C	22 (NB)	C	Yes TRA-6-g
	PM	21 (NB)	C	28 (NB)	D	39 (NB)	E	

Notes:

Bold – Indicates an intersection operated at unacceptable LOS E or F.

^a This table summarizes level of service analysis results for intersection operating at LOS E or F under 2020 with Project Conditions. Please see Table F.3-3 for a summary of level of service analysis results for all study intersections.

^b Although the intersection will continue to operate at unacceptable LOS, the 2020 LRDP traffic does not increase total traffic volume at the intersection by 5 percent or more.

^c Signalized intersection level of service based on average control delay per vehicle, according to the *Highway Capacity Manual, Special Report 209*, Transportation Research Board, 2000.

^d All-way stop-controlled intersection level of service based on average control delay per vehicle, according to the *Highway Capacity Manual, Special Report 209*, Transportation Research Board, 2000.

^e Based on 2000 HCM methodology, the intersection operates at LOS D during the AM peak hour and LOS C during the PM peak hour under Existing Conditions and LOS D under both AM and PM peak hours under 2020 No Project Conditions. However, this does not take into account pedestrian volumes. Based on field observations, this intersection has a heavy pedestrian volume, resulting in major delays for vehicles under existing conditions. With the additional traffic at the intersection under 2020 no Project and 2020 with Project conditions, the intersection is estimated to continue operating at LOS F.

^f Side-street stop-controlled intersection level of service based on worst approach control delay, according to the *Highway Capacity Manual, Special Report 209*, Transportation Research Board, 2000.

Source: Fehr & Peers Associates, March 2004.

LRDP Mitigation Measure TRA-6-d: The University will work with the City of Berkeley to design and, on a fair share basis, install a signal at the Addison Street/Oxford Street intersection, and provide the necessary provisions for coordination with adjacent signals along Oxford Street. The University will contribute fair share funding for a periodic (annual or biennial) signal warrant check at this and other impact intersections, to allow the City to determine when a signal and the associated coordination improvements are warranted. With the implementation of this mitigation measure, the intersection will operate at LOS A during both AM and PM peak hours.

LRDP Mitigation Measure TRA-6-e: The University will work with the City of Berkeley to design and, on a fair share basis, install a signal at Allston Way/Oxford Street intersection, and provide the necessary provisions for coordination with adjacent signals along Oxford Street. The University will contribute fair share funding for a periodic (annual or biennial) signal warrant check at this and other impact intersections, to allow the City to determine when a signal and the associated coordination improvements are warranted. With the implementation of this mitigation measure, the intersection will operate at LOS A during both AM and PM peak hours.

LRDP Mitigation Measure TRA-6-f: The University will work with the City of Berkeley to design and, on a fair share basis, install a signal at the Kittredge Street/Oxford Street intersection, and provide the necessary provisions for coordination with adjacent signals along Oxford Street. The University will contribute fair share funding for a periodic (annual or biennial) signal warrant check at this and other impact intersections, to allow the City to determine when a signal and the associated coordination improvements are warranted. With the implementation of this mitigation measure, the intersection will operate at LOS A during both AM and PM peak hours.

LRDP Mitigation Measure TRA-6-g: The University will work with the City of Berkeley to design and, on a fair share basis, install a signal at the Bancroft Way/Ellsworth Street intersection, and provide the necessary provisions for coordination with adjacent signals along Bancroft Way. The University will contribute fair share funding for a periodic (annual or biennial) signal warrant check at this and other impact intersections, to allow the City to determine when a signal and the associated coordination improvements are warranted. With the implementation of this mitigation measure, the intersection will operate at LOS B during both AM and PM peak hours.

Because these mitigations are outside the jurisdiction of The Regents and could only be implemented at the discretion of the City of Berkeley, the impact remains potentially significant and unavoidable.

LRDP Impact TRA-7: Development under the 2020 LRDP would contribute to the projected unacceptable delay at the all-way stop-controlled **Bancroft Way/Piedmont Avenue** intersection, which is projected to operate at LOS F during both AM and PM peak hours regardless of the project. The project would increase the intersection volume by 11 percent during the AM peak hour, and 5 percent during the PM peak hour. The mitigation described below would if implemented with review and approval of the City Traffic Engineer, reduce this impact to a *less than significant* level.

LRDP Mitigation Measure TRA-7: The University will work with the City of Berkeley to design and, on a fair share basis, install a signal at the Bancroft Way/Piedmont Avenue intersection, and provide an exclusive left-turn lane and an exclusive through lane on the northbound approach. The University will contribute fair share funding for a periodic (annual or biennial) signal warrant check at this and other impact intersections, to allow the City to determine when a signal and the associated capacity improvements are warranted. With the implementation of this mitigation measure, the intersection would operate at LOS B during both AM and PM peak hours.

Because the mitigation is outside the jurisdiction of the Regents and could only be implemented at the discretion of the City of Berkeley, the impact remains potentially significant and unavoidable.

LRDP Impact TRA-8: The 2020 LRDP would increase vehicle trips and traffic congestion at the intersections listed below, leading to substantial degradation in level of service. These impacts are *significant and unavoidable*.

- The signalized University Avenue / Sixth Street intersection, which is projected to operate at LOS F during both AM and PM peak hours regardless of the project. The project would increase the intersection volume by 7 percent during the AM peak hour, and 6 percent during the PM peak hour.
- The signalized University Avenue / San Pablo Avenue intersection, which is projected to operate at LOS F during both AM and PM peak hours regardless of the project. The project would increase the intersection volume by 8 percent during the AM peak hour, and 6 percent during the PM peak hour.

The magnitude of the impact would be reduced through trip reduction policies implemented through the 2020 LRDP. However, no feasible mitigation measures can currently be implemented at the **University Avenue / Sixth Street**, or **University Avenue / San Pablo Avenue** intersections. While campus transportation programs and incentives would continue to reduce the number of auto commute trips, this impact would remain *significant and unavoidable*.

LRDP Impact TRA-9: Housing projects in the 2020 LRDP Housing Zone could increase vehicle trips and traffic congestion in the vicinity of project sites, which could lead to substantial degradation in level of service. The mitigation described below would reduce this impact to a *less than significant level*.

Trip generation and traffic impacts associated with housing development that will occur under the 2020 LRDP in the LRDP Housing Zone are included in the overall traffic analysis in the preceding section. The impacts and mitigation measures for the regional traffic network in that section therefore include consideration of housing development in the LRDP Housing Zone. Moreover, localized trip impacts of any housing that will be constructed in the City Environs are also covered in the analysis above, since the above analysis assumes that all development under the 2020 LRDP would be focused on the City Environs.

However, development in the LRDP Housing Zone could occur in a wide variety of locations, including locations outside the City Environs. Trip generation from this housing, particularly for trips to and from the Campus Park, is expected to be minimal, since the housing would be built in areas with good transit access to campus and since students living in the housing would generally not be eligible for Campus parking permits. Still, new housing development in the LRDP Housing Zone could have localized effects on intersection level of service that are not covered above, particularly if student residents have cars and use them for trips to non-campus locations. The locations and magnitude of these effects cannot be known at this time, since the exact locations in which housing will be constructed have not been determined.

LRDP Mitigation Measure TRA-9: Prior to approving any development outside the City Environs, the University will conduct a traffic study to assess the localized traffic impacts of this development. Mitigations required to ensure that the housing project does not cause LOS deterioration exceeding the stated impact levels would be implemented, if necessary.

FREEWAY AND CMP/MTS ROUTE IMPACTS

LRDP Impact TRA-10: Development under the 2020 LRDP would cause the following Alameda County CMP Designated System and MTS roadways listed below to exceed the level of service standard established by the CMA (see text below for further definition of the standard of significance). This impact is *significant and unavoidable*.

- Ashby Avenue westbound, between Adeline Street and San Pablo Avenue
- Ashby Avenue eastbound, between College Avenue and Domingo Street
- University Avenue westbound, between MLK Jr. Way and I-80
- San Pablo Avenue northbound, between Gilman Street and Marin Avenue
- Shattuck Avenue southbound, between Dwight Way and Adeline Street
- Shattuck Avenue southbound, between Hearst Avenue and University Avenue (MTS only)
- Dwight Way westbound, between MLK Jr. Way and Sixth Street (MTS only)

For the purposes of this EIR, this standard of significance is measured as follows:

- On CMP-designated roadway segments that are projected to meet the CMP standard in the future without the project (2025), the impact is significant if the project causes the segment to exceed the standard and adds at least 5 percent to the future peak hour traffic volume; or

- On CMP-designated roadway segments that are projected to exceed the CMP standard in the future without the project (2025), the impact is significant if the project adds at least 5 percent to the future peak hour traffic volume.

As required by the CMA, the estimated project trips were added to the CMP and MTS designated roadways for the baseline 2010 and 2025 volumes. Table F.3-4 in Appendix F.3 shows the computational results and identifies the level of project impacts on the 2010 network and Table F.3-5 shows the impacts on the 2025 network. Based on the significance criteria, the project would not have a significant impact on most roadway segments. However, the seven impacts noted in Impact TRA-10 would occur.

The magnitude of the impact would be reduced through trip reduction policies implemented through the 2020 LRDP. However, no feasible mitigation measures are available to reduce the impact on these corridors to a less than significant level. This would, therefore, be a *significant, unavoidable* impact.

As shown in the above analysis, the proposed project would increase freeway volumes in the immediate vicinity of the campus by less than 1 percent. Based on the significance criteria, an impact would be significant if the project would cause an increase in a facility's total traffic volume by 5 percent or more, relative to the No Project volume. Thus, the project would not have any significant impacts on freeways within Alameda County.

For freeways in Contra Costa County, the Contra Costa Transportation Authority (CCTA) has established traffic service objectives generally based on delay index for each individual facility. Delay index is defined as the ratio of forecasted travel time to free-flow travel time. Since the proposed project would increase freeway volumes by less than 1 percent on Contra Costa freeways near the project (I-80, I-580 and SR24), the increase in delay index is estimated to be negligible. Thus, the project is not expected to have any significant impacts on freeways within Contra Costa County.

PARKING IMPACTS

LRDP Impact TRA-11: Implementation of the 2020 LRDP could induce a “mode shift” to driving by some commuters who currently take transit, bicycle or walk. This would be inconsistent with the intent of the 2020 LRDP. The mitigation described below would reduce this impact to a *less than significant* level.

The net increase of 2,300 spaces planned under the 2020 LRDP would increase the planned future commuter parking supply from 6,424 spaces without the 2020 LRDP³⁰ up to 8,724 spaces with the 2020 LRDP. This parking increase is designed to meet the needs of future growth in campus headcount, which would generate a parking demand of 1,745 spaces³¹ and to reduce an existing parking deficit, reducing University-generated demand on non-University parking (primarily Downtown parking facilities or on-street parking) by 555 spaces. Anticipated beneficial impacts of increased supply include a reduction in automobile traffic caused by cars circling in search of parking.

Despite the fact that existing unmet demand for University parking is estimated at over 3500 spaces, for purposes of conservative impact analysis, this EIR assumes that the increase in the University parking supply could induce a “mode shift” to driving by some commuters who currently take transit, bicycle or walk. The relative increase in

parking supply may make parking somewhat easier to find, resulting in the mode shift. Since the University is committed to maintaining and preferably improving the non-auto mode use among existing and future faculty, staff and students, the 2020 LRDP parking supply increase will be accompanied by policies, outlined in Mitigation Measure TRA-11, which will minimize the incentives for such a mode shift.

LRDP Mitigation Measure TRA-11: The University will implement the following measures to limit the shift to driving by existing and potential future non-auto commuters:

- Review the number of sold parking permits in relation to the number of campus parking spaces and demographic trends on a yearly basis, and establish limits on the total number of parking permits sold proportionate to the number of spaces, with the objective of reducing the ratio of permits to spaces over time as the number of spaces grows, thus ensuring that new supply improves the existing space-to-permit ratio without encouraging mode change to single occupant vehicles.
- As new parking becomes operational, assign a portion of the new or existing parking supply to short-term or visitor parking, thus targeting parkers who choose on-street parking now, and also effectively reserving part of the added supply for non-commuters.
- Expand the quantity of parking that is available only after 10:00 a.m., to avoid affecting the travel mode use patterns of the peak hour commuting population, as new parking inventory is added to the system.
- Review and consider reductions in attended parking as new parking inventory is added to the system and other impacts do not reduce parking supply.

PEDESTRIAN CIRCULATION

LRDP Impact TRA-12: The level of pedestrian growth associated with the LRDP may require physical and operational modifications to the intersections and roadways in the immediate campus vicinity and on major pedestrian routes serving UC Berkeley, to ensure adequate capacity for pedestrian movement and adequate design to protect pedestrian safety. The mitigation described below would reduce this impact to a *less than significant* level.

For the purposes of this EIR, the impact on pedestrian safety is significant if:

- the primary routes to/from the Campus Park for pedestrian traffic cannot accommodate the projected growth in pedestrian traffic volume, based on the sidewalk width, roadway crossing conditions, and availability of protected roadway crossings (i.e. traffic signals), or
- the project obstructs accessible walking paths and sidewalks.

New pedestrian trips for the 2020 LRDP were estimated as part of the trip generation development described in Appendix F.1. Commute period pedestrian trip generation by population group and residence distance from campus was calculated, as shown in Table F.1-12. A total of 917 new daily commuting pedestrian trips are anticipated with the 2020 LRDP, with the majority (76 percent) occurring within a one-mile radius of cam-

pus. The undergraduate population group is anticipated to generate the most new walking trips, as undergraduate students typically live in areas close to campus and have limited vehicle ownership.

In addition to the new commute walking trips, all transit and vehicle trips begin and end with a pedestrian trip. Using the trip generation data along with the locations of transit stops and potential new parking lots/structures, pedestrian volumes at the primary pedestrian gateways to the Campus Park were estimated, and are presented in Table F.1-13. Pedestrian volumes at the gateways, primarily along Oxford Street, are anticipated to increase substantially since much of the new parking supply is planned for the downtown zone. The pedestrian increases at specific intersections are approximations only, as the actual volume increases will be directly related to the specific parking locations.

The increased pedestrian volume at these campus gateways, and at intersections in the immediate vicinity of the Campus Park, will affect the way the City manages traffic operations and intersection improvements in the future. For example, as the volume of pedestrians crossing at signalized intersections such as Center Street / Oxford Street, Bancroft Way / Telegraph Avenue, and Hearst Avenue / Oxford Street grows, the amount of green time allocated to certain signal phases may need to be increased. At stop-controlled intersections such as Bancroft Way / Piedmont Avenue / Gayley Road, additional signing or traffic calming measures would be needed to ensure pedestrian safety and appropriate yielding of right-of-way. Finally, at uncontrolled locations (such as the highly used crossing areas along Gayley Road, Hearst Street near LeRoy Avenue, and Bancroft Way near the athletic complex), measures such as mid-block crosswalks, in-pavement flashers, signalized pedestrian crossings, or crossing prohibitions, may be needed to ensure pedestrian safety.

Along with continuing best practices such as TRA-1-a, above, Mitigation Measure TRA-12 would reduce these impacts to a *less than significant level*.

LRDP Mitigation Measure TRA-12: The University shall prepare a strategic pedestrian improvement plan that outlines the expected locations and types of pedestrian improvements that may be desirable to accommodate 2020 LRDP growth. The plan shall be flexible to respond to changing conditions as the LRDP builds out, and shall contain optional strategies and improvements that can be applied to specific problems that arise as the LRDP builds out. The University shall develop the Plan in consultation with the City of Berkeley, and work with the City to implement plan elements as needed during the life of the 2020 LRDP on a fair share basis.

4.12.9 TIEN CENTER IMPACTS

This section describes the potential traffic and circulation impacts of the Chang-Lin Tien Center for East Asian Studies, based on the Standards of Significance, whether they are significant or less than significant, and whether any significant impacts can be mitigated to less than significant levels.

The Tien Center will be located south of the North Gate, just east of Haviland Hall. Part of the Phase I building site is currently a surface parking lot, with striped spaces for approximately 34 vehicles. The Phase I building will house 28 permanent staff and 18

workers, a net increase of 5 total staff over the current number of employees working in Durant, California Hall and CCSL. Net new employment for the Phase II building is not known. The potential number of visitors (e.g. non-UC affiliates) to the Center has not been estimated. The number of staff that could make use of the vacated space in Durant, California Hall and CCSL has also not been estimated, but is likely to be minimal due to the over-subscribed space currently being used to house the East Asian Studies activities. Thus, for the purposes of the transportation impact analysis, the net new staff is assumed to be 5.

The net new auto, bicycle, pedestrian and transit trips associated with the net new employment in the Phase I building are very small and would not generate significant impacts. However, the project will generate impacts during the construction period, as well as impacts related to the design of the buildings and its integration with the local circulation system.

These impacts are summarized below, along with discussions of the impacts and the recommended mitigation measures.

Tien Center Impact TRA-1: The construction of the Tien Center would not substantially increase traffic loads or substantially decrease street system capacity over current conditions.

The Phase I building will involve the removal of approximately 15,000 cubic yards of soil, most to all of which will be hauled off-site. The proposed truck routing is via University Avenue, with a loop consisting of Oxford-Hearst-Gayley-University Drive-West Crescent (trucks will use either counter-clockwise or clockwise routing depending on truck turning or other maneuvering constraints). The construction period will include four discrete phases with different levels of truck activity, in addition to construction worker traffic. The first and most intensive phase is the soil off-hauling, which would involve 100 trucks per work day for 15-20 work days.

The second phase is the concrete slab pour, which would involve 10 to 20 trucks per work day for 5 to 6 weeks. The third phase is the construction of the concrete vertical walls and floor structure, which would involve 10-15 trucks per work day for several days. The fourth and final phase is the remaining construction period, with delivery of materials, steel, and framing materials, which would involve 5 – 10 trucks per work day. Thus, approximately the first four weeks would have the highest truck traffic (100 trucks per day), followed by about seven weeks of 10 to 20 trucks a day. Thereafter, 5 to 10 trucks per day would be the norm.

The trucks, as well as construction workers requiring site access with their vehicles, would use the route described above. The primary planned materials staging area is located near the east side of the new building, adjacent to McCone Hall; the west and south sides of the construction site would be secondary staging/storage areas. The primary planned staging area could conflict with pedestrian and bicycle circulation between the North Gate and the central part of campus.

As described above, Continuing Best Practices outlined under TRA-3 designed to address project-level construction impacts in the 2020 LRDP, would ensure Tien Center construction would not substantially impact street systems or traffic loading.

Tien Center Impact TRA-2: The Tien Center would not adversely impact local pedestrian and bicycle circulation.

The 2020 LRDP contains planning policies and guidelines to ensure that new buildings are well integrated with the campus circulation system. In addition, current best practices outlined under LRDP Impact TRA-1, and the mitigation measure developed under LRDP Impact TRA-12, above, would address the appropriate design of bicycle and pedestrian circulation and accessibility. The proposed project would remove surface parking at the site, further reducing potential pedestrian and bicycle conflicts resulting from the project.

4.12.10 CUMULATIVE IMPACTS

This analysis considers cumulative growth as represented by the implementation of municipal general plans, implementation of the proposed Lawrence Berkeley National Laboratory 2004 LRDP, the proposed redevelopment of University Village Albany, the proposed AC Transit Bus Rapid Transit project, the draft Southside Plan, the AC Transit Major Investment Study, and implementation of the 2020 LRDP, as described in 4.0.5. The analysis also includes growth anticipated by previously certified UC Berkeley EIRs, including the Northeast Quadrant Science and Safety Projects (SCH 2001022038), Seismic Replacement Building 1 (SCH 99122065), and the Underhill Area Projects (SCH 99042051).

For vehicular traffic, cumulative conditions are the same as the future “with project” conditions described in Section 4.12.8. This is because these conditions already take account of future baseline conditions that include all development foreseen under the general plans of each of the jurisdictions as well as the LBNL 2004 LRDP and the 2020 LRDP in the cumulative impact LRDP area, as described in Section 4.12.5.

Cumulative construction-related traffic and parking may exacerbate parking capacity concerns, congestion conditions, or create unsafe conditions for pedestrians or bicyclists. As described 4.12.4 above, the existing setting analysis prepared for the 2020 LRDP EIR occurred during a time of intensive cumulative construction conditions. In its Building 49 EIR, LBNL commits to limiting construction truck trips for that project to the hours between 9 am and 4 pm, to reduce construction contributions to peak period congestion.³² Best management practices employed by LBNL contractors are expected to reduce risks to pedestrians and bicyclists. With these and similar practices, cumulative construction-related traffic impacts would not be significant. In general, continuing coordination of construction scheduling effecting area roadways, and continuing implementation of construction management best practices outlined in Section 4.12.8 above, would serve to reduce potential traffic and parking impacts of construction.

For other transportation issues, including parking, transit, and pedestrian and bicycle circulation, no significant increases in demand beyond those foreseen in Section 4.12.8 are anticipated. This is because non-university cumulative development would be dis-

persed, thereby minimizing impacts in the area around the Campus Park and City Environs. Moreover, non-vehicular modes have relatively large amounts of available capacity. Thus no cumulative impacts beyond those described above are expected to occur.

4.12.11 REFERENCES

- ¹ Lawrence Berkeley National Laboratory, *Revised Notice of Preparation: Draft Environmental Impact Report*, October 28, 2003, page 8.
- ² *City of Berkeley Draft General Plan EIR*, February 2001, page 34.
- ³ *City of Berkeley Final General Plan EIR*, June 2001, page 35.
- ⁴ *City of Berkeley Draft General Plan EIR*, February 2001, page 128.
- ⁵ *City of Berkeley Final General Plan EIR*, June 2001, page 48.
- ⁶ *City of Berkeley Final General Plan EIR*, June 2001, pages 48-49.
- ⁷ *City of Berkeley Draft General Plan EIR*, February 2001, pages 122-135.
- ⁸ *Berkeley Bicycle Plan Draft for Inclusion in the General Plan*, December 1998, page 1-1.
- ⁹ *Berkeley Bicycle Plan Draft for Inclusion in the General Plan*, December 1998, page ES-1.
- ¹⁰ City of Berkeley, *Draft Southside Plan (Subcommittee Draft)*, Planning Commission, December 2001, page 10.
- ¹¹ City of Berkeley, *Planning Commission General Plan, Transportation Element*, December 2001, pages T-25 and T-26.
- ¹² Table 4.12-1 shows existing levels of service, and also shows future levels of service without and with development under the 2020 LRDP. Future levels of service are explained later in this chapter.
- ¹³ Transportation Research Board, *Highway Capacity Manual – Special Report 209*, 2000.
- ¹⁴ UC Berkeley, *Faculty/Staff Housing, Transportation, and Parking Survey*, Spring 2001 and UC Berkeley, *Student Housing and Transportation Survey*, Fall 2000.
- ¹⁵ Refer to the Campus Transportation Policies and Programs section for more information.
- ¹⁶ Wilbur Smith Associates, *UC Berkeley Campus Parking Policy & Planning Options Study*, February 11, 1999, page IV.
- ¹⁷ Wilbur Smith Associates, *UC Berkeley Campus Parking Policy & Planning Options Study*, February 11, 1999, page IV.
- ¹⁸ Wilbur Smith Associates, *UC Berkeley Campus Parking Policy & Planning Options Study*, February 11, 1999, page VI.
- ¹⁹ Assumes the average duration of stay for students, faculty and staff is 2+ hours.
- ²⁰ 1990 US Census Data.
- ²¹ City of Berkeley Bicycle and Pedestrian Safety Task Force, *Evaluation and Recommendations, Final Report*, March 2000, page 19.
- ²² City of Berkeley Bicycle and Pedestrian Safety Task Force, *Evaluation and Recommendations, Final Report*, March 2000, page 19.
- ²³ Forbes, Paul, Capacity Planning Support, BART. Personal communication with Fehr & Peers, January 7, 2003.
- ²⁴ Der, Howard, AC Transit. Personal communication with Fehr & Peers, March 3 and 9, 2004.
- ²⁵ Der, Howard, AC Transit. Personal communication with Fehr & Peers, March 3 and 9, 2004.
- ²⁶ UC Berkeley, *Northeast Quadrant Science and Safety Projects and 1990 Long Range Development Plan Amendment Draft Environmental Impact Report*, Volume 1, June 2001, page 3.6-18.
- ²⁷ This is the common standard, employed in the *Underbill Area Projects EIR* (see page IV.B-16); the *Northeast Quadrant Science and Safety Projects EIR* (see page 3.6-31) and the *City of Berkeley General Plan EIR* (see page 121).
- ²⁸ City of Berkeley/UC Berkeley, *Southside/Downtown TDM Study*, March 2001. Prepared by Nelson/Nygaard Consulting Associates.
- ²⁹ See, for example, UC Berkeley, *Northeast Quadrant Science and Safety Projects and 1990 Long Range Development Plan Amendment Draft Environmental Impact Report*, Volume 1, June 2001, MM TRAF-4.
- ³⁰ Refer to 2020 Parking Conditions section.
- ³¹ Calculations of future parking demand presented in Appendix F.1.
- ³² Lawrence Berkeley National Laboratory, *Construction and Operation of the Building 49 Project Draft Environmental Impact Report*, September 2003, SCH #2003062097, prepared by Environmental Science Associates Inc. pp IV.K-5 to IV.K.6.

4.13 UTILITIES AND SERVICE SYSTEMS

This chapter evaluates the potential physical and environmental effects resulting from implementation of the 2020 LRDP and development of the Chang-Lin Tien Center for East Asian Studies related to water supply and distribution, wastewater collection and treatment, stormwater, steam heating, solid waste, and electricity and natural gas.

During the scoping period for this EIR, comments related to utilities and service systems focused on the potential impacts that 2020 LRDP development could have on the capacity of sewer, storm drainage and other service systems. These issues are addressed in this chapter.

4.13.1 WATER

4.13.1.1 ANALYTICAL METHODS

Potential impacts of the 2020 LRDP and Tien Center were assessed by determining utility demand factors appropriate for the proposed project and comparing anticipated utility requirements with existing and future planned capacity, considering any upgrading of systems that may be approved or in progress.

4.13.1.2 REGULATORY FRAMEWORK

Planning for water supply and distribution is regulated at the State level by Senate Bill (SB) 610, which is codified as Sections 10910-10915 of the California Public Resources Code. SB 610 requires local water providers to conduct a water supply assessment for projects proposing over 500 housing units or equivalent usage. Additionally, the local water supplier must prepare an Urban Water Management Plan to guide planning and development in the water supplier's service area.

4.13.1.3 LOCAL PLANS AND POLICIES

Although the University is constitutionally exempt from local land use regulations when using its property in furtherance of its educational purposes, it is University policy to evaluate proposed projects for consistency with local plans and policies. Therefore, this section outlines the plans and policies of the Cities of Berkeley and Oakland related to utilities and service systems.

BERKELEY GENERAL PLAN

Berkeley General Plan policies related to water conservation and water supply include EM-26, to promote water conservation through drought tolerant landscaping and low flow irrigation systems and through consideration of an East Bay Municipal Utility District (EBMUD) recycled water project to make gray water available for irrigation and other non-potable uses; and EM-28 to restore a fresh water supply to creeks and the bay by eliminating conditions that pollute rainwater, reducing impervious surfaces and encouraging swales, cisterns and other devices that increase infiltration and replenish underground water supplies that nourish creeks.¹

FINDINGS OF THE BERKELEY GENERAL PLAN EIR

The Berkeley General Plan EIR found the implementation of the General Plan would not require substantial extension or reconstruction of major water and wastewater lines to serve new development. A potentially significant impact regarding demand for water beyond the planned EBMUD water supply was identified for policies encouraging

increased commercial development and residential population in areas in the downtown, higher density housing and commercial development in commercial and mixed use districts and along transit corridors, and additional University housing.

Mitigation for this impact was the adoption and implementation of a recycled water ordinance. Although the city as a whole receives an adequate water supply from EBMUD, the ability to feed water from the central main to smaller mains and to hydrants has been determined by the city to require improvement.²

OAKLAND GENERAL PLAN

The Oakland General Plan contains policies that require use of drought-tolerant plants; promote the use of reclaimed water; encourage coordination between the city and EBMUD on water recycling and on public education about water conservation; encourage development patterns that are less water-consumptive; and require adequate existing or planned infrastructure as a condition of development approval.³

4.13.1.4 EXISTING SETTING

Water supply and distribution to much of Alameda and Contra Costa County is provided by EBMUD. The EBMUD water supply system consists of a network of reservoirs, aqueducts, treatment plants, and distribution facilities that extends from its principal water source, the Mokelumne River Basin in the Sierra Nevada range, to the East Bay. Untreated water from Pardee Reservoir is transported 91.5 miles to the East Bay treatment plants or terminal reservoirs through the Pardee Tunnel, the Mokelumne aqueducts, and the Lafayette aqueducts. The EBMUD system extends from Crockett in the north to Hayward in the south and Walnut Creek and San Ramon in the east.⁴

UC Berkeley is located within EBMUD's Berryman, Stonewall and Summit pressure zones with service elevation ranges of 200 to 400 feet, 400 to 500 feet and 500 to 700 feet, respectively.⁵ There are nine major connecting points to the campus distribution system with metering and back flow prevention devices. There are also approximately 50 smaller connections to individual campus buildings, each with a separate meter.⁶

On average, 95 percent of the water used by EBMUD comes from the 577-square-mile protected watershed of the Mokelumne River, which collects melted snows of Alpine, Amador and Calaveras counties. The watershed is located on the west slope of the Sierra Nevada and is generally contained within national forests, EBMUD-owned lands, or other undeveloped lands with minimal human activity. EBMUD has water rights and facilities to divert up to a daily maximum of 325 million gallons per day (mgd) from the Mokelumne River, subject to the availability of Mokelumne River runoff and the prior water rights of other users.⁷ In 2000, the entire EBMUD system had an average daily consumption of approximately 186.8 mgd,⁸ of which 1.3 mgd, or 0.7 percent, represents water use on the Campus Park.⁹

The campus is served by two water supply systems: the East System and the Central Campus system. The Central Campus system serves water to the area bounded by Bancroft, Oxford, Hearst Avenues and Gayley Road and is fed by six EBMUD stations, three on the east side of campus and three on the west side. The East Campus system is located east of Memorial Stadium, where two of three metering backflow stations are shared with Lawrence Berkeley National Laboratory (LBNL).

Under a series of State-funded water distribution system upgrades in the 1990s, UC Berkeley has replaced and upgraded water mains and increased inter-connectivity to improve reliability and redundancy.¹⁰

CAMPUS PARK

EBMUD supplies water to the University-owned distribution system from its supply lines and meters along the periphery of the Campus Park. A 20-inch diameter EBMUD water main runs along Hearst Avenue, Gayley Road, Piedmont Avenue and Bancroft Way. A 48-inch diameter water main runs west under Hearst Avenue and Bancroft Way, and south along Oxford Street.¹¹

The University owns, operates and maintains the distribution system that carries water from EBMUD's mains at the boundaries of the Campus Park to campus facilities. Water lines ranging in diameter from 2 to 12 inches are located throughout the Campus Park.¹² In general, UC Berkeley's water distribution system provides adequate and reliable water distribution to campus irrigation and building supply needs.¹³

HILL CAMPUS

UC Berkeley maintains the water lines in the Hill Campus. Existing line sizes and pressure are sufficient for current water usage. Part of the Hill Campus water system provides redundancy to the LBNL system.¹⁴

ADJACENT BLOCKS, SOUTHSIDE AND THE CITY OF BERKELEY

The City of Berkeley owns and maintains the distribution lines in the Adjacent Blocks, Southside, and the Berkeley portion of the LRDP Housing Zone.

CITY OF OAKLAND

The areas within the Oakland portion of the LRDP Housing Zone are all urban sites zoned for multi-unit housing with infrastructure to serve residential demand. Many of Oakland's water mains are 8 inches or less in diameter and are quite old. Most of the water delivery lines serving the LRDP Housing Zone in Oakland were constructed in the 1920s and 1930s. Storage capacity is generally adequate in the area.¹⁵

4.13.1.5 STANDARDS OF SIGNIFICANCE

The significance of the potential impacts of the 2020 LRDP and Tien Center on water supply and distribution was determined based on the following standards:

Standard: Would the project exceed the capacity of existing and planned water entitlements and resources?

Standard: Would the project require or result in the construction of new or expansion of existing water facilities, the construction of which could cause significant adverse effects?

4.13.1.6 POLICIES AND PROCEDURES GUIDING FUTURE PROJECT REVIEW

2020 LRDP

Review of individual projects under the 2020 LRDP would influence water use by guiding the location, scale, form and design of new University projects. Two of the Objectives described in Chapter 3.1 are particularly relevant to water use:

- **Provide the space, technology, and infrastructure we require to excel in education, research and public service.**
- **Plan every new project as a model of resource conservation and stewardship.**

The 2020 LRDP also includes more specific policies that would contribute to minimizing new water demand. Under the 2020 LRDP, UC Berkeley would design future projects to minimize energy and water consumption and wastewater production; design new buildings to a standard equivalent to LEED 2.1 certification and LABS 21 environmental performance criteria; and base capital investment decisions on life cycle costs. This last policy would help minimize water consumption by ensuring a more balanced consideration of initial and ongoing costs of buildings and infrastructure, and thus encourage investment in conservation technology.

CAMPUS POLICIES AND PROCEDURES

WATER SUPPLY REVIEW. Whenever UC Berkeley is in preliminary project design for a new development, the Physical Plant/Campus Services' Engineering and Utilities Department staff reviews each project to determine if the existing water supply is adequate at the point of connection. If water supply is judged inadequate, UC Berkeley upgrades the system to provide adequate water flow and pressure to the project site before or as part of the project.

WATER CONSERVATION PROGRAMS. The implementation of a number of campus water conservation programs has resulted in a net decrease in water use on the central campus from 1.8 million gpd in 1980 to 1.2 million gpd in 2001, a reduction of 33 percent, despite expanded development. These programs range from plumbing fixture retrofits in existing buildings and high efficiency fixtures in all new construction to monitoring programs that improve efficiency and provide early detection of system malfunction.

Beginning in the mid 1980s, UC Berkeley began installing efficient plumbing fixtures to replace existing high volume units when restrooms were upgraded as part of seismic or other major retrofit programs. Replacement lab buildings or major retrofits of existing lab buildings typically eliminated wasteful once-through cooling systems, replacing them with highly efficient recirculating systems. Also, in accordance with current building standards, all new campus buildings contain low-flow plumbing fixtures.

A small number of Campus Park building water meters are being replaced each year as part of on-going maintenance work. As funds permit, the campus plans to implement real time monitoring of meters via the campus energy management system: this would allow the University to detect water leaks and malfunctioning plumbing fixtures, enabling more rapid repair and reduced water use. Housing and dining services facilities and fixtures have also been retrofitted: replacement of 35 spray nozzles in campus dining facilities allowed an estimated savings of as much as 300 gallons per day (gpd) per nozzle.¹⁶

TABLE 4.13-1

PROJECTED WATER DEMAND	2020 LRDP Max Net Addl	Demand Factor (gpd)	Projected Addl Demand (gpd)
Academic & Support: Labs (gsf)	700,000	0.32	224,000
Academic & Support: Other (gsf)	1,500,000	0.03	45,000
Residential: Student (beds)	2,500	50	125,000
Residential: Faculty/Staff (units)	200	153	30,600
Total Addl Water Demand (gpd)			424,600

Virtually the entire campus irrigation system has been automated. Since the mid 1980s, the University has upgraded irrigation by installing automated controllers with repetitive cycles and low volume heads, both of which reduce consumption and runoff waste. Recently the campus has connected about one-third of all campus irrigation to the SCADA (Supervisory Control and Data Acquisition) system that monitors environmental conditions to improve irrigation efficiency. Centralized control allows rapid reprogramming of many circuits to adapt to leaks or other system failure. SCADA controlled irrigation continues to be installed on a project-by-project basis. As funds permit, the system will be enhanced to also enable monitoring of soil moisture.

4.13.1.7 2020 LRDP IMPACTS

This section describes the potential water supply and distribution impacts of the 2020 LRDP based on the Standards of Significance, whether they are significant or less than significant, and whether any significant impacts can be mitigated to less than significant levels.

LESS THAN SIGNIFICANT IMPACTS

LRDP Impact USS-1.1: Implementation of the 2020 LRDP would increase water demand, but this increase is not anticipated to result in a significant impact on water entitlements and resources, nor result in construction of new or altered facilities.

According to EBMUD, water demand in the EBMUD service area will total 277 mgd in 2020. As noted above, EBMUD’s entitlement for the Mokelumne River is 325 mgd.¹⁷ Implementation of the 2020 LRDP would increase water demand by 424,600 gpd. This additional LRDP-related growth would require 0.13 percent of the total EBMUD entitlement, and would represent an increase of only 0.15 percent of EBMUD’s predicted demand for 2020. The portion of water demand attributable to the 2020 LRDP is minimal and thus creates a *less than significant* impact on the overall water demand.

EBMUD conducted a water supply assessment of the 2020 LRDP in January 2004. EBMUD indicated that, based on extensive forecasting in its water supply management program as well as recent land used based demand forecasting, the projected water demand of 277 mgd can be reduced to 229 mgd with successful water recycling and conservation programs in place. The 2020 LRDP would not change the EBMUD 2020 demand projection.¹⁸

Although EBMUD has adequate water supply to meet the needs of anticipated future development during normal years, Mokelumne River water is not adequate to meet the 325 mgd entitlement during periods of drought. EBMUD is studying a groundwater project and other strategies to increase the water supply for drought years.¹⁹

While new Hill Campus development would largely occur in areas already served by the campus water distribution system,²⁰ provision of water service to new Hill Campus facilities may require increased system pressure. Existing facilities would be surveyed for the possibility of excessive leakage due to increased pressure, especially at pressure reducing valve stations.

UC Berkeley continues to explore system improvements and retrofit to reduce water consumption. The feasibility of providing recycled water for irrigation, with an on-site wastewater treatment plant is currently being explored with EBMUD.²¹ This would further reduce new water supply demands of the 2020 LRDP by generating reclaimed and recycled waters for landscape irrigation or other non-potable uses.

While development on campus has increased, overall campus water usage has been reduced from 1.8 mgd in 1980 to 1.3 mgd in 2000 and 1.2 mgd in 2001, with proportional reductions in wastewater generation.²² The campus water distribution system would be able to accommodate an increase in water demand to 1980 levels. With the additional demand projected as a result of the 2020 LRDP, water consumption would remain below 1980 levels.

Continuing Best Practice USS-1.1: For campus development that increases water demand, UC Berkeley would continue to evaluate the size of existing distribution lines as well as pressure of the specific feed affected by development on a project-by-project basis, and necessary improvements would be incorporated into the scope of work for each project to maintain current service and performance levels. The design of the water distribution system, including fire flow, for new buildings would be coordinated among UC Berkeley staff, EBMUD, and the Berkeley Fire Department.

4.13.1.8 TIEN CENTER IMPACTS

The water demands generated by the Tien Center would fall within the water demands generated by the 2020 LRDP, which are described above. Thus no additional impact on water supply would occur beyond that already foreseen for the 2020 LRDP.

4.13.2 WASTEWATER

4.13.2.1 ANALYTICAL METHODS

Potential impacts of the 2020 LRDP and Tien Center were assessed by determining utility demand factors appropriate for the proposed project and comparing anticipated utility requirements with existing and future planned capacity, considering any upgrading of systems that may be approved or in progress.

4.13.2.2 REGULATORY FRAMEWORK

Wastewater discharge is regulated under the National Pollutant Discharge Elimination System (NPDES) permit program for direct discharges into receiving waters and by the National Pretreatment Program for indirect discharges to a sewage treatment plant. Campus wastewater is treated by EBMUD which has an NPDES Direct Discharge permit to discharge treated wastewater into the San Francisco Bay. Under this permit, EBMUD imposes effluent guidelines and discharge limitations pursuant to the National

Pretreatment Program on the campus via the local EBMUD ordinance and by the EBMUD discharge permit issued to the campus.²³

4.13.2.3 LOCAL PLANS AND POLICIES

Although the University is constitutionally exempt from local land use regulations when using its property in furtherance of its educational purposes, it is University policy to evaluate proposed projects for consistency with local plans and policies. Therefore, this section outlines the plans and policies of the Cities of Berkeley and Oakland related to utilities and service systems.

BERKELEY GENERAL PLAN

Berkeley General Plan policies related to wastewater collection and treatment include EM-24, to protect and improve water quality by improving the citywide sewer system; and EM-28 to restore a fresh water supply to creeks and the bay by eliminating conditions that pollute rainwater, reducing impervious surfaces and encouraging swales, cisterns and other devices that increase infiltration and replenish underground water supplies that nourish creeks.²⁴

FINDINGS OF THE BERKELEY GENERAL PLAN EIR

The Berkeley General Plan EIR estimated that combined residential and non-residential wastewater generation resulting from policies encouraging increased commercial development and residential population in the downtown, as well as higher density housing and commercial development in commercial and mixed use districts and along transit corridors, would result in approximately a 1.2 percent increase over the current average dry weather flow of 75 mgd to the wastewater treatment plant.²⁵

The city's inflow/infiltration correction program, now underway, would allow for a base wastewater flow increase of up to 20 percent in each of the city's 89 sub-basins.²⁶ The Berkeley General Plan Final EIR found that the area bounded by the city boundary to the east, Virginia Street to the north, MLK Way to the west, and Dwight Way to the south could accommodate over 4,100 new jobs and 1,600 new housing units without generating a 20 percent increase in any single sewer sub-basin, based on a growth distribution scenario formulated for the EIR.²⁷ However the city cautions actual growth could be distributed among sub-basins differently than envisioned in the scenario.

OAKLAND GENERAL PLAN

The Oakland General Plan includes policies that encourage reduction of inflow/infiltration and require approval of development based on availability of existing or planned infrastructure.²⁸

4.13.2.4 EXISTING SETTING

EBMUD provides wastewater collection for the entire 2020 LRDP area located in Alameda County, and provides wastewater treatment for all of the 2020 LRDP area. Sanitary sewage flows toward the San Francisco Bay through a network of pipes and mains that connect into the EBMUD regional interceptor line, which conveys the sewage south to the EBMUD Special District No. 1 (SD-1) Wastewater Treatment Plant, which then discharges the treated effluent into the Bay from a submerged outfall pipe under the Bay Bridge.²⁹

The SD-1 plant presently has a dry weather flow treatment capacity of 168 mgd. Average dry-weather flows to the plant currently totals 77 mgd. This leaves 91 mgd or 54 percent surplus treatment capacity. Peak wet-weather capacity is 415 mgd. EBMUD has indicated that the SD-1 plant will continue operating at roughly 46 percent capacity through 2020.³⁰

Within the City of Berkeley there are approximately 400 miles of sanitary sewer mains, which range in size from 6 to 48 inches, with an estimated 28,000 lateral connections. According to Henry Yee, City of Berkeley Wastewater Engineer, the Central Campus sewer sub-basin (17-012) was listed as one of the 49 sub-basins in the city requiring replacement/rehabilitation of 50 percent of the lateral lines.³¹

In 1990 the City of Berkeley agreed to upgrade its sewer system as required to serve development proposed by the Draft 1990 LRDP. UC Berkeley has paid more than \$3 million to the city to support these improvements. Additionally, the University currently pays sewer hook up fees on bed spaces developed on blocks adjacent to the campus.

CAMPUS PARK

UC Berkeley owns and maintains its own sanitary sewer infrastructure serving the Campus Park. Sewer lines ranging from 4 to 15 inches in diameter run east to west throughout the Campus Park. The campus system includes a main trunk line for the Campus Park and Adjacent Blocks North, which passes north of Moffitt Undergraduate Library and runs to the west past the Campus Park entrance at West Gate near Oxford Street. UC Berkeley facilities adjacent to the Campus Park either feed into the University-owned system or connect directly to the city's system.³²

In general, UC Berkeley's system capacity for average dry weather flows (ADWF) is adequate, although regular maintenance and repairs are required. Campus engineering studies have demonstrated that no capacity problems occur under existing or proposed future conditions for ADWF or three-hour peak flows.³³

UC Berkeley's wastewater collection system has experienced its most significant design capacity problems during wet-weather wastewater flows. However, since 1990 extensive improvement programs have replaced sewer mains, including those between Evans Hall and the West Circle, reducing capacity constraints on campus. Major sanitary sewer trunk lines have been increased in size and relief sewers have been installed, particularly in the west segment of the campus where the lines converge to connect to the City of Berkeley sewer system.³⁴

ADJACENT BLOCKS, SOUTHSIDE, AND THE CITY OF BERKELEY

Wastewater treatment for the Adjacent Blocks, Southside and the rest of the City of Berkeley is provided by EBMUD, with wastewater conveyance provided by the City of Berkeley. The sewer mains in the City of Berkeley range in age up to 100 years old. The system is currently undergoing renovation and replacement.³⁵ Existing ADWF for the City of Berkeley is approximately 75 mgd.³⁶ The ADWF from UC Berkeley is approximately 8.3 mgd, or about 11 percent of the city's flow.³⁷

Stormwater infiltration and inflow (I/I) has created significant overflow problems for the Berkeley sewer system. During intense storms, stormwater can seep into the sewer

system through cracks and cross connections, increasing wet weather sewage flow up to 20 times the amount of dry weather flow due to the infiltration and inflow of storm water.³⁸ The I/I correction program, initiated by the city in late 1987, includes rehabilitation or replacement of 50 percent of the city's existing system over 30 years, as well as 12 miles of new relief sewer to accommodate overflow conditions by the year 2007.

By 1999, over 25 percent of planned replacement and rehabilitation had been completed and about 10 miles of the proposed 12 miles of new sewer lines had been installed. A 22-mile interceptor line along Adeline Street, completed in 1992, now conveys wet weather flow to EBMUD's storage and treatment facilities.³⁹

HILL CAMPUS

UC Berkeley owns and maintains the sanitary sewer infrastructure serving the Hill Campus and connects to the City of Berkeley collection system at points along Stadium Rim Way.⁴⁰ Existing lines are sufficient for existing wastewater loads. However, since portions of the sanitary sewer lines in the Hill Campus flow to the Campus Park, capacity deficiencies on the Campus Park and City of Berkeley system could affect the Hill Campus' wastewater capacity.⁴¹

CITY OF OAKLAND

The City of Oakland collects wastewater from an area of about 39 square miles. This system then feeds into the EBMUD collection system. The majority of the pipes in the Oakland sewer system were put in place before 1938.⁴² The city is currently rehabilitating the Adeline and 62nd Street area, upgrading from a 6-inch to an 8-inch line, as part of the city's 25-year public works improvement program.⁴³

4.13.2.5 STANDARDS OF SIGNIFICANCE

The significance of the potential impacts of the 2020 LRDP and Tien Center on wastewater collection and treatment was determined based on the following standards:

Standard: Would the project result in a determination by the wastewater treatment provider which serves or may serve the project that it does not have adequate capacity to serve the project's projected demand in addition to the provider's existing commitment?

Standard: Would the project require or result in the construction of new or expansion of existing wastewater treatment facilities, the construction of which could cause significant adverse effect?

Standard: Would the project exceed wastewater treatment requirements of the Regional Water Quality Control Board?

4.13.2.6 POLICIES AND PROCEDURES GUIDING FUTURE PROJECT REVIEW

2020 LRDP

Review of individual projects under the 2020 LRDP would influence wastewater generation by guiding the location, scale, form and design of new University projects. Two of the Objectives described in Chapter 3.1 are particularly relevant to wastewater:

- **Provide the space, technology, and infrastructure we require to excel in education, research and public service.**
- **Plan every new project as a model of resource conservation and stewardship.**

The 2020 LRDP also includes more specific policies that would contribute to minimizing new demand for wastewater collection and treatment. Under the 2020 LRDP, UC Berkeley would design future projects to minimize energy and water consumption and wastewater production; design new buildings to a standard equivalent to LEED 2.1 certification and LABS 21 environmental performance criteria; and base capital investment decisions on life cycle costs. This last policy would help minimize wastewater production by ensuring a more balanced consideration of initial and ongoing costs of buildings and infrastructure, and thus encourage investment in conservation technology.

CAMPUS POLICIES AND PROCEDURES

WASTEWATER CAPACITY REVIEW. Whenever UC Berkeley develops a preliminary project design for a new development, the engineering and utilities unit of Facilities Services reviews the project to determine whether existing capacity of the sanitary sewer line at the point of connection is adequate. If the capacity of the sewer line is determined inadequate, the University upgrades the system to provide adequate service to the project site prior to occupation or operation.

Campus water conservation programs outlined in section 4.13.1.6 also influence wastewater collection and treatment by reducing the volume of wastewater generated.

WASTEWATER PERMITS. As described above, UC Berkeley complies with all provisions of its industrial wastewater permits issued with EBMUD's disposal permit. UC Berkeley will continue to obtain and comply with all provisions of wastewater permits required for 2020 LRDP-related development.

4.13.2.7 2020 LRDP IMPACTS

This section describes the potential wastewater collection and treatment impacts of the 2020 LRDP based on the Standards of Significance, whether they are significant or less than significant, and whether any significant impacts can be mitigated to less than significant levels.

LESS THAN SIGNIFICANT IMPACTS

LRDP Impact USS-2.1-a: Implementation of the 2020 LRDP may result in increased demand for wastewater treatment, but this increase is not anticipated to result in a significant impact on treatment capacity, nor result in construction of new or altered facilities.

LRDP Impact USS-2.1-b: Implementation of the 2020 LRDP may result in increased demand on wastewater collection systems and the construction of new or altered facilities, but these are not anticipated to have significant environmental impacts.

EBMUD's SD-1 plant, which receives effluent transported from its own collection lines as well as the Berkeley and Oakland collection systems, presently has 54 percent surplus treatment capacity. EBMUD estimates this surplus capacity will remain the same until

TABLE 4.13-2

PROJECTED WASTEWATER GENERATION	Projected Water Demand (gpd)	Wastewater Factor	Projected Wastewater (gpd)
Academic & Support: Labs (gsf)	224,000	90%	201,600
Academic & Support: Other (gsf)	45,000	80%	36,000
Residential: Student (beds)	125,000	95%	118,800
Residential: Faculty/Staff (units)	30,600	95%	29,100
Total Addl Wastewater Generation (gpd)			385,500
Total Addl Wastewater Generation (gpd) Minus Housing			237,600

2020.⁴⁴ Implementation of the 2020 LRDP will increase wastewater generation by 385,500 gpd, as shown in Table 4.13-2.⁴⁵ This increase represents just 0.2 percent of the total daily permitted wastewater flow of the SD-1 plant. The portion of wastewater generation attributable to the 2020 LRDP would result in a *less than significant* impact.

As described in the discussion of water supply and distribution, above, with anticipated 2020 LRDP development, water usage and wastewater generation will remain lower than volumes experienced in the 1980s. The wastewater generation due to the 2020 LRDP would represent an increase of under 5 percent in the current existing UC Berkeley flow of roughly 8.3 mgd, well within the 20 percent increase in capacity for each sub-basin projected in the Berkeley General Plan EIR.⁴⁶

However, depending on where it is located, it is possible localized clusters of new development may exceed the capacity of individual sub-basins. The following Continuing Best Practices would continue to be implemented by UC Berkeley, to minimize possible collection capacity impacts:

Continuing Best Practice USS-2.1-a: UC Berkeley will promote and expand the central energy management system (EMS), to tie building water meters into the system for flow monitoring.

Continuing Best Practice USS-2.1-b: UC Berkeley will analyze water and sewer systems on a project-by-project basis to determine specific capacity considerations in the planning of any project proposed under the 2020 LRDP.

Continuing Best Practice USS-2.1-c: UC Berkeley will continue and expand programs retrofitting plumbing in high-occupancy buildings, and seek funding for these programs from EBMUD or other outside agencies as appropriate.

Continuing Best Practice USS-2.1-d: UC Berkeley will continue to incorporate specific water conservation measures into project design to reduce water consumption and wastewater generation. This could include the use of special air-flow aerators, water-saving shower heads, flush cycle reducers, low-volume toilets, drip irrigation systems, and the use of drought resistant plantings in landscaped areas.

Continuing Best Practice USS-2.1-e: The current agreement under which UC Berkeley makes payments to the City of Berkeley to help fund sewer improvements terminates at the conclusion of academic year 2005-2006 or upon approval of the 2020 LRDP.⁴⁷ Any future payments to service providers to help fund wastewater treatment or collection facilities would conform to Section 54999 of the California Government Code, including but not limited to the following provisions:

- Fees would be limited to the cost of capital construction or expansion.
- Fees would be imposed only after an agreement has been negotiated by the University and the service provider.
- The service provider must demonstrate the fee is nondiscriminatory: i.e. the fee must not exceed an amount determined on the basis of the same objective criteria and methodology applied to comparable non-public users, and is not in excess of the proportionate share of the cost of the facilities of benefit to the entity property being charged, based upon the proportionate share of use of those facilities.
- The service provider must demonstrate the amount of the fee does not exceed the amount necessary to provide capital facilities for which the fee is charged.

To the extent Continuing Best Practice USS-2.1e results in the construction of new or enlarged facilities, such construction may have the potential to cause environmental impacts. However, each such project would be reviewed and, as necessary, mitigated by the service provider in its role as CEQA lead agency. In general, any such impacts would be limited to the temporary impacts of construction. Given the already intensively developed character of the Campus Park and City Environs, these new wastewater facilities are not anticipated to significantly alter land use patterns or have other permanent environmental impacts.

4.13.2.8 TIEN CENTER IMPACTS

The wastewater generated by the Tien Center would fall within the total wastewater generated by the 2020 LRDP, which is described above. Thus no additional impact on wastewater conveyance would occur beyond that already foreseen for the 2020 LRDP.

4.13.3 STORMWATER

4.13.3.1 ANALYTICAL METHODS

Potential impacts of the 2020 LRDP and Tien Center were assessed by determining utility demand factors appropriate for the proposed project and comparing anticipated utility requirements with existing and future planned capacity, considering any upgrading of systems that may be approved or in progress.

4.13.3.2 REGULATORY FRAMEWORK

The regulatory framework regarding NPDES stormwater permits presented in Chapter 4.7 is applicable to stormwater utilities.

4.13.3.3 LOCAL PLANS AND POLICIES

Although the University is constitutionally exempt from local land use regulations when using its property in furtherance of its educational purposes, it is University policy to evaluate proposed projects for consistency with local plans and policies. Therefore, this section outlines the plans and policies of the Cities of Berkeley and Oakland related to utilities and service systems.

BERKELEY GENERAL PLAN

Berkeley General Plan policies related to stormwater management include EM-23, to improve water quality in San Francisco Bay by minimizing storm sewer pollution of the Bay, by maintaining an effective street sweeping and cleaning program, and by identifying and eliminating sanitary and storm sewer cross connections; and EM-28, to restore a fresh water supply to creeks and the bay by eliminating conditions that pollute rainwater, by reducing impervious surfaces, and by encouraging swales, cisterns and other devices that increase infiltration and replenish underground water supplies that nourish creeks.⁴⁸

FINDINGS OF THE BERKELEY GENERAL PLAN EIR

The Berkeley General Plan EIR found that construction of new medium and high density housing and additional student housing at UC Berkeley could result in localized flooding problems by increasing impervious surfaces. As described in the EIR, “when storm water runoff volumes and velocities are increased, existing storm drainage components that are at or near capacity may be inadequate to convey the additional runoff during peak events, causing localized ponding and flooding.” The EIR concludes that existing programs to review project design, and the fact that most building would occur on previously developed sites, would make this impact less than significant.⁴⁹

OAKLAND GENERAL PLAN

The Oakland General Plan contain policies that require individual developments to mitigate the stormwater impacts they create.⁵⁰

4.13.3.4 EXISTING SETTING

CAMPUS PARK

UC Berkeley operates and maintains the stormwater utilities on the Campus Park. Most of the campus stormwater runoff is drained into Strawberry Creek. Strawberry Creek drains into a culvert owned by the City of Berkeley. Stormwater pipes on the Campus Park range in age from 10 years to 100 years old.

ADJACENT BLOCKS, SOUTHSIDE AND CITY OF BERKELEY

The City of Berkeley is responsible for stormwater conveyance on the Adjacent Blocks, Southside and the portion of the LRDP Housing Zone located in Berkeley. Currently, stormwater from the Adjacent Blocks flows to Strawberry Creek (as described in Chapter 4.7), except for the Southside area that flows to the storm drain on Bowditch Street.⁵¹

A capital improvement program managed by the City of Berkeley maps the entire storm drain system, and schedules needed improvements, such as pipe replacements and enlargements. Ongoing maintenance programs include catch basin cleaning, street/sidewalk sweeping, site inspection, testing and monitoring, runoff control from

new development, and public information and participation such as catch basin stenciling. Maintenance and improvements of the system are paid for by the General Fund and through hook-up fees paid by new development.⁵²

HILL CAMPUS

UC Berkeley is responsible for stormwater utilities on the Hill Campus. The system currently has adequate capacity to handle existing loads. For any growth, the stormwater drainage has to be evaluated including that of LBNL. Some stormwater drainage from the Hill Campus goes through LBNL then to the city.⁵³

CITY OF OAKLAND

The City of Oakland is responsible for the storm drainage in the portion of the LRDP Housing Zone located in Oakland. Drainage improvements and maintenance are performed on a case-by-case basis at this time because the city is constrained by a lack of funding.⁵⁴ Projects are usually completed in response to erosion or localized flooding problems.⁵⁵

4.13.3.5 STANDARDS OF SIGNIFICANCE

The significance of the potential impacts of the 2020 LRDP and Tien Center on stormwater was determined based on the following standard:

Standard: Would the project require or result in the construction of new or expansion of existing stormwater drainage facilities, the construction of which could cause significant adverse effects?

4.13.3.6 POLICIES AND PROCEDURES GUIDING FUTURE PROJECT REVIEW

This section describes how UC Berkeley would conduct project-specific review regarding stormwater impacts for projects to be approved under the 2020 LRDP.

2020 LRDP

Review of individual projects under the 2020 LRDP would influence stormwater management by guiding the location, scale, form and design of new University projects. Three of the Objectives described in Chapter 3.1 are particularly relevant to stormwater:

- **Provide the space, technology, and infrastructure we require to excel in education, research and public service.**
- **Plan every new project as a model of resource conservation and stewardship.**
- **Maintain the Hill Campus as a natural resource for research, education and recreation, with focused development on suitable sites.**

The 2020 LRDP also includes more specific policies that would contribute to minimizing new demand for stormwater facilities. Under the 2020 LRDP, UC Berkeley would: accommodate new programs primarily through more intensive use of university owned land on and adjacent to the Campus Park, and design new buildings to a standard equivalent to LEED 2.1 certification and LABS 21 environmental performance criteria. These Objectives and policies would minimize the increase in impervious surfaces and thus in runoff, by directing nearly all new development under the 2020 LRDP to sites in already urbanized areas.

The Campus Park Framework and Guidelines in the 2020 LRDP also contain policies that protect significant natural areas and open spaces, including the riparian zones along Strawberry Creek, from further intrusion, and recommend paving materials that maximize the amount of pervious surfaces to minimize runoff.

CAMPUS POLICIES AND PROCEDURES

STORMWATER CONVEYANCE CAPACITY REVIEW. Whenever UC Berkeley develops preliminary project designs for a new development, the Physical Plant/Campus Services Engineering and Utilities Department reviews the project to determine whether existing storm drainage system is adequate at the point of connection. If the storm drainage system is determined inadequate, UC Berkeley upgrades the system to provide adequate storm water drainage and/or detention as part of construction of the project.

4.13.3.7 2020 LRDP IMPACTS

This section describes the potential stormwater impacts of the 2020 LRDP based on the Standards of Significance, whether they are significant or less than significant, and whether any significant impacts can be mitigated to less than significant levels.

LESS THAN SIGNIFICANT IMPACTS

LRDP Impact USS-3.1: At all sites outside the Hill Campus, implementation of the 2020 LRDP could alter drainage patterns in the project area and increase impervious surfaces, but would not exceed the capacity of stormwater drainage systems.

As described in detail in Chapter 4.7, almost all development under the 2020 LRDP would occur in urbanized areas where runoff is already relatively great due to existing levels of paving and construction. Thus new development under the 2020 LRDP would not increase runoff or require improvements to the overall stormwater system. The only exception to this situation is the Hill Campus, where limited new construction may occur on currently undeveloped sites that drain into Strawberry Creek.

Continuing Best Practice USS-3.1: UC Berkeley shall continue to manage runoff into storm drain systems such that the aggregate effect of projects implementing the 2020 LRDP is no net increase in runoff over existing conditions.⁵⁶

SIGNIFICANT IMPACTS AND MITIGATION MEASURES

LRDP Impact USS-3.2: Projects implemented in the Hill Campus under the 2020 LRDP could alter drainage patterns and increase impervious surfaces, which could exceed the capacity of stormwater drainage systems, but the mitigation described below would ensure this impact is *less than significant*.

Given the steeper slopes and upstream position, projects in the Hill Campus that are substantial enough to alter drainage patterns would have an impact on the amount of runoff contributed to the storm drain system. For this reason, projects with potential to alter drainage patterns in the Hill Campus would be accompanied by a hydrologic modification analysis, and would implement a plan to prevent increases of flow from the newly developed site.

LRDP Mitigation Measure USS-3.2: In addition to Best Practice USS-3.1, projects proposed with potential to alter drainage patterns in the Hill Campus would be accompanied by a hydrologic modification analysis, and would incorporate a plan to prevent increases of flow from the project site, preventing downstream flooding and substantial siltation and erosion.

4.13.3.8 TIEN CENTER IMPACTS

The stormwater volume generated by the Tien Center would fall within the total stormwater volume generated by the 2020 LRDP on the Campus Park, as described above. Thus no additional impact on stormwater conveyance would occur beyond that already foreseen for the 2020 LRDP.

4.13.4 STEAM HEATING

4.13.4.1 ANALYTICAL METHODS

Potential impacts of the 2020 LRDP and Tien Center were assessed by determining utility demand factors appropriate for the proposed projects and comparing anticipated utility requirements with existing and future planned capacity, considering any upgrading of systems that may be approved or in progress.

4.13.4.2 REGULATORY FRAMEWORK

There are no federal or State regulations that apply to steam heating.

4.13.4.3 LOCAL PLANS AND POLICIES

There are no local plans or policies that apply to steam heating.

4.13.4.4 EXISTING SETTING

CAMPUS PARK

UC Berkeley owns and operates a steam heating distribution system for all buildings and facilities at UC Berkeley. Steam is generated from a co-generation plant, fueled by natural gas, located behind the Evans Memorial Stadium. Steam is distributed from the central heating plant via a piping system to individual buildings.⁵⁷ The cogeneration plant is owned and maintained privately. Peak demand for steam is currently 249,000 pounds per hour and the plant's capacity is 353,000 pounds per hour.⁵⁸ In 2002, UC Berkeley used 749 million pounds of steam.⁵⁹

The 1990 LRDP EIR noted a number of deficiencies in the steam heat distribution system. These deficiencies have been addressed as part of various projects since 1990, including improvements to Hearst Mining Building and Stanley Hall. Additionally, steam feeds to Stern Hall have been recently replaced.⁶⁰

The University recently completed a study to identify maintenance and expansion needs of the steam distribution system. There are still existing deficiencies in the UC Berkeley system as noted in the steam study, but there is no separate project dedicated to solely addressing all the recommendations in the study due to budget constraints. Upgrades to various deficient areas are typically completed as part of the construction of new projects.⁶¹

ADJACENT BLOCKS AND SOUTHSIDE

Generally, the steam system does not extend beyond the Campus Park with the exception of a few university buildings located in the Adjacent Blocks and Southside, including:⁶²

- West side of Oxford Street from the UC Printing Plant to the Oxford Tract.
- Buildings in the Adjacent Blocks North and South east of Gayley Road, including Stern Hall, Greek Theater, Bowles Hall, International House and Memorial Stadium.

UC Berkeley facilities located in the Adjacent Blocks and Southside that are not connected to the campus steam heating system have their own electric or natural gas boilers.⁶³

HILL CAMPUS AND LRDP HOUSING ZONE

No portions of the Hill Campus or LRDP Housing Zone have steam heating facilities.

4.13.4.5 STANDARDS OF SIGNIFICANCE

The significance of the potential impacts of the 2020 LRDP and Tien Center on steam heating was determined based on the following standard:

Standard: Would the project require or result in the construction of new or expansion of existing steam facilities, the construction of which could cause significant adverse effects?

4.13.4.6 POLICIES AND PROCEDURES GUIDING FUTURE PROJECT REVIEW

This section describes how UC Berkeley would conduct project-specific review regarding steam heating impacts for projects to be approved under the 2020 LRDP.

2020 LRDP

Review of individual projects under the 2020 LRDP would influence steam heat demand by guiding the location, scale, form and design of new University projects. Two of the Objectives described in Chapter 3.1 are particularly relevant to steam heat

- **Provide the space, technology, and infrastructure we require to excel in education, research and public service.**
- **Plan every new project as a model of resource conservation and stewardship.**

The 2020 LRDP also includes more specific policies that would contribute to minimizing new demand for steam heat. Under the 2020 LRDP, UC Berkeley would: design new buildings to a standard equivalent to LEED 2.1 certification and LABS 21 environmental performance criteria; design new buildings to outperform the required provisions of Title 24 by at least 20 percent; design future projects to minimize energy and water consumption and wastewater production; and base capital investment decisions on life cycle costs. This last policy would help minimize energy consumption by ensuring a more balanced consideration of initial and ongoing costs of buildings and infrastructure, and thus encourage investment in conservation technology.

CAMPUS POLICIES AND PROCEDURES

STEAM HEATING CAPACITY REVIEW. Whenever UC Berkeley develops a preliminary project design for a new development, the Physical Plant/Campus Services Engineering and Utilities Department reviews the project to determine whether existing capacity of the steam system at the point of connection is adequate. If the capacity of the steam system is determined inadequate, the University upgrades the system to provide adequate service to the project site before or as part of the project. In the event there is not enough capacity in the steam system, the campus would use natural gas or electricity for building heating and cooling.

4.13.4.7 2020 LRDP IMPACTS

This section describes the potential steam heating impacts of the 2020 LRDP based on the Standards of Significance, whether they are significant or less than significant, and whether any significant impacts can be mitigated to less than significant levels.

LESS THAN SIGNIFICANT IMPACTS

LRDP Impact USS-4.1: Implementation of the 2020 LRDP would increase demand for steam, but is not anticipated to result in a need for new or altered facilities.

Implementation of the 2020 LRDP could increase UC Berkeley's steam demand by up to 22,200 pounds per hour, a 9 percent increase over current peak demand.⁶⁴ The additional steam use increase attributable to 2020 LRDP development is well within the existing capacity of 353,000 pounds per hour.

4.13.4.8 TIEN CENTER IMPACTS

The steam used by the Tien Center would fall within the total steam demand under the 2020 LRDP, which is described above. Thus no additional impact on steam heating capacity would occur beyond that already foreseen for the 2020 LRDP.

4.13.5 SOLID WASTE

4.13.5.1 ANALYTICAL METHODS

Potential impacts of the 2020 LRDP and Tien Center were assessed by determining utility demand factors appropriate for the proposed project and comparing anticipated utility requirements with existing and future planned capacity, considering any upgrading of systems that may be approved or in progress.

4.13.5.2 REGULATORY FRAMEWORK

The California Integrated Waste Management Act of 1989 (Assembly Bill 939) established the Integrated Waste Management Board, required the implementation of integrated waste management plans and mandated that local jurisdictions divert at least 50 percent of all solid waste generated, starting January 1, 2000.

4.13.5.3 LOCAL PLANS AND POLICIES

Although the University is constitutionally exempt from local land use regulations when using its property in furtherance of its educational purposes, it is University policy to

evaluate proposed projects for consistency with local plans and policies. Therefore, this section outlines the plans and policies of the Cities of Berkeley and Oakland related to utilities and service systems.

BERKELEY GENERAL PLAN

Berkeley General Plan policies related to solid waste include policies that encourage reduction of solid waste, reuse of buildings and construction waste, increased access to recycling stations, materials recovery, re-manufacturing, and biodegradable materials.⁶⁵

FINDINGS OF THE BERKELEY GENERAL PLAN EIR

The Berkeley General Plan EIR estimated that policies encouraging increased commercial development and residential population in the Downtown, as well as higher-density housing and commercial development in commercial and mixed use districts and along transit corridors could result in increased solid waste generation. New housing units were anticipated to generate approximately 9,802 tons of added waste. Given that the Vasco Road landfill had 18 years of capacity in 1999, and that the city anticipated diversion of approximately 41 percent of its solid waste, the EIR determined that solid waste increases could be accommodated without significant impact.⁶⁶

OAKLAND GENERAL PLAN

The Oakland General Plan does not contain policies regarding solid waste or recycling.

4.13.5.4 EXISTING SETTING

CAMPUS PARK

UC Berkeley's Recycling and Refuse Services unit collects and hauls all non-hazardous solid waste generated on the Campus Park, with the exception of construction waste, which under current practices is managed by the construction contractor. Non-construction debris boxes and compactors are hauled by a private firm supervised by the campus. In 1999-2000, UC Berkeley generated 9,186 tons of solid waste, not including construction waste. Of this amount, 6,006 tons were disposed of and 3,180 tons were recycled.⁶⁷

The Recycling and Refuse Services unit provides refuse and recycling collection for all University-owned properties, including student housing. The campus maintains a fleet of 6 packer style garbage trucks, mostly later model Volvo GMC with Heil bodies and rear compaction capacity: currently, these vehicles use standard diesel fuel, but may be converted to biodiesel fuel pending a pilot program. UC Berkeley is exempt from county requirements to dispose of solid waste in the county, and therefore selects landfill sites based on lowest cost. The campus currently hauls waste to the West Contra Costa County Sanitary Landfill.⁶⁸

While the total amount of waste generated from campus operations (excluding construction) has remained fairly constant over the past four years, the amount of waste diverted from landfill has increased from 16 percent in 1997 to 37 percent in 2002, due to improvements in the campus recycling program⁶⁹. Construction debris, including debris generated by demolition activities, is often transported by demolition contractors to privately owned and operated facilities that specialize in debris recycling and provide for landfilling of materials that cannot be recycled.

ADJACENT BLOCKS, SOUTHSIDE AND CITY OF BERKELEY

The City of Berkeley Refuse Collection Division provides for pickup of solid wastes for the Adjacent Blocks and Southside, as well as the rest of Berkeley. University owned properties, however, are served by the campus' Recycling and Refuse Service unit. The City of Berkeley also provides or contracts for a number of recycling programs for solid waste. This includes a curbside collection program and buy-back center and salvage operation at Second and Gilman Streets. The city initiated a pilot program for commercial recycling, yard debris curb collection and a waste oil storage depository at the transfer station.⁷⁰ In 2000, the entire City of Berkeley generated 139,500 tons of waste.⁷¹

HILL CAMPUS

UC Berkeley's Physical Plant Services, Campus Recycling and Refuse Division, collects and hauls all non-hazardous solid waste generated on the Hill Campus, with the exception of construction debris. In 2001-2002, 288 tons of wastes were collected from the Hill Campus.⁷²

CITY OF OAKLAND

The City of Oakland generated 422,484 tons of waste in 2000.⁷³ Solid waste collection and disposal for the portions of the LRDP Housing Zone located in Oakland is provided by Waste Management of Alameda County, which hauls garbage to the San Leandro Transfer Station. Ultimately, waste is disposed of at the Altamont Landfill in eastern Alameda County. The Altamont Landfill has a peak permitted capacity of 11,500 tons per day and receives on average 5,600 tons per day;⁷⁴ it has an expected life of over 20 years.

4.13.5.5 STANDARDS OF SIGNIFICANCE

The significance of the potential impacts of the 2020 LRDP and Tien Center on solid waste services was determined based on the following standards:

Standard: Would the project violate any applicable federal, State, and local statutes and regulations related to solid waste?

Standard: Would implementation of the project exceed the permitted capacity of a landfill that serves the project's solid waste disposal needs?

4.13.5.6 POLICIES AND PROCEDURES GUIDING FUTURE PROJECT REVIEW

2020 LRDP

Review of individual projects under the 2020 LRDP would influence solid waste management by guiding the location, scale, form and design of new University projects. Two of the Objectives described in Chapter 3.1 are particularly relevant to solid waste

- **Provide the space, technology, and infrastructure we require to excel in education, research and public service.**
- **Plan every new project as a model of resource conservation and stewardship.**

The 2020 LRDP also includes more specific policies that would contribute to solid waste management. Under the 2020 LRDP, UC Berkeley would: design new buildings to a standard equivalent to LEED 2.1 certification and LABS 21 environmental performance criteria, and base capital investment decisions on life cycle costs. This last policy

would contribute to solid waste management by ensuring a more balanced consideration of initial and ongoing costs of buildings and infrastructure, and thus encourage investment in conservation technology.

CAMPUS POLICIES AND PROCEDURES

WASTE REDUCTION AND RECYCLING PROGRAMS. The University promotes many voluntary waste reduction and reuse programs. Grounds maintenance crews chip woody debris and manage lawn cuttings for mulch, reducing wastes by an estimated 28 tons per month, or over 336 tons per year. Campus Refuse and Recycling distributed 5,000 reusable plastic coffee cups with an estimated savings of 3 million disposable cups, or 100 tons, per year. The campus materials exchange program diverts approximately 10 tons of waste per year by facilitating the reuse of office supplies and printed materials through an on-campus drop off and pick up location. The campus' Surplus and Salvage unit handles furniture and other large equipment.

The residential recycling education program employs students both as paid employees and volunteers to promote recycling for batteries, light bulbs, electronic equipment (computers and monitors) mixed paper and bottles in all of the residential housing units operated by the campus. Mixed paper recycling diverts over 2,100 tons of material annually from all quadrants of the campus.

4.13.5.7 2020 LRDP IMPACTS

This section describes the potential solid waste impacts of the 2020 LRDP based on the Standards of Significance, whether they are significant or less than significant, and whether any significant impacts can be mitigated to less than significant levels.

LESS THAN SIGNIFICANT IMPACTS

LRDP Impact USS-5.1: Implementation of the 2020 LRDP would not violate any applicable federal, state, and local statutes and regulations related to solid waste.

While the University of California is exempt from AB 939, UC Berkeley waste materials may be counted against the diversion percentages of the city of origin, in this case the City of Berkeley. The campus remains committed through campus policy to continuing and improving waste reduction and minimization efforts. Implementation of the 2020 LRDP would not violate any applicable state or federal statutes and would result in a *less than significant* impact in this regard.

Continuing Best Practice USS-5.1: UC Berkeley would continue to implement a solid waste reduction and recycling program designed to reduce the total quantity of campus solid waste that is disposed of in landfills during implementation of the 2020 LRDP.

LRDP Impact USS-5.2: Implementation of the 2020 LRDP may result in increased generation of solid waste, but is not anticipated to exceed the capacity of permitted sites.

UC Berkeley is exempt from county requirements to dispose of solid waste in the county, and therefore selects landfill sites based on lowest cost. The campus currently hauls waste to the West Contra Costa County Sanitary Landfill.⁷⁵ Projects implemented

under the 2020 LRDP are expected to generate up to 2.8 tons of waste per day from maintenance and operational activities.⁷⁶

The West Contra Costa facility is slated to close in the near future, however, at which point a new deposit site would be selected. While the new site is not yet identified, there is adequate capacity at other potential sites to accommodate the increase in solid waste due to the 2020 LRDP. For example, the Altamont Landfill in eastern Alameda County has a permitted peak capacity of 11,500 tons per day and receives on average 5,600 tons per day;⁷⁷ it has an expected life of over 20 years. The projected increment of 2.8 tons per day due to implementation of the 2020 LRDP would represent only .02 percent of peak permitted capacity at Altamont.

Demolition and construction debris from 2020 LRDP projects would be disposed of at any available landfill. This is a one-time disposal activity. It would be the responsibility of the demolition contractor to haul and dispose of the debris at appropriate sites.

Continuing Best Practice USS-5.2: In accordance with the Regents-adopted green building policy and the policies of the 2020 LRDP, the University would develop a method to quantify solid waste diversion. Contractors working for the University would be required under their contracts to report their solid waste diversion according to the University's waste management reporting requirements.

4.13.5.8 TIEN CENTER IMPACTS

The solid waste generated by the Tien Center would fall within the total solid waste generated by the 2020 LRDP, as described above. Thus no additional impact on landfill capacity would occur beyond that already foreseen for the 2020 LRDP.

4.13.6 ENERGY

4.13.6.1 ANALYTICAL METHODS

Potential impacts of the 2020 LRDP and Tien Center were assessed by determining utility demand factors appropriate for the proposed project and comparing anticipated utility requirements with existing and future planned capacity, considering any upgrading of systems that may be approved or in progress.

4.13.6.2 REGULATORY FRAMEWORK

CALIFORNIA ADMINISTRATIVE CODE TITLE 24

New buildings in California built after June 30, 1977 must comply with standards set forth in Title 24 of the California Administrative Code. Title 24 requires the inclusion of state-of-the-art energy conservation features in building design and construction including: incorporation of specific energy conserving design features, use of non-depletable energy resources, or a demonstration that the proposed new buildings would comply with a designated energy budget.⁷⁸

EXECUTIVE ORDER D-16-00

Although not mandatory, the Regents of the University of California are encouraged to comply with Executive Order D-16-00, issued August 2, 2000, which establishes the

Governor's sustainable building goal: 'to site, design, deconstruct, construct, renovate, operate, and maintain State buildings that are models of energy, water and materials efficiency; while providing healthy, productive and comfortable indoor environment and long-term benefits to Californians.⁷⁹

4.13.6.3 LOCAL PLANS AND POLICIES

Although the University is constitutionally exempt from local regulations when using its property in furtherance of its educational purposes, it is University policy to evaluate proposed projects for consistency with local plans and policies. Therefore, this section outlines the plans and policies of the Cities of Berkeley and Oakland related to utilities and service systems. Policies from these local plans specific to energy include the following:

- The Berkeley General Plan contains policies which encourage energy efficiency, fossil fuel conservation through building design and construction methods, and development patterns that locate housing close to transportation and commercial/job centers.⁸⁰
- The Oakland General Plan includes policies that encourage the use of energy-efficient construction and building materials; development of site plans which maximize energy efficiency; and maintenance of building codes, regulations and procedures which support energy conservation.⁸¹

4.13.6.4 EXISTING SETTING

CAMPUS PARK

ELECTRICITY. Electric power to UC Berkeley is provided by two sources: power generated at the campus cogeneration plant, and power furnished to the Hill Area Substation by Pacific Gas & Electric. Campus electricity is currently obtained under a direct access contract with Arizona Public Service, and delivered to the campus through transmission lines owned by PG&E. Electricity is transported via underground wiring to a switching station on the Campus Park and then distributed to various buildings on the Campus Park.

All major elements in the campus high voltage electrical system, including transformers, switches and wire materials have been replaced within the past ten years, except the conduits and the manholes.⁸² UC Berkeley has completed several upgrades and maintenance activities during the last twelve months on the high voltage electrical system.⁸³ Presently, there are no major electricity utility deficiencies in the Campus Park based on current loads. Capacity deficiencies resulting from additional development are typically addressed as part of the scope of each new project.⁸⁴

NATURAL GAS. Both PG&E and the University own and manage limited gas distribution lines on the Campus Park. Gas enters the Campus Park from gas mains located on Bancroft Way, Hearst Avenue, Oxford Street and Channing Way. The natural gas distribution network on the Campus Park is a small utility compared to other utilities. Gas is provided to those buildings that do not have steam service, and when gas is required for lab use or emergency generators.⁸⁵

Natural gas is used on the Campus Park for producing electricity, steam, space heating, heating water for domestic use, cooking, laboratory needs and emergency generators.⁸⁶

There are no major gas utility deficiencies in the Campus Park based on current loads. Capacity deficiencies resulting from additional development are typically addressed as part of the scope of each new project.⁸⁷

The age of the University-owned natural gas lines is not known; the age of the pipes may reflect the age of the building they serve. PG&E follows maintenance guidelines set up by the California Public Utilities Commission (PUC) for their gas lines. The gas main from Oxford Street up to the Heating Plant was replaced in 1997 by PG&E.⁸⁸ Other replacements are completed, as necessary, as part of the University's Annual Main Gas Line Leak Survey.⁸⁹

HILL CAMPUS

Both PG&E and the University own and manage some gas distribution lines on the Hill Campus. Gas enters the Hill Campus from gas mains located on Bancroft Way, Hearst Avenue, Oxford Street and Channing Way. The University-owned natural gas lines are of an unknown age, while PG&E-owned gas lines follow maintenance guidelines set up by the California PUC.⁹⁰ There are no major capacity problems on gas and electric in the Hill Campus based on current loads.⁹¹

ADJACENT BLOCKS, SOUTHSIDE AND THE LRDP HOUSING ZONE

Natural gas and electricity are provided to the Adjacent Blocks, Southside and LRDP Housing Zone by PG&E. Gas is provided through underground transmission lines located in the public right-of-way and electricity is provided through above ground and below ground lines. Currently, there is sufficient capacity in the distribution lines.⁹²

4.13.6.5 STANDARDS OF SIGNIFICANCE

The significance of the potential impacts of the 2020 LRDP and Tien Center on electricity service systems was determined based on the following standards:

Standard: Would the project require or result in the construction of new or expansion of existing energy production and/or transmission facilities, the construction of which could cause significant adverse effects?

Standard: Would the project encourage the wasteful or inefficient use of energy?

4.13.6.6 POLICIES AND PROCEDURES GUIDING FUTURE PROJECT REVIEW

2020 LRDP

Review of individual projects under the 2020 LRDP would influence energy demand by guiding the location, scale, form and design of new University projects. Two of the Objectives described in Chapter 3.1 are particularly relevant to energy:

- **Provide the space, technology, and infrastructure we require to excel in education, research and public service.**
- **Plan every new project as a model of resource conservation and stewardship.**

The 2020 LRDP also includes more specific policies that would contribute to minimizing new demand for energy. Under the 2020 LRDP, UC Berkeley would: design new buildings to a standard equivalent to LEED 2.1 certification and LABS 21 environ-

mental performance criteria; design new buildings to outperform the required provisions of Title 24 by at least 20 percent; design future projects to minimize energy and water consumption and wastewater production; and base capital investment decisions on life cycle costs. This last policy would help minimize energy consumption by ensuring a more balanced consideration of initial and ongoing costs of buildings and infrastructure, and thus encourage investment in conservation technology.

The Campus Park Design Guidelines also include several provisions related to building orientation, exposure, and roof and façade design, to both minimize energy consumption and facilitate the use of renewable sources of energy.

CAMPUS POLICIES AND PROCEDURES

CHANCELLOR'S POLICY ON CAMPUS POWER CURTAILMENT.⁹³ The UC Berkeley Chancellor has directed the campus to comply with specific measures regarding campus power curtailment and energy conservation. Measures applicable to the 2020 LRDP include:

- Compliance with Executive Order D-16-00 so that all new campus buildings are designed based on life-cycle cost analyses.
- Design new buildings to outperform the required provisions of Title 24 by at least 20 percent.

ENERGY CAPACITY REVIEW. Whenever UC Berkeley develops a preliminary project design for a new development, the Physical Plant/Campus Services Engineering and Utilities Department reviews the project to determine whether existing capacity of the gas and electric system at the point of connection is adequate. If the capacity of the gas and/or electric system is determined inadequate, the campus upgrades the system to provide adequate service to the project site before or as part of the project.

4.13.6.7 2020 LRDP IMPACTS

This section describes the potential energy impacts of the 2020 LRDP based on the Standards of Significance, whether they are significant or less than significant, and whether any significant impacts can be mitigated to less than significant levels.

LESS THAN SIGNIFICANT IMPACTS

LRDP Impact USS-6.1: Implementation of the 2020 LRDP would result in increased use of energy, but is not anticipated to result in the need for new or altered production and/or transmission facilities.

Implementation of the 2020 LRDP would increase the use of both electricity and natural gas. As shown in Tables 4.13-3 and 4.13-4, electricity use would increase by up to 57,202 mWh per year, while natural gas use would increase by up to 163,200 mmBtu per year. The additional electricity use increase attributable to 2020 LRDP development is minimal compared to the 273 million mWh of electricity generated for California in 2002.⁹⁴ The additional natural gas use increase attributable to 2020 LRDP development is minimal relative to the 1.3 billion mmBtu of natural gas generated for California in 2000.⁹⁵

LRDP buildout would probably require some upgrades to gas and electricity lines in order to provide adequate levels of service.⁹⁶ However, these upgrades would occur in

TABLE 4.13-3

PROJECTED ELECTRICITY USE	2020 LRDP Max Net Addl	Demand Factor (kWh)	Projected Addl Demand (mWh)
Academic & Support: Labs (gsf)	700,000	45.2	31,640
Academic & Support: Other (gsf)	1,500,000	12.1	18,150
Residential: student (beds)	2,500	2,615	6,538
Residential: faculty/staff (units)	200	4,371	874
Total Addl Electricity Use/Year (mWh)			57,202

TABLE 4.13-4

PROJECTED NATURAL GAS USE	2020 LRDP Max Net Addl	Demand Factor (kBtu)	Projected Addl Use(mmBtu)
Academic & Support: Labs (gsf)	700,000	137	95,900
Academic & Support: Other (gsf)	1,500,000	23.8	35,700
Residential: student (beds)	2,500	9,600	24,000
Residential: faculty/staff (units)	200	38,300	7,660
Total Addl Natural Gas Use/Year (mmBtu)			163,200

already urbanized portions of the East Bay, so no environmental impacts from construction are expected. Thus, the impact would be *less than significant*.

LRDP Impact USS-6.2: Implementation of the 2020 LRDP would not encourage the wasteful or inefficient use of energy.

UC Berkeley would continue to meet or exceed Title 24 energy conservation requirements for new buildings, and it would continue to incorporate energy efficient design elements outlined in the Chancellor’s Policy on Campus Power Curtailment and in the policies of the 2020 LRDP, which includes the policy to outperform the Title 24 requirements by 20%. Thus, the impact would be *less than significant*.

4.13.6.8 TIEN CENTER IMPACTS

The energy used by the Tien Center would fall within the energy usage under the 2020 LRDP, which are described above. Thus no additional impact on energy supply and distribution would occur beyond that already foreseen for the 2020 LRDP.

4.13.7 CUMULATIVE IMPACTS

This section evaluates whether the 2020 LRDP, in combination with other University and non-University projects which are reasonably foreseeable, would result in significant cumulative impacts on utilities and service systems.

This analysis considers cumulative growth as represented by the implementation of municipal general plans, implementation of the proposed Lawrence Berkeley National Laboratory 2004 LRDP, the proposed redevelopment of University Village Albany, and implementation of the 2020 LRDP, as described in 4.0.5. The analysis also includes growth anticipated by the City of Berkeley General Plan EIR and by previously certified UC Berkeley EIRs, including the Northeast Quadrant Science and Safety Projects (SCH 2001022038), Seismic Replacement Building 1 (SCH 99122065), and the Underhill Area Projects (SCH 99042051).

The Standard of Significance for cumulative utilities and service systems impacts, described below, are defined in terms of whether or not new development would exceed the capacities of existing systems. The relevant scope of this analysis, therefore, is the area served by those systems that might be significantly affected by cumulative development.

As explained in section 4.10.9, the 2020 LRDP, in combination with the other reasonably foreseeable projects referenced in Chapter 4.0, would represent an increase of less than one percent of the population growth anticipated in ABAG Projections 2003. This includes both the direct and indirect impacts of population growth generated by new jobs (and, at UC Berkeley, by new students).

While this magnitude of growth is not anticipated to have significant impacts on utilities and service systems as a whole, the referenced cumulative projects may cause potential localized impacts on those systems or subsystems serving the areas of most intensive development: namely, the cities of Berkeley, Oakland, and Albany, in which the referenced cumulative projects are located.

However, the potential impacts of the planned expansion of University facilities at University Village Albany and other cumulative projects are addressed in a Draft EIR published in January 2004. The UVA Draft EIR found the potential impacts of this planned expansion would have no significant impacts on utilities or service systems within the City of Albany.⁹⁷

The geographic context for this analysis of cumulative utilities and service systems impacts, therefore, includes the City of Berkeley and the areas of the City of Oakland within the scope of the 2020 LRDP, and the systems serving these areas.

The significance of potential utilities and service systems impacts was determined based on the following standard:

Standard: *Would the project require or result in a need for new or altered facilities for water, wastewater, stormwater, solid waste, or steam, electricity or natural gas, the construction of which could cause significant environmental impacts?*

The question posed in this section is twofold:

- Is the potential *cumulative* impact of the 2020 LRDP *and* other reasonably foreseeable projects under these standards significant?
- Is the contribution of the 2020 LRDP to these impacts cumulatively considerable?

Cumulative Impact USS-1: The 2020 LRDP, in combination with other reasonably foreseeable projects, would increase the demand for water, for wastewater treatment, for solid waste disposal, and for steam, electricity, and natural gas, but these are not anticipated to result in the need for new or altered facilities.

Cumulative Impact USS-2: The 2020 LRDP, in combination with other reasonably foreseeable projects, would increase the demand for wastewater and stormwater conveyance, and may result in the construction of new or altered facilities, but these are not anticipated to have significant environmental impacts.

The Notice of Preparation for the Lawrence Berkeley National Laboratory 2004 LRDP anticipates an increase in on-site population of up to 1,200 by 2025, and an increase in building space of up to 800,000 gsf. The magnitude of these increments is roughly 40 percent of the 2020 LRDP projections for campus headcount and academic and support space, respectively.

To the extent cumulative service demands require the construction of new wastewater or stormwater conveyance facilities, such construction may have the potential to cause environmental impacts. However, each such project would be reviewed and, as necessary, mitigated by the service provider in its role as CEQA lead agency. In general, any such impacts would be limited to the temporary impacts of construction: given the already urbanized character of the geographic context, these new conveyance facilities are not anticipated to significantly alter land use patterns or have other permanent environmental impacts, such as inducement of new growth in previously undeveloped areas.

As discussed in Chapter 4.7, it is possible that, given an increase in impervious surfaces in the Hill Campus due to development under the 2020 LRDP, combined with development under the LBNL 2004 LRDP, stormwater flows may exceed the capacity of stormwater drainage systems serving the Strawberry Creek watershed. However, continuing Best Practice HYD-4-e would ensure that there is no net increase in stormwater runoff resulting from implementation of the 2020 LRDP; therefore, the contribution of the 2020 LRDP to cumulative stormwater impacts under Cumulative Impact USS-2 would not be cumulatively considerable.

Growth due to projects other than the 2020 LRDP and the Lawrence Berkeley National Laboratory 2004 LRDP are assumed to follow the patterns described in current city and county general plans and other adopted land use plans and policies. Any such projects would be subject to review by the relevant CEQA lead agency, to ensure they are adequately served by utilities and service systems.

The capacities of existing water, wastewater treatment, and solid waste systems are expected to be adequate to serve cumulative growth within the geographic context through 2020, particularly given the effects of conservation measures in new construction, which result in demand factors significantly lower than in older buildings. However, despite similar conservation measures with respect to energy consumption, there may be a need for additional energy capacity. New generation facilities 50 mW and larger proposed in California would be reviewed under CEQA, and impacts mitigated as necessary, by the California Energy Commission. Smaller energy facility projects would also undergo CEQA review under the auspices of the relevant lead agency.

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scenario in which all 700,000 gsf of laboratory space built under the 2020 LRDP is located on the Campus Park.

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5.0 ALTERNATIVES

This section evaluates alternatives to the 2020 LRDP and the Tien Center project, and examines the potential environmental impacts of each alternative. The relative advantages and disadvantages of each alternative are assessed in comparison to the 2020 LRDP and Tien Center project as described in Chapter 3.

The CEQA Guidelines require that selection of the range of alternatives evaluated in an EIR be governed by a rule of reason. CEQA does not require every conceivable alternative to be evaluated, nor does it require the consideration of infeasible alternatives.¹ Section 15126.6 of the CEQA Guidelines states the factors that may be taken into account in determining the feasibility of alternatives include site suitability, economic viability, availability of infrastructure, other regulatory constraints, and jurisdictional boundaries.

The CEQA Guidelines state the evaluation of the alternatives must focus on those capable of either avoiding or substantially reducing any significant environmental impacts of the project, even if the alternative would be more costly or would impede, to some extent, the achievement of the project objectives stated in Chapter 3. On the other hand, the evaluation need not address alternatives for which implementation is remote or speculative, and the assessment of alternatives need not be presented to the same level of detail as the assessment of the project.

Based on the CEQA Guidelines, the selection of the alternatives to be evaluated in an EIR, and the level of analytical detail required in this evaluation, should be based on several factors:

- The nature of the significant impacts of the proposed project,
- The potential of alternatives to avoid or lessen those significant impacts,
- The ability of alternatives to meet the objectives of the project, and
- The feasibility of the alternatives.

The alternatives selected for evaluation in this section, therefore, represent those which have the potential to lessen or avoid the identified significant and unavoidable impacts of the 2020 LRDP and/or the Tien Center project.

¹ *CEQA Guidelines*, Section 15126.6(a)

5.1 2020 LRDP ALTERNATIVES

The analyses presented in Chapter 4 of this EIR finds the 2020 LRDP would result in significant and unavoidable impacts with respect to:

- **Air Quality:** Operational impacts from the combined total of vehicular, stationary, and area sources may hinder the attainment of the regional Clean Air Plan. The 2020 LRDP, in combination with other cumulative projects, would result in a cumulatively considerable increase of non-attainment pollutants and thereby conflict with the most recent Clean Air Plan. Further, with the incorporation of diesel particulate matter into air risk analyses, the 2020 LRDP would contribute to a cumulatively considerable increase in toxic air contaminants.
- **Cultural Resources:** While in general the provisions of the 2020 LRDP and campus best practices would avoid significant impacts to cultural resources, under certain unavoidable circumstances the educational mission of the university may require the demolition or alteration of a resource of significance. These instances could also contribute to a cumulative reduction and/or degradation of the resource base of historical and/or archaeological resources.
- **Noise:** Some construction activities necessary to implement the 2020 LRDP would generate noise levels that would cause a substantial increase above existing ambient levels and would exceed limits set forth in local regulations. Notwithstanding the enforcement of noise control requirements in contract specifications, construction noise would still be significant and unavoidable. Construction of university housing in the urban environs of the campus may also expose its residents to noise levels in excess of established standards.
- **Traffic:** Traffic generated by implementation of the 2020 LRDP would contribute to unacceptable, and unavoidable, delays at two intersections and would unavoidably exceed CMA service standards on five CMP designated roadway segments and two MTS roadway segments. Potentially significant impacts would occur at seven other intersections, and unacceptable conditions could be exacerbated at an eighth intersection; however, these could be mitigated at the discretion of the City of Berkeley.

The alternatives selected for evaluation in this section, therefore, represent those which have the potential to lessen or avoid the identified significant and unavoidable impacts of the 2020 LRDP. Alternatives analyzed in detail for the 2020 LRDP include:

- Lower enrollment and employment growth
- No new parking and more transit incentives
- Diversion of some growth to remote sites
- No project (as required by CEQA)

During the scoping process, other alternatives were considered, but as a result of qualitative analysis were determined either to be infeasible or to offer no significant environmental benefits over the 2020 LRDP or Alternatives L-1 through L-4, and were therefore not analyzed quantitatively. This chapter presents a brief summary of findings for each of these alternatives.

TABLE 5.1-1

ALTERNATIVE L-1: HEADCOUNT	Estimated	Projected 2020	
	2001-2002	2020 LRDP	Alternative L-1
Regular Term Students	31,800	33,450	32,500
Faculty	1,760	1,980	1,980
Academic Staff	3,040	4,880	4,190
Nonacademic Staff	8,140	8,950	8,580
Visitors & Vendors	1,200	2,000	1,750
Total Regular Terms Headcount	45,940	51,260	49,000
<i>Net Growth by 2020</i>		<i>5,320</i>	<i>3,060</i>
Total Employment	12,940	15,810	14,750
<i>Net Growth by 2020</i>		<i>2,870</i>	<i>1,810</i>

TABLE 5.1-2

ALTERNATIVE L-1: PROPOSED SPACE	Actual + Foreseeable	Projected 2020	
	2001-2002	2020 LRDP	Alternative L-1
Program Space (GSF)	12,100,000	14,300,000	13,600,000
<i>Net Growth by 2020</i>		<i>2,200,000</i>	<i>1,500,000</i>
<i>Net Lab Space Growth by 2020</i>		<i>700,000</i>	<i>380,000</i>
Housing (bed spaces)	8,190	10,790	10,790
<i>Net Growth by 2020</i>		<i>2,600</i>	<i>2,600</i>
Parking (auto spaces)	7,690	9,990	9,290
<i>Net Growth by 2020</i>		<i>2,300</i>	<i>1,600</i>

TABLE 5.1-3

ALTERNATIVE L-1: PROGRAM SPACE & PARKING DISTRIBUTION	Program Space (GSF)		Parking (spaces)	
	2020 LRDP	Altern L-1	2020 LRDP	Altern L-1
Campus Park	1,000,000	680,000	600	400
City Environs				
Adjacent Blocks North	50,000	30,000		
Adjacent Blocks West	800,000	550,000	1,300	950
Adjacent Blocks South	400,000	270,000	600	400
Southside	50,000	30,000		
Other Berkeley Sites	50,000	30,000		
Hill Campus	100,000	70,000		
Max Net Addl Space NTE	2,200,000	1,500,000	2,300	1,600

Housing unchanged from base scenario for 2020 LRDP.

5.1.1 ALTERNATIVE L-1: LOWER ENROLLMENT AND EMPLOYMENT GROWTH

The 2020 LRDP estimates of demand for program space, housing, and parking are based on projections of growth in both enrollment and in sponsored research. For enrollment, the 2020 LRDP assumed enrollment would grow to a regular-term average student headcount of 33,450 and then stabilize at this level through 2020. This increase reflects the equivalent of 4,000 new students over base year 1998, and equals the target identified by the University of California for the UC Berkeley campus to evaluate as part of the University's strategy to accommodate the projected rise in the number of college Californians.

5.1-2

The growth in employment under the 2020 LRDP is the result of two factors. The increase in enrollment would require a concomitant increase in faculty and other academic and nonacademic staff engaged in teaching and serving those students. The increase in external research funds, meanwhile, would generate new demand for postdocs, researchers, and administrators in academic departments and organized research units. The 2020 LRDP assumes that the inflation-adjusted average rate of growth of 3.6 percent per year in external research funds in the last decade of the 20th century would continue through 2020.

These two growth drivers, enrollment and employment, are largely independent: a slower rate of actual growth in one does not mean the other would also slow down. Enrollment is driven by demographic changes within the state, while federal agencies are by far the largest source of external research funds. However, for the purpose of analysis, this alternative examines the combined effects of lower rates of growth in both enrollment and in sponsored research.

In this alternative, enrollment is assumed to stabilize at the estimated average 2002-2003 regular term headcount of roughly 32,500, rather than the 33,450 projected in the 2020 LRDP. External research funds are assumed to increase at an average inflation-adjusted rate of 2.4 percent per year, or two-thirds the rate projected in the 2020 LRDP. This rate in fact is similar to the average rate of increase at UC Berkeley over the five year period from 1997 through 2002.

As shown in Tables 5.1-1 and 5.1-2, these lower rates of growth would result in reductions in both headcount and program space to be constructed relative to the proposed 2020 LRDP. This alternative would therefore also include a lower number of new parking spaces, since the increment of new parking proposed in the 2020 LRDP is derived partly from the existing parking deficit and partly from projections of future demand based on growth in enrollment and employment. The number of visitors and vendors would also be lower, because the lower amount of new program space would require fewer construction workers. University housing is assumed to grow by the same amount in Alternative L-1 as in the 2020 LRDP.

L-1 AIR QUALITY

Development under Alternative L-1 would result in a 2020 campus headcount equal to roughly 96 percent of the headcount projected under the 2020 LRDP. As described in Section 4.2.7 under LRDP Impact AIR-5, any campus growth may not be consistent with the most recent Clean Air Plan and may result in a significant impact. Because it is possible that the air district will not attain air quality standards with the inclusion of this project in the plan, the impact is considered significant and unavoidable.

Although the BAAQMD CEQA Guidelines do not require the quantification of emissions associated with a plan, daily emissions associated with Alternative L-1 were estimated and are reported below in Table 5.1-4 for informational purposes. To evaluate the criteria pollutant emissions from Alternative L-1, the growth ratio of Alternative L-1 to the 2020 LRDP was applied to the total operational and construction emissions from the 2020 LRDP. Note that the 2020 LRDP emissions represent the increment of emissions from 2020 LRDP growth above the existing emissions. The following table summarizes Alternative L-1 emissions.

TABLE 5.1-4
OPERATIONAL & CONSTRUCTION CRITERIA POLLUTANT EMISSIONS: ALTERNATIVE L-1

	Operational	Construction – Site Grading (lbs/day)	Construction – Building Construction (lbs/day)	BAAQMD CEQA Thresholds (lbs/day)
NO _x	119	716	1061	80
ROG	219	83	1589	80
PM ₁₀	10	143	49	80
CO	274	561	962	550

As with the 2020 LRDP, mitigation of these impacts would be implemented, but the impact would remain significant and unavoidable.

The cumulative risk from stationary and area source toxic air contaminant emissions, discussed in Section 4.2.9 of this EIR, under Cumulative Impact AIR-4, may be somewhat reduced proportional to the reduction in program space. However, existing emissions for LBNL and UC Berkeley exceed the 10 in one million standard for a 70-year exposure. Given that the primary contribution to cumulative risk is diesel particulate matter, a slower rate of program renewal and improvement, and concomitant replacement of existing emergency diesel generators, may not be beneficial to an overall reduction in this cumulative impact.

L-1 CULTURAL RESOURCES

The potential cultural resource impacts under Alternative L-1 would in general be the same as described for the 2020 LRDP. The Best Practices and Mitigation Measures described in Chapter 4.4 regarding historical, archaeological and paleontological resources would apply under Alternative L-1 and, in general, would avoid significant impacts. The special circumstances under which demolition or alteration of a significant resource is unavoidable would also have the potential to occur in L-1, but given the reduced building program fewer such instances would be likely.

L-1 NOISE

The potential noise impacts under Alternative L-1 would be the same as described for the 2020 LRDP. However, since Alternative L-1 would result in less net growth in program space and lab space, the duration and level of construction would be somewhat less. The conclusion that the impact would be significant and unavoidable for the 2020 LRDP also applies to L-1 because the application of mitigation measures would not be sufficient to avoid a substantial temporary increase in ambient noise levels. All other conclusions regarding noise for the 2020 LRDP would be the same for Alternative L-1.

L-1 TRANSPORTATION AND TRAFFIC

This alternative would result in a somewhat lessened deterioration of traffic operations in comparison to the 2020 LRDP. The lower campus headcount, relative to the 2020 LRDP, would reduce the expected future congestion at the impacted intersections and on the CMA designated system segments included as part of the Alameda County Congestion Management Plan. The lower increments of growth in program space and parking would also reduce local traffic impacts due to the reduction in construction activity.

Local traffic operation impacts would also be lessened due to the fact the number of new student beds would remain the same as in the 2020 LRDP. Lower enrollment growth, without a drop in planned new university housing, would enable a greater percentage of students to reside in walking distance of campus or along transit corridors (i.e. within the Housing Zone). The lessened traffic operation impacts and the decrease in overall campus headcount, relative to the 2020 LRDP, would also improve pedestrian and bicycle circulation.

This alternative would reduce the significance of LRDP Impacts TRA-2 through TRA-12, but not necessarily to a less than significant level. In general, the mitigation measures associated with these impacts would still be required.

L-1 OTHER ANTICIPATED EFFECTS

AESTHETICS

The potential aesthetic impacts under Alternative L-1 would in general be the same as described for the 2020 LRDP. However, since there would be less program space and parking under Alternative L-1, there would be fewer projects and thus less potential for aesthetic impacts. The Best Practices and Mitigation Measures described in Chapter 4.1 would apply under Alternative L-1 and mitigate any potential impacts to less than significant levels.

BIOLOGICAL RESOURCES

No significant unavoidable adverse impacts on biological resources were identified under the proposed 2020 LRDP. Alternative L-1 would not appreciably reduce identified impacts on biological resources such as Strawberry Creek, campus natural areas and mature trees, and sensitive habitats. These resources would be adequately protected by the provisions of the 2020 LRDP and by Best Practices and Mitigation Measures.

GEOLOGY, SOILS AND SEISMICITY

The potential geology, soils and seismicity impacts under Alternative L-1 would in general be the same as described for the 2020 LRDP. However, since Alternative L-1 would result in a lower regular term headcount than the 2020 LRDP, fewer people and less program space would be exposed to seismic hazards under Alternative L-1 than the 2020 LRDP. The Continuing Best Practices described in Chapter 4.5 regarding seismic safety would apply under Alternative L-1 and mitigate any potential impacts to less than significant levels.

HAZARDOUS MATERIALS

Impacts associated with increased use of hazardous materials would be incrementally reduced under this alternative because the increase in laboratory space would be smaller than under the 2020 LRDP.

HYDROLOGY

The potential hydrologic impacts under Alternative L-1 would be the same as those that would result from the 2020 LRDP. Although the same amount of university housing would be required under Alternative L-1 as described in the 2020 LRDP, there would be less program space to be constructed and fewer parking spaces required. Therefore, the increase in impervious area would be less. However, given campus programs that

protect against pollutant loading and ensure no net increased runoff, potential impacts would be the same as for the 2020 LRDP.

LAND USE

The potential land use impacts under Alternative L-1 would in general be the same as described for the 2020 LRDP. However, since there would be less program space and parking under Alternative L-1, there would be fewer projects and thus less potential for land use impacts. The Best Practices and Mitigation Measures described in Chapter 4.8 would apply under Alternative L-1 and mitigate any potential impacts to less than significant levels

POPULATION AND HOUSING

The potential population and housing impacts under Alternative L-1 would be less than under the 2020 LRDP, since the incremental increase in regular terms headcount would be only 58% of the increase under the 2020 LRDP. The Best Practices and Mitigation Measures described in Chapter 4.10 would apply under Alternative L-1 and mitigate any potential impacts to less than significant levels

PUBLIC SERVICES

The increase in both headcount and built space would be less under Alternative L-1 than under the 2020 LRDP. Since the public service impacts under the 2020 LRDP were less than significant, the impacts on fire and emergency services, police services, schools, parks and recreation, and solid waste under Alternative L-1 would also be less than significant.

UTILITIES AND SERVICE SYSTEMS

The increase in both headcount and built space would be less under Alternative L-1 than under the 2020 LRDP. Since the impacts on utilities and service systems under the 2020 LRDP were less than significant, the impacts under Alternative L-1 would also be less than significant.

L-1 RELATIONSHIP TO PROJECT OBJECTIVES

This section examines how Alternative L-1 would compare with the 2020 LRDP in terms of achieving the Objectives presented in Chapter 3.1.

- **Stabilize enrollment at a level commensurate with our academic standards and our land and capital resources.**
- **Provide the space, technology and infrastructure we require to excel in education, research, and public service.**

The amount of net new program space in Alternative L-1 is based on the same factors and formulas used for the 2020 LRDP: the difference is due entirely to the lower rates of growth assumed for L-1. Therefore, if enrollment and employment do in fact grow at the slower rates projected in L-1, the amount of space in L-1 *would* be adequate.

However, UC Berkeley believes the lower projections of growth in L-1 do not adequately reflect long-term trends in sponsored research, nor do they meet University-wide targets for enrollment growth. UC Berkeley believes the rates of growth projected in the 2020 LRDP represent the best estimate of future space demand, and if this demand

does materialize as expected, the amount of net new program space in Alternative L-1 would be severely inadequate, and would severely constrain the ability of UC Berkeley to maintain its standard of excellence.

- **Provide the housing, parking, and services we require to support a vital intellectual community and promote full engagement in campus life.**

The amount of housing proposed in L-1 is the same as in the 2020 LRDP. The slower rates of growth in L-1 would result in fewer net new parking spaces, since the increment of new parking proposed in the 2020 LRDP is derived partly from the existing parking deficit and partly from projected future demand based on growth in enrollment and employment.

As with program space, if enrollment and employment do in fact grow at the slower rates projected in L-1, the amount of net new parking in L-1 *would* be adequate: however, UC Berkeley expects growth to occur as projected in the 2020 LRDP, and in this event the amount of net new parking in L-1 would be adequate to address the current parking deficit, but not to meet future demand.

- **Plan every new project to respect and enhance the character, livability, and cultural vitality of our City Environs.**

The more modest amount of program space and parking required under L-1 could lessen impacts on the future environment of the City Environs, because fewer new buildings would be required, and a greater percentage of new building space could be located within the Campus Park. However, no significant impacts with respect to land use or aesthetics have been identified for the 2020 LRDP.

The relationship of Alternative L-1 to the other Objectives would not differ significantly from the 2020 LRDP, except as described above with respect to significant environmental impacts.

5.1.2 ALTERNATIVE L-2: NO NEW PARKING AND MORE TRANSIT INCENTIVES

The impacts on vehicular circulation identified in Chapter 4.12 are due to a combination of headcount growth and an increase in the parking inventory. The growth in campus headcount is expected to result in an increase in the number of vehicle trips to the campus, while the location of new parking influences the routes and destinations of those new vehicle trips.

Several comments submitted in response to the Notice of Preparation (NOP)¹ suggest the increase in the parking inventory may itself induce new vehicle trips. Since demand for university parking in many locations presently exceeds the supply, the difficulty of finding parking may serve as a disincentive to drive-alone trips and, conversely, as an incentive for alternative modes of travel.

Other commentors suggest the same type of transit price subsidy now offered to students through the UC Berkeley Class Pass program should also be offered to UC Berkeley employees, and suggest that such a program, often described as the 'EcoPass', could result in a significant reduction in vehicle trips.

TABLE 5.1-5

ALTERNATIVE L-2: HEADCOUNT	Estimated	Projected 2020	
	2001-2002	2020 LRDP	Alternative L-2
Regular Term Students	31,800	33,450	33,450
Faculty	1,760	1,980	1,980
Academic Staff	3,040	4,880	4,880
Nonacademic Staff	8,140	8,950	8,950
Visitors & Vendors	1,200	2,000	2,000
Total Regular Terms Headcount	45,940	51,260	51,260
<i>Net Growth by 2020</i>		<i>5,320</i>	<i>5,320</i>
Total Employment	12,940	15,810	15,810
<i>Net Growth by 2020</i>		<i>2,870</i>	<i>2,870</i>

TABLE 5.1-6

ALTERNATIVE L-2: PROPOSED SPACE	Actual + Foreseeable	Projected 2020	
	2001-2002	2020 LRDP	Alternative L-2
Program Space (GSF)	12,100,000	14,300,000	14,300,000
<i>Net Growth by 2020</i>		<i>2,200,000</i>	<i>2,200,000</i>
<i>Net Lab Space Growth by 2020</i>		<i>700,000</i>	<i>700,000</i>
Housing (bed spaces)	8,190	10,790	10,790
<i>Net Growth by 2020</i>		<i>2,600</i>	<i>2,600</i>
Parking (auto spaces)	7,690	9,990	7,690
<i>Net Growth by 2020</i>		<i>2,300</i>	<i>0</i>

TABLE 5.1-7

ALTERNATIVE L-2: PROGRAM SPACE & PARKING DISTRIBUTION	Program Space (GSF)		Parking (spaces)	
	2020 LRDP	Altern L-2	2020 LRDP	Altern L-2
Campus Park	1,000,000	1,000,000	600	
City Environs				
Adjacent Blocks North	50,000	50,000		
Adjacent Blocks West	800,000	800,000	1,300	
Adjacent Blocks South	400,000	400,000	600	
Southside	50,000	50,000		
Other Berkeley Sites	50,000	50,000		
Hill Campus	100,000	100,000		
Max Net Addl Space NTE	2,200,000	2,200,000	2,300	0

Housing unchanged from base scenario for 2020 LRDP.

In Alternative L-2, no new university parking would be constructed under the auspices of the 2020 LRDP. The Southside/Downtown TDM Study² could guide development of new or expanded incentive programs, parking management programs, or transit improvement programs, by UC Berkeley alone or in collaboration with the city of Berkeley. However, the changes in campus headcount through 2020 would be the same as in the 2020 LRDP, and therefore the figures for program space, as well as for housing, would also be the same as in the 2020 LRDP. Clearly, further reductions in vehicle trips might be achieved if headcount growth were also reduced, as in L-1, but this alternative serves the purpose of isolating and maximizing the effects of less new parking.

L-2 AIR QUALITY

Reduced parking on campus may decrease the total vehicle miles traveled for this alternative, if people would use more transit options without the availability of parking. This would be a benefit to air quality, but the total operational emissions from all sources would not be reduced to below a level of significance. No matter what the reduction in vehicular emissions, non-vehicular source emissions would remain unaccounted for in projections informing the Clean Air Plan.

The cumulative risk from stationary and area source toxic air contaminant emissions, discussed in Section 4.2.9 of this EIR, under Cumulative Impact AIR-4, would not be reduced in this alternative. While a potential increase in transit-related diesel particulate emissions may occur, as described in Section 4.2.7, overall, mobile source emissions are lessening to meet new regulatory standards, as discussed under Cumulative Impact AIR-3.

L-2 CULTURAL RESOURCES

The potential cultural resource impacts under Alternative L-2 would in general be the same as described for the 2020 LRDP. The Best Practices and Mitigation Measures described in Chapter 4.4 regarding historical, archaeological and paleontological resources would apply under Alternative L-2 and, in general, would avoid significant impacts. The special circumstances under which demolition or alteration of a significant resource is unavoidable would also have roughly the same potential to occur in L-2, since the building program is identical to the 2020 LRDP except for parking.

L-2 NOISE

If no new parking is constructed there would be a reduction in the amount of construction noise. The conclusion that the impact would be significant and unavoidable for the LRDP also applies to Alternative L-2 because the application of mitigation measures would not be sufficient to avoid a substantial temporary increase in ambient noise levels. All other conclusions regarding the noise for the LRDP would be the same for Alternative L-2.

L-2 TRANSPORTATION AND TRAFFIC

Under this alternative, every effort would be made to accommodate growth through shifting commuters to transportation alternatives³ and new parking would not be constructed. . This would create a new significant parking impact, under the Standard of Significance “Would the project result in inadequate parking capacity?” The existing shortage of parking compared to demand would be exacerbated by future growth in campus headcount proposed under the 2020 LRDP. Construction-period impacts would remain significant impacts as construction materials storage and staging areas, and lots that could be used for construction worker attendant parking, would be scarcer. Visitors and retail shoppers may experience greater parking difficulties in the vicinity of campus.⁴

With additional transit incentives, and no new university parking, a greater percentage of the campus population would likely use transit to travel to and from campus. A shift to more transit use would reduce the expected future congestion at the impacted intersections. However, there is also some potential for local traffic congestion to increase, as the result of longer searches for available spaces by those who continue to drive.

Thus, LRDP Impacts TRA-6, TRA-7 and TRA-8 would likely remain significant impacts. There could be new significant impacts on AC Transit and/or BART service, if the ridership grows to a level that cannot be supported by current and planned future service levels, due to the combination of transit incentives and lack of new parking to serve a larger campus headcount.

L-2 OTHER ANTICIPATED EFFECTS

AESTHETICS

The potential aesthetic impacts under Alternative L-2 would in general be the same as described for the 2020 LRDP since the amount of new program space and housing would be the same as under the 2020 LRDP. The Best Practices and Mitigation Measures described in Chapter 4.1 would apply under Alternative L-2 and mitigate any potential impacts to less than significant levels.

BIOLOGICAL RESOURCES

No significant unavoidable adverse impacts on biological resources were identified under the proposed 2020 LRDP. Alternative L-1 would not appreciably reduce identified impacts on biological resources such as Strawberry Creek, campus natural areas and mature trees, and sensitive habitats. Parking facilities proposed under the 2020 LRDP would be located in urbanized areas, and would not affect sensitive biological resources.

GEOLOGY, SOILS AND SEISMICITY

The potential geology, soils and seismicity impacts under Alternative L-2 would in general be the same as described for the 2020 LRDP. The Continuing Best Practices described in Chapter 4.5 regarding seismic safety would apply under Alternative L-2 and mitigate any potential impacts to less than significant levels.

HAZARDOUS MATERIALS

Under this alternative, impacts associated with increased use of hazardous materials would be the same as under the 2020 LRDP.

HYDROLOGY

The construction of parking could potentially increase the impervious area on campus, which may increase the surface runoff to the streams and storm drain systems on campus. Parking lots and structures often contain pollutants leaked from cars that could be carried to the streams with surface runoff. Impervious areas also may increase the amount and velocity of the runoff and therefore contribute to erosion. Finally, the increase in the amount of runoff may also cause the capacity of the storm drain system to be exceeded, therefore causing local drainage. Since no new university parking would be constructed under Alternative L-2, these negative impacts associated with increased parking would not occur.

LAND USE

The potential land use impacts under Alternative L-2 would in general be the same as described for the 2020 LRDP. The Best Practices described in Chapter 4.8 would apply under the 2020 LRDP would also apply under Alternative L-2 and mitigate any potential impacts to less than significant levels.

POPULATION AND HOUSING

For Alternative L-2, the changes in campus headcount and university housing through 2020 would be the same as in the 2020 LRDP, and therefore the population and housing impacts under Alternative L-2 would be the same as those under the 2020 LRDP.

PUBLIC SERVICES

Since campus headcount under Alternative L-2 would be the same as under the 2020 LRDP, the public services impacts under both scenarios would in general be the same.

UTILITIES AND SERVICE SYSTEMS

Since Alternative L-2 would result in the same campus headcount and, except for parking, the same amount of built space as in the 2020 LRDP, impacts to utilities and service systems under this alternative would in general be the same as under the 2020 LRDP.

L-2 RELATIONSHIP TO PROJECT OBJECTIVES

This section examines how Alternative L-2 would compare with the 2020 LRDP in terms of achieving the Objectives presented in Chapter 3.

- **Provide the housing, parking, and services we require to support a vital intellectual community and promote full engagement in campus life.**

The amount of housing proposed in L-2 is the same as in the 2020 LRDP, but the parking supply would remain at current 2003 levels. UC Berkeley presently estimates a deficit of at least 1,300 parking spaces: this number is consistent with the findings of both the 1990-2005 LRDP and a 1999 study of campus parking, which also recommends construction of 1,300 net new parking spaces to address current needs.⁵

Alternative L-2 would neither address this current deficit nor accommodate future campus growth. The objective of a vital intellectual community can not be met if access to campus is increasingly constrained by the shortage of parking.

- **Plan every new project to respect and enhance the character, livability, and cultural vitality of our City Environs.**

The increase in parking demand due to growth in enrollment and employment, without any increase in the parking supply, would likely result in more UC Berkeley students and employees parking in the districts around campus, particularly unregulated residential districts. Commentors on the NOP already perceive this as a serious problem, and it might be expected to worsen under L-2, unless incentives such as the EcoPass induce substantial numbers of single drivers to shift to alternate modes. Based on past surveys of both students and employees, UC Berkeley considers the potential of such programs to be modest, given the already low drive-alone rate at UC Berkeley and the relatively low priority of cost as a mode selection factor.

The relationship of Alternative L-2 to the other objectives would not differ significantly from the 2020 LRDP, except as described above with respect to significant environmental impacts.

5.1.3 ALTERNATIVE L-3: DIVERSION OF SOME GROWTH TO REMOTE SITES

Several comments received in response to the NOP suggest Noise and Traffic impacts might be reduced by diverting some of the growth projected in the 2020 LRDP from the campus and its environs to one or more remote sites. The 100-acre University-owned Richmond Field Station (RFS) is the most suitable candidate site for this strategy, being located roughly four miles north⁶ of the Campus Park.

As explained in Chapter 3, new development at the RFS is not within the scope of the 2020 LRDP. As of 2003, a master plan for development of RFS was in the initial stage of formulation, but no parameters for its development had yet been established. As of 2001-2002, RFS contained 549,000 GSF of program space, or roughly 4 percent of the UC Berkeley inventory of built space.

In Alternative L-3, the same increases in enrollment, employment, program space, and housing are assumed as in the 2020 LRDP. However, one-third of the projected growth in sponsored research is assumed to be housed at Richmond Field Station rather than at the campus and its environs. This would result in a lower staff and visitor/vendor headcount than in the 2020 LRDP, as shown in Table 5.3-1. This would also allow for a smaller building program in the Campus Park and City Environs, and the amount of new parking would also be reduced.

L-3 AIR QUALITY

Localized carbon monoxide and particulate matter impacts would decrease because some trips would divert to Richmond Field Station. However, other vehicle emissions (NO_x and ROG) are more of a regional air quality issue due to the fact that some pollutants are transported downwind of the emission source (unlike carbon monoxide and particulate matter, which disperse rapidly). Since the total student, staff, and faculty population would not change but some would be merely displaced, the total vehicle emissions would remain roughly the same as the 2020 LRDP. There would be a slight change in miles traveled since Richmond Field Station is located four miles north of the Campus, but this would not cause a substantial change in total emissions.

The cumulative risk from stationary and area source toxic air contaminant emissions, discussed in Section 4.2.9 of this EIR, under Cumulative Impact AIR-4, may be somewhat reduced proportional to the reduction in program space on the Campus. However, existing emissions for LBNL and UC Berkeley exceed the 10 in one million standard for a 70-year exposure. Given that the primary contribution to cumulative risk is diesel particulate matter, a slower rate of program renewal and improvement on the Campus because of off-site development under this Alternative, and concomitant replacement of existing emergency diesel generators, may not be beneficial to an overall reduction in this cumulative impact. Toxic air contaminant emissions would increase in the vicinity of the Richmond Field Station.

TABLE 5.1-8

ALTERNATIVE L-3: HEADCOUNT	Estimated	Projected 2020	
	2001-2002	2020 LRDP	Alternative L-3
Regular Term Students	31,800	33,450	33,450
Faculty	1,760	1,980	1,980
Academic Staff	3,040	4,880	4,190
Nonacademic Staff	8,140	8,950	8,800
Visitors & Vendors	1,200	2,000	1,750
Total Regular Terms Headcount	45,940	51,260	50,170
<i>Net Growth by 2020</i>		<i>5,320</i>	<i>4,240</i>
Total Employment	12,940	15,810	14,970
<i>Net Growth by 2020</i>		<i>2,870</i>	<i>2,040</i>

TABLE 5.1-9

ALTERNATIVE L-3: PROPOSED SPACE	Actual + Approved	Projected 2020	
	2001-2002	2020 LRDP	Alternative L-3
Program Space (GSF)	12,100,000	14,300,000	13,800,000
<i>Net Growth by 2020</i>		<i>2,200,000</i>	<i>1,700,000</i>
<i>Net Lab Space Growth by 2020</i>		<i>660,000</i>	<i>470,000</i>
Housing (bed spaces)	8,190	10,790	10,790
<i>Net Growth by 2020</i>		<i>2,600</i>	<i>2,600</i>
Parking (auto spaces)	7,690	9,990	9,490
<i>Net Growth by 2020</i>		<i>2,300</i>	<i>1,800</i>

TABLE 5.1-10

ALTERNATIVE L-3: PROGRAM SPACE & PARKING DISTRIBUTION	Program Space (GSF)		Parking (spaces)	
	2020 LRDP	Altern L-3	2020 LRDP	Altern L-3
Campus Park	1,000,000	770,000	600	500
City Environs				
Adjacent Blocks North	50,000	40,000		
Adjacent Blocks West	800,000	620,000	1,300	1,000
Adjacent Blocks South	400,000	310,000	600	500
Southside	50,000	40,000		
Other Berkeley Sites	50,000	40,000		
Hill Campus	100,000	80,000		
Max Net Addl Space NTE	2,200,000	1,700,000	2,300	1,800

Housing unchanged from base scenario for 2020 LRDP.

Total lab and building emissions on a regional basis would be the same as those for the LRDP, since the total student and staff population growth would be the same as under the 2020 LRDP, but with some of the growth placed at Richmond Field Station. In conclusion, total regional pollutant emissions would be equivalent under Alternative 3 to the 2020 LRDP, and would be significant and unavoidable with respect to compliance with the Clean Air Plan.

L-3 CULTURAL RESOURCES

The potential cultural resource impacts under Alternative L-3 would in general be the same as described for L-1 within the geographic scope of the 2020 LRDP. The Best Practices and Mitigation Measures described in Chapter 4.4 regarding historical,

archaeological and paleontological resources would apply under Alternative L-3 and, in general, would avoid significant impacts. The special circumstances under which demolition or alteration of a significant resource is unavoidable would also have the potential to occur in L-3, but given the reduced building program in the Campus Park and City Environs, fewer such instances would be likely. The potential for discovery of cultural resources at RFS also exists in L-3, and would require further assessment.

L-3 NOISE

Alternative L-3 assumes that if one-third of the projected growth and sponsored research would be housed at the Richmond Field Station this would substantially reduce the duration and scope of construction in the Campus Park area and its environs. The conclusion regarding the significance of the impact of construction noise would be the same as under the 2020 LRDP, that is the impact would be significant and unavoidable. Noise levels would substantially increase temporarily at sensitive receivers and would exceed limits set forth by local jurisdictions.

However, the number of projects in the vicinity of the campus would be reduced. While this reduction would be matched by an increase in construction activity at RFS, RFS in general has fewer sensitive receivers than the campus vicinity.

L-3 TRANSPORTATION AND TRAFFIC

Relocating a third of the growth in sponsored research to the Richmond Field Station would reduce the population growth at the Campus Park. However the reduction would be related to the relocation of postdocs, research and administrative staff, whereas relocated faculty and students would likely make trips on a regular basis to the Campus Park. The relatively small reduction in the population making daily trips to the Campus Park would reduce local congestion and congestion at the study intersections relative to those in the 2020 LRDP. However, the intersection congestion impacts identified for the project would likely remain significant.

Because the same amount of parking would be added as in the 2020 LRDP, parking impacts would remain essentially the same, although the relative demand for the new parking would be slightly lower and thus the pressure for non-auto commuters to shift modes would be slightly lower. The construction-related impacts would be slightly lessened due to lower construction levels on campus.

The alternative would result in a new significant impact related to shuttle service between the RFS and the Campus Park, as it is likely that additional shuttle vehicles and more frequent service would be required to link the two sites. The current shuttle's fare is not covered by the Class Pass Program. The additional fare and the inconvenience of the shuttle may cause people to use their personal vehicles. This in turn would have the effect of increasing congestion at the study intersections, especially to the north and west of the Campus Park.

In addition, this alternative could produce traffic congestion impacts in the vicinity of the RFS, particularly because that site is not as well-served by transit (BART and AC Transit buses) as the Campus Park, nor as well located within bicycling/walking distance of substantial housing opportunities.

L-3 OTHER ANTICIPATED EFFECTS

AESTHETICS

The potential aesthetic impacts under Alternative L-3 within the geographic scope of the 2020 LRDP would in general be the same as described for the 2020 LRDP. However, since there would be less program space and parking under Alternative L-3, there would be fewer projects and thus less potential for aesthetic impacts. The Continuing Best Practices and Mitigation Measures described in Chapter 4.1 would apply under Alternative L-3 and mitigate any potential impacts to less than significant levels.

BIOLOGICAL RESOURCES

This alternative is not expected to reduce identified impacts on biological resources, and could contribute to potential adverse impacts on sensitive resources at the Richmond Field Station. No significant unavoidable adverse impacts on biological resources were identified under the proposed 2020 LRDP. The reduction in program space on the Campus Park and increase in projected growth at the Richmond Field Station would not provide appreciably greater protection of sensitive resources such as Strawberry Creek, campus natural areas and mature trees, or sensitive habitats.

There is a possibility that the increased growth at the Richmond Field Station could affect sensitive resources at that remote site, which include native grasslands, coastal salt marsh, raptor nesting, and possibly roosting locations for special-status bat species. Projected growth at the Richmond Field Station would presumably be accommodated in locations where sensitive biological and wetland resources are absent, but would require further environmental assessment.

GEOLOGY, SOILS AND SEISMICITY

Development under Alternative L-3 would have the same potential geology, soils and seismicity impacts as described for the 2020 LRDP, although since campus headcount would be lower, fewer people within the geographic scope of the 2020 LRDP would be subject to seismic risk. Alternative L-3 projects that one-third of the projected growth in sponsored research would be housed at RFS. The geological and seismic setting of RFS is different from that of the LRDP area, and would require further assessment. Any development under Alternative L-3 would be subject to the Best Practices described in Chapter 4.5 regarding seismic safety. These best practices would mitigate any potential impacts to less than significant levels.

HAZARDOUS MATERIALS

Under Alternative L-3, the hazardous materials impacts within the geographic scope of the 2020 LRDP would be reduced compared to the 2020 LRDP because the increase in laboratory space on and around campus would be smaller. Hazardous materials use at the RFS site would increase; however, as under the 2020 LRDP, the impacts would be less than significant because the University would continue to comply with applicable laws, regulations, and policies.

HYDROLOGY

Development under Alternative L-3 would in general have the same potential hydrology and water quality impacts as described for the 2020 LRDP. Alternative L-3 projects that one-third of the projected growth in sponsored research would be housed at RFS. The hydrologic setting of RFS is different from that of the LRDP area, and would require

further assessment. Any development under Alternative L-3 would be subject to the Continuing Best Practices described in Chapter 4.7 regarding hydrology. These best practices would mitigate any potential impacts to less than significant levels.

LAND USE

The potential land use impacts under Alternative L-3 would in general be the same as described for the 2020 LRDP. The Best Practices that would apply under the 2020 LRDP would also apply under Alternative L-3. Increased research space growth at RFS under Alternative L-3 would not be expected to result in significant incompatibilities since RFS already houses research uses and is surrounded by similar uses.

POPULATION AND HOUSING

For Alternative L-3, the changes in campus headcount and university housing through 2020 would be the same as in the 2020 LRDP, and therefore the population and housing impacts under Alternative L-2 would at a regional level be the same as those under the 2020 LRDP. However, since a third of research growth would occur at RFS, the localized demand on the Berkeley housing market could be somewhat lower under L-3, if some employees stationed at RFS choose residences closer to their workplace.

PUBLIC SERVICES

The increase in both headcount and built space within the geographic scope of the 2020 LRDP would be less under Alternative L-3 than under the 2020 LRDP, and therefore the impacts on fire and emergency services, police services, schools, parks and recreation, and solid waste under Alternative L-3 would also be less than significant within this area. Public services at RFS may experience some increase in demand under Alternative L-3, however, and would require further assessment.

UTILITIES AND SERVICE SYSTEMS

The increase in both headcount and built space within the geographic scope of the 2020 LRDP would be less under Alternative L-3 than under the 2020 LRDP. Since the impacts on utilities and service systems under the 2020 LRDP were less than significant, the impacts under Alternative L-3 would also be less than significant. Systems serving RFS may experience some increase in demand under Alternative L-3, however, and would require further assessment.

L-3 RELATIONSHIP TO PROJECT OBJECTIVES

As noted above, from the standpoint of impacts within the scope of the 2020 LRDP, L-3 would be similar to L-1. The two differ, however, in terms of their relationship to the 2020 LRDP 2020 Objectives.

- **Provide the space, technology and infrastructure we require to excel in education, research, and public service.**

Unlike L-1, L-3 would meet this Objective by accommodating the full demand for program space projected in the 2020 LRDP, although a third of the demand generated by growth in sponsored research would be located at RFS rather than on or around the Campus Park.

- **Build a campus that fosters intellectual synergy and collaborative endeavors both within and across disciplines.**

L-3 would not, however, fully meet the Objective to retain and reinforce the contiguity of academic programs. The future of both education and research is increasingly interdisciplinary, and the UC Berkeley campus must continue to be a place that encourages interdisciplinary synergy. Because the potential for synergy is everywhere, the 2020 LRDP responds to this Objective by locating 90-100% of new program space on or adjacent to the Campus Park.

In L-3, only two-thirds of the program space demand generated by growth in sponsored research would be accommodated on or adjacent to the Campus Park: the balance would be housed at RFS. While there are some research programs that do not require proximity to the Campus Park – and several of these are already located at RFS – L-3 could preclude a number of future programs for which proximity to the Campus Park is essential. For this reason, L-3 does not fully meet this Objective of the 2020 LRDP.

The relationship of Alternative L-3 to the other Objectives would not differ significantly from Alternative L-1.

5.1.4 ALTERNATIVE L-4: NO PROJECT

Under the no project alternative, the current 1990-2005 LRDP would remain in place. While substantial capacity remains under the current LRDP to develop student housing and parking, virtually its entire allocation of 723,000 net additional GSF of program space has already been constructed. Regular term student headcount and total headcount have also both grown beyond the maxima prescribed under the current 1990-2005 LRDP.

Alternative L-4, therefore, would leave the campus with two options. One would be to stop developing new program space. This is infeasible for several reasons. First, the growth in student enrollment is part of a University-wide strategy to continue to meet its obligations under the California Master Plan for Higher Education, in the face of dramatic growth in the number of college-age Californians: enrollment growth at Berkeley is an integral part of this strategy.

To maintain the quality of education at UC Berkeley, this growth in enrollment requires a corresponding increase in faculty and academic and nonacademic staff, and therefore in campus facilities. Second, the aging facility inventory at UC Berkeley must continue to be renewed, not only to remedy the space deficits created by enrollment growth, but also to provide the state-of-the-art space, technology, and infrastructure required by modern education and research.

Moreover, continued growth in research programs is desirable, not only because these programs pursue research of great public benefit, but also because participation in a vital and diverse research enterprise is crucial to the educational experience of both graduate and undergraduate students.

The other option under Alternative L-4 would be to amend the current LRDP each time a new project is required. One such amendment, for the NEQSS facilities in 2002, has already been approved. Because UC Berkeley works at the frontiers of knowledge, new and unanticipated facility needs sometimes emerge, and LRDP amendments are sometimes necessary. However, to rely exclusively on amendments to an increasingly outdated LRDP would not be in the best interests of either campus or community, because it would lead to an increasingly piecemeal approach to campus development.

Under this interpretation of the No Project Alternative L-4, the same amount of development would be expected to occur as under the 2020 LRDP, since the factors driving the projected increase in campus headcount and space requirements would not change. However, they would be analyzed under CEQA project by project.

The Continuing Best Practices, since they are already in place at UC Berkeley, would serve to mitigate the environmental impacts of future projects in the same way they would under the 2020 LRDP. However, Mitigation Measures would be prescribed project by project rather than, as in the 2020 LRDP, based on a comprehensive overview of the full scope of development from now through 2020.

More importantly, under the No Project Alternative the objectives, policies, and guidelines prescribed in the 2020 LRDP to shape future development would not be available. In the absence of the larger, longer-term policy context established by the 2020 LRDP, each project would be forced to rely on an increasingly outdated 1990-2005 LRDP, and would likely be driven far more by local and temporal factors rather than the best long-term interest of the campus as a whole.

5.1.5 ALTERNATIVES WITHDRAWN FROM CONSIDERATION

During the scoping process, other alternatives were considered, but as a result of qualitative analysis were determined either to be infeasible or to offer no significant environmental benefits over the 2020 LRDP or Alternatives L-1 through L-4, and were therefore not analyzed quantitatively.

ALTERNATIVE L-5: LESS NEW UNIVERSITY HOUSING

The University received NOP comments advocating construction of less housing than proposed in the 2020 LRDP. However, this option appears to offer almost no significant environmental benefits over the 2020 LRDP. This section analyzes this option relative to the four significant and unavoidable impacts of the 2020 LRDP: noise, traffic, cultural resources and air quality.

AIR QUALITY

Air emissions from vehicle trips would increase if more students must live further from campus due to less University housing, and therefore would have fewer transit alternatives and/or longer drives to campus. However, there would also be a decrease in area source emissions associated with student housing (natural gas combustion emissions for water and space heating, consumer product use, and landscape maintenance).

CULTURAL RESOURCES

Because the lower number of new housing units under L-5 would result in fewer projects, the potential for impacts on cultural resources could be somewhat less than under the 2020 LRDP. However, such impacts are very unlikely given the range of alternate sites within the 2020 LRDP Housing Zone, and therefore the low probability of unavoidable demolition or alteration of cultural resources due to housing under the 2020 LRDP.

NOISE

If new University housing were not constructed, new residents would not be exposed to excessive noise levels within the 2020 LRDP Housing Zone. This may be the one environmental benefit of Alternative L-5.

While construction noise is a significant and unavoidable impact under the 2020 LRDP, housing construction of the type envisioned by the 2020 LRDP has less severe noise impacts than the construction of program space or parking, for several reasons: First, housing construction under the 2020 LRDP would be far more widely dispersed than program space or parking, so the likelihood of multiple sequential projects in the vicinity of any one site is much lower.

Second, nearly all new housing is expected to be light frame construction, for which the duration of construction is shorter than concrete or steel projects. Finally, light frame construction does not require some of the noisiest construction methods required in the typical steel or concrete project, such as major work for foundation excavation, foundation construction and erection of the steel superstructure. For these reasons, Alternatives L-1 or L-3, which involve significant reductions in new program space and new parking compared to the 2020 LRDP, would be more effective in reducing noise impacts than Alternative L-5.

TRAFFIC

A strategy of building less new university housing is likely to make traffic conditions worse, because the LRDP Housing Zone is designed to ensure the location of this new housing encourages alternate modes of travel to and from campus. If less new university housing is built in the LRDP Housing Zone, more students would likely live farther from campus, in places less convenient to transit, and would be more likely to drive.

OTHER ENVIRONMENTAL EFFECTS

Because the lower number of new housing units under L-5 would result in fewer projects, the potential for impacts on aesthetics and land use could be somewhat less than under the 2020 LRDP, but no significant and unavoidable impacts are identified in these categories for the 2020 LRDP. On the other hand, the lower number of housing units could increase the potential for housing market impacts, since campus headcount under L-5 would be the same as in the 2020 LRDP.

ALTERNATIVE L-6: MORE NEW UNIVERSITY HOUSING

In contrast to NOP comments suggesting a reduction in housing, some NOP comments advocated an increase in housing relative to that proposed in the 2020 LRDP. This option is infeasible under the current financial practices of the University.

While the long term goals in the Strategic Academic Plan may ultimately require more University housing than envisioned in the 2020 LRDP, under the current financial practices of the University it is not possible to sustain a more intensive pace of housing development than the 2020 LRDP proposes. Because the state provides no funds for University housing, its entire capital and operating cost must be supported by rents and other revenues.

Although the UC Berkeley housing inventory includes many relatively new facilities, many others are old and in critical need of major renovation, including the Clark Kerr Campus and Bowles and Stern Halls. Rents must sustain these renovations as well as new construction projects. However, new construction projects begin generating new expenses well before they begin generating new revenues, while renovation projects typically generate no new revenues.

Given the need to keep rents at reasonable levels and maintain the financial integrity of the housing auxiliary as a whole, the campus is therefore limited in the number of projects it can pursue at any one time. While the 2020 LRDP housing program appears at this point to be supportable by projected future rents, a significantly larger program would be infeasible.

ALTERNATIVE L-7: MORE INTENSIVE DEVELOPMENT OF HILL CAMPUS

Several NOP comments emphasized the need to preserve the ecological integrity, environmental quality and recreational amenity of the Hill Campus. However, several campus individuals have advocated developing the Hill Campus more intensively than is proposed under the 2020 LRDP.

One argument advanced is that development in the Hill Campus would be preferable to diverting growth to a remote site, as in Alternative L-3, given the 2020 LRDP objective to maintain a vital intellectual community. Another argument advanced for developing the Hill Campus more intensively is that it would reduce the need for the University to purchase additional land to implement the 2020 LRDP, since the Hill Campus lands are already in University ownership.

However, the physical separation of the Hill Campus from the Campus Park is a significant obstacle to productive working relationships with units on the Campus Park due to time lost in travel and the near absence of informal interaction. The 2020 LRDP program to concentrate new program space and parking on and around the Campus Park is a preferable solution, in terms of the 2020 LRDP objective to support a vital intellectual community and promote full engagement in campus life.

For this analysis, it is assumed more intensive development of the Hill Campus would entail an equivalent reduction in development in the City Environs, while the total amount of development under the 2020 LRDP would remain the same.

AIR QUALITY

Air quality impacts would be the same under Alternative L-7 as under the 2020 LRDP.

CULTURAL RESOURCES

The nature, but not necessarily the significance, of the potential impacts would be different under L-7 than under the 2020 LRDP. The City Environs has a far greater number of designated historic resources, but the probability of prehistoric resources is likely to be greater in the Hill Campus.

NOISE

The noise environment on the Hill Campus area is relatively quiet due to the low level of traffic and intensity of development, and the area includes noise sensitive uses such as the Field Station for Behavioral Research. Because ambient noise is low in the Hill Campus, increased development in this area would have a greater potential to cause a substantial noise impact, both temporarily during construction and permanently, although the number of sensitive receivers would be lower than in the City Environs.

TRAFFIC

While some redistribution of trips would occur within the immediate vicinity of the campus, the total number of trips to and from the campus vicinity would be the same as under the 2020 LRDP. Thus, while the incidence of impacts might differ slightly from the 2020 LRDP, the total magnitude of impacts would be similar. Moreover, Centennial Drive – the only route through the Hill Campus – is particularly vulnerable to congestion due to its curves, steep grades, narrow width, and poor visibility.

OTHER ENVIRONMENTAL EFFECTS

More intensive development in the Hill Campus could, compared to the 2020 LRDP, result in greater potential environmental impacts in a number of areas:

- The Hill Campus is a scenic and recreational resource for the entire East Bay, and is part of the continuous greenbelt of park and watershed land that extends the entire length of the East Bay Hills from Richmond to Hayward. Its increased development could thus result in impacts to both aesthetics and recreation.
- The mix of scrub, conifer and eucalyptus stands makes the East Bay Hills, including the Hill Campus, a regular seasonal fire risk. The steep terrain, poor access and limited infrastructure present enormous obstacles to fire response.
- The steep terrain and poor access and infrastructure in the Hill Campus make development itself more disruptive. With few exceptions, substantial regrading would be required for new projects, and in many areas infrastructure extensions or upgrades may also be required.
- The Hill Campus is known to contain sensitive wetlands, the riparian habitat of Strawberry Creek and its tributary drainages, and suitable habitat for a number of special status species.
- The Hill Campus is largely designated as a landslide hazard area, and thus more intensive development in the Hill Campus has the potential to expose more people to geologic hazards than an equivalent amount of development elsewhere in the 2020 LRDP area.
- The potential for hydrology and water quality impacts would be greater in this alternative than under the 2020 LRDP because of the presence of several open creeks and tributaries in the Hill Campus. The terrain may make it more difficult for the campus to maintain runoff volumes at existing levels. Also, a large

increase in runoff could also exceed the current capacity of the storm drain system. These factors would have to be considered, and further hydrologic analysis completed for this alternative

- More intensive development in the Hill Campus would result in greater potential impacts to both fire and emergency services and recreation than the 2020 LRDP. The risk of wildland fires is much greater in the Hill Campus than in other areas of the 2020 LRDP, and more intensive development in the Hill Campus would expose more people to this risk.
- More intensive development in the Hill Campus would result in a greater increase in impervious surfaces than under the 2020 LRDP, which concentrates development in already urbanized areas.

For these reasons, more intensive development of the Hill Campus was eliminated for further study as an alternative in this EIR.

ALTERNATIVE L-8: MORE INTENSIVE DEVELOPMENT OF CLARK KERR CAMPUS

A strategy to accommodate a significant portion of the 2020 LRDP housing targets on the Clark Kerr Campus could offer substantial fiscal advantages to the City if it reduced the University's need to purchase additional housing sites, thus removing those sites from the tax rolls. However, this alternative is infeasible due to the restrictions imposed by the 1982 Memorandum of Understanding with the City and the 1982 Declaration of Covenants with the neighboring property owners, both of which run until 2032.

AIR QUALITY

Air quality impacts would remain the same under Alternative L-7 as under the 2020 LRDP.

CULTURAL RESOURCES

The Clark Kerr Campus is on the National Register of Historic Places. While this alternative would not necessarily entail the demolition or alteration of any existing resources on the site, any new development would have to be designed with great care to respect the visual quality and character of the campus, and the composition of buildings and open spaces that contributes to this character.

NOISE

The Clark Kerr Campus is surrounded by residential neighbors. Most intensive development of the Clark Kerr Campus would have the potential to cause both a short-term and long-term noise impacts upon the adjacent sensitive receivers. This is not significantly different than other development areas proposed for the 2020 LRDP around the perimeter of the Campus Park. Noise impacts under Alternative L-8 would be the same as the 2020 LRDP, but would involve an additional group of sensitive receivers.

TRAFFIC

Since the Clark Kerr Campus lies within easy walking and biking distance of the Campus Park, housing located at this site would not only discourage driving but would also avoid capacity impacts on transit systems. A given amount of new housing constructed at Clark Kerr Campus, therefore, would have less transportation-related impacts than an equivalent amount of housing constructed along a transit corridor.

OTHER ENVIRONMENTAL EFFECTS

The Clark Kerr Campus is on the National Register of Historic Places, and also contains mature trees and landscaping that may have to be removed in order to accommodate new development. Development on the campus could therefore have a greater potential for significant aesthetic impact than an equivalent amount of development elsewhere within the LRDP Housing Zone.

Alternative L-8 could expose more people to seismic hazards when compared to the 2020 LRDP. Seismic shaking at Clark Kerr Campus is expected to be strong in the event of an earthquake on the Hayward fault, given its proximity to the fault. A significant portion of the campus lies within the Alquist-Priolo Earthquake Hazard Zone for the Hayward fault, and development within this zone would be subject to the provisions of the Alquist-Priolo Act.

5.1.6 2020 LRDP ENVIRONMENTALLY SUPERIOR ALTERNATIVE

An EIR is required to identify the environmentally superior alternative from among the range of reasonable and feasible alternatives evaluated. As a rule this would be the alternative that results in fewer or no significant and unavoidable impacts.

Of the feasible alternatives described above, Alternative L-1 is the most favorable in terms of both the 2020 LRDP Objectives and its environmental impacts. With respect to the latter, L-1 is also preferable to the 2020 LRDP; impacts would not be worse than under the 2020 LRDP in any category, and would be reduced in several categories, roughly in proportion to the reduction in campus headcount, construction of new projects, or both.

The amount of net new program space in Alternative L-1 is based on the same factors and formulas used for the 2020 LRDP; the difference is due entirely to the lower rates of growth assumed for L-1. Therefore, if enrollment and employment do in fact grow at the slower rates projected in L-1, the amount of net new program space, housing and parking in L-1 *would* be adequate.

However, UC Berkeley believes the lower projections of growth in L-1 do not adequately reflect long-term trends in sponsored research, nor do they meet University-wide targets for enrollment growth. UC Berkeley believes the rates of growth projected in the 2020 LRDP represent the best estimate of future space demand, and if this demand does materialize as expected, the amount of net new program space in Alternative L-1 would be inadequate, and would severely constrain the ability of UC Berkeley to maintain its standard of excellence. Restricting future growth in headcount and building space to the levels in Alternative L-1 would not, therefore, meet the Objectives of the 2020 LRDP.

For this reason, despite the potential environmental advantages of Alternative L-1, the 2020 LRDP represents the best balance of institutional objectives and environmental stewardship.

5.1.7 REFERENCES

- ¹ UC Berkeley, *Notice of Preparation: Environmental Impact Report for the 2020 LRDP and Chang-Lin Tien Center for East Asian Studies*, August 29, 2003.
- ² City of Berkeley/UC Berkeley, *Southside/Downtown TDM Study*, March 2001. Prepared by Nelson/Nygaard Consulting Associates.
- ³ City of Berkeley/UC Berkeley, *Southside/Downtown TDM Study*, March 2001. Prepared by Nelson/Nygaard Consulting Associates. Page ES-5.
- ⁴ City of Berkeley/UC Berkeley, *Southside/Downtown TDM Study*, March 2001. Prepared by Nelson/Nygaard Consulting Associates. Page 10-14.
- ⁵ Wilbur Smith Associates, *UC Berkeley Campus Parking Policy & Planning Options Study*, 11 February 1999, page 9-7.
- ⁶ <http://eehsl.berkeley.edu/rfs.html> retrieved on November 26, 2003.

TABLE 5.1-1 SUMMARY COMPARISON OF 2020 LRDP ALTERNATIVES

Significant Impacts (Before Mitigation)	L-1	L-2	L-3	L-4
AESTHETICS				
LRDP Impact AES-3: Projects under the 2020 LRDP have the potential to create new sources of substantial light or glare that could have adverse impacts on day- or night-time views, but the mitigation measures would reduce this impact to <i>less than significant</i> .	E	E	E	E+
AIR QUALITY				
LRDP Impact AIR-5: Operational emissions from implementation of the 2020 LRDP may hinder the attainment of the Clean Air Plan. This would be a significant and unavoidable impact.	L	L	E	E+
CULTURAL RESOURCES				
LRDP Impact CUL-2: Projects developed under the 2020 LRDP could cause adverse changes in the significance of historical resources. However, in general the provisions of the 2020 LRDP and the best practices would ensure this impact is <i>less than significant</i> .	*L	E	*L _R	E+
LRDP Impact CUL-3: Under certain circumstances warranted by public benefits in furtherance of the University’s educational mission, projects developed under the 2020 LRDP could cause substantial adverse changes in the significance of historical resources. Under these circumstances, the University would follow the mitigation measure described, but the impact would remain <i>significant and unavoidable</i> .	*L	E	*L _R	E+
LRDP Impact CUL-4: Projects developed under the 2020 LRDP could destroy significant prehistoric or historic archaeological resources. The mitigations would reduce this impact to <i>less than significant</i> .	*L	E	*L _R	E+
LRDP Impact CUL-5: Under certain circumstances warranted by public benefits in furtherance of the University’s educational mission, projects developed under the 2020 LRDP could cause substantial adverse changes in the significance of archaeological resources. Under these circumstances, the University would follow the mitigation measure, but the impact would remain <i>significant and unavoidable</i> .	*L	E	*L _R	E+
HYDROLOGY AND WATER QUALITY				
LRDP Impact HYD-5: Projects implemented in the Hill Campus under the 2020 LRDP could alter drainage patterns and increase impervious surfaces, which could exceed the capacity of stormwater drainage systems, result in localized flooding, contribute to off-site flooding, and result in substantial siltation or erosion, but the mitigations would ensure this impact is <i>less than significant</i> .	L	E	L _R	E+
LRDP Impact HYD-6: Implementation of the 2020 LRDP could place structures which would impede or redirect flood flows within the 100-year flood hazard area, but the mitigations would ensure this impact is <i>less than significant</i> .	*L	E	*L _R	E+

E = Impacts expected to be roughly the same as under the 2020 LRDP
 E+ = Impacts expected to be roughly the same as under the 2020 LRDP, except environmental stewardship would be undertaken project by project, without the coherent design framework and comprehensive mitigation strategy of the 2020 LRDP.
 L = Impacts expected to be less than under the 2020 LRDP.
 *L = Impacts expected to be roughly the same as under the 2020 LRDP, except incidence may be lower due to fewer projects.
 L_R and *L_R = Same relationship to 2020 LRDP as L and *L, but may also entail as yet undetermined impacts at RFS.

TABLE 5.1-1 SUMMARY COMPARISON OF 2020 LRDP ALTERNATIVES

Significant Impacts (Before Mitigation)	L-1	L-2	L-3	L-4
NOISE				
LRDP Impact NOI-3: University housing developed under the 2020 LRDP could expose residents to excessive noise levels. This impact is <i>significant and unavoidable</i> .	E	E	E	E+
LRDP Impact NOI-4: Noise resulting from demolition and construction activities necessary for implementation of the 2020 LRDP would, in some instances, cause a substantial temporary or periodic increase in noise levels, in excess of local standards prescribed in Section 13.40.070 of the City of Berkeley noise ordinance, at affected residential or commercial property lines. This is a <i>significant and unavoidable</i> impact.	*L	E	*L _R	E+
LRDP Impact NOI-5: Construction of campus facilities under the 2020 LRDP could expose nearby receptors to excessive groundborne vibration, but the mitigation measures would ensure this impact is <i>less than significant</i> .	*L	E	*L _R	E+
PUBLIC SERVICES				
LRDP Impact PUB-2.4: Implementation of the 2020 LRDP could temporarily result in emergency access constraints, but the mitigation measures would reduce this impact to <i>less than significant</i> .	*L	E	*L	E+
LRDP Impact PUB-4.4: Implementation of the 2020 LRDP could result in the unanticipated loss of some University owned recreational facilities, which could result in increased use leading to the physical deterioration of remaining facilities, but the mitigations would reduce this impact to <i>less than significant</i> .	L	E	L	E+
TRANSPORTATION AND TRAFFIC				
LRDP Impact TRA-6: The 2020 LRDP would increase vehicle trips and traffic congestion at [seven] intersections, leading to substantial degradation in level of service. The mitigations, if implemented with review and approval of the City Traffic Engineer, would reduce these impacts to a <i>less than significant</i> level.	L	L	L _R	E+
LRDP Impact TRA-7: Development under the 2020 LRDP would contribute to the projected unacceptable delay at the all-way stop-controlled Bancroft Way/Piedmont Avenue intersection, which is projected to operate at LOS F during both AM and PM peak hours regardless of the project. The project would increase the intersection volume by 11 percent during the AM peak hour, and 5 percent during the PM peak hour. The mitigation prescribed would reduce this impact to a <i>less than significant</i> level.	L	L	L _R	E+
LRDP Impact TRA-8: The 2020 LRDP would increase vehicle trips and traffic congestion at [two] intersections, leading to substantial degradation in level of service. These impacts are <i>significant and unavoidable</i> .	L	L	L _R	E+

E = Impacts expected to be roughly the same as under the 2020 LRDP

E+ = Impacts expected to be roughly the same as under the 2020 LRDP, except environmental stewardship would be undertaken project by project, without the coherent design framework and comprehensive mitigation strategy of the 2020 LRDP.

L = Impacts expected to be less than under the 2020 LRDP.

*L = Impacts expected to be roughly the same as under the 2020 LRDP, except incidence may be lower due to fewer projects.

L_R and *L_R = Same relationship to 2020 LRDP as L and *L, but may also cause as yet undetermined impacts at RFS.

TABLE 5.1-1 SUMMARY COMPARISON OF 2020 LRDP ALTERNATIVES

Significant Impacts (Before Mitigation)	L-1	L-2	L-3	L-4
LRDP Impact TRA-9: Housing projects in the 2020 LRDP Housing Zone could increase vehicle trips and traffic congestion in the vicinity of project sites, which could lead to substantial degradation in level of service. The mitigation prescribed would reduce this impact to a <i>less than significant</i> level.	E	E	E	E+
LRDP Impact TRA-10: Development under the 2020 LRDP would cause the following Alameda County CMP and MTS Designated System roadways listed below to exceed the level of service standard established by the CMA. This impact is <i>significant and unavoidable</i> . <ul style="list-style-type: none"> ▪ Ashby Avenue eastbound, Between College Avenue and Domingo Street ▪ Ashby Avenue westbound, between San Pablo Avenue and Adeline Street ▪ University Avenue westbound, between I-80 and MLK Jr. Way ▪ San Pablo Avenue northbound, between Gilman Street and Marin Avenue ▪ Shattuck Avenue southbound, between Dwight Way and Adeline Street ▪ Shattuck Avenue southbound, between Hearst Avenue and University Avenue (MTS only) ▪ Dwight Way westbound, between MLK Jr. Way and Sixth Street (MTS only) 	L	L	L _R	E+
LRDP Impact TRA-11: Implementation of the 2020 LRDP could induce a “mode shift” to driving by some commuters who currently take transit, bicycle or walk. This would be inconsistent with the intent of the 2020 LRDP. The mitigation prescribed would reduce this impact to a <i>less than significant</i> level.	E	L	E	E+
LRDP Impact TRA-12: The level of pedestrian growth associated with the LRDP may require physical and operational modifications to the intersections and roadways in the immediate campus vicinity and on major pedestrian routes serving UC Berkeley, to ensure adequate capacity for pedestrian movement and adequate design to protect pedestrian safety. The mitigation prescribed would reduce this impact to a <i>less than significant</i> level.	L	E	L	E+
UTILITIES AND SERVICE SYSTEMS				
LRDP Impact USS-3.2: Projects implemented in the Hill Campus under the 2020 LRDP could alter drainage patterns and increase impervious surfaces, which could exceed the capacity of stormwater drainage systems, but the mitigations would ensure this impact is <i>less than significant</i> .	L	E	L _R	E+

E = Impacts expected to be roughly the same as under the 2020 LRDP
 E+ = Impacts expected to be roughly the same as under the 2020 LRDP, except environmental stewardship would be undertaken project by project, without the coherent design framework and comprehensive mitigation strategy of the 2020 LRDP.
 L = Impacts expected to be less than under the 2020 LRDP.
 *L = Impacts expected to be roughly the same as under the 2020 LRDP, except incidence may be lower due to fewer projects.
 L_R and *L_R = Same relationship to 2020 LRDP as L and *L, but may also entail as yet undetermined impacts at RFS.

5.2 TIEN CENTER ALTERNATIVES

The following section evaluates alternatives to the proposed Chang-Lin Tien Center and examines the potential environmental impacts associated with each alternative. The Tien Center alternatives analyzed in this EIR include the following:

- No project (as required by CEQA)
- Alternate site: Dwinelle lot
- Phase 1 as proposed, no Phase 2

5.2.1 ALTERNATIVE T-1: NO PROJECT

CEQA Guidelines Section 15126.6(e)(2) requires the evaluation of a “no project” alternative, which means “the existing conditions, as well as what would reasonably be expected to occur in the foreseeable future if the project were not approved, based on current plans and consistent with available infrastructure and community services.” Under this alternative, the project site at the base of Observatory Hill would remain in its present condition and neither Phase 1 nor Phase 2 of the proposed Tien Center would be constructed. The programs and services proposed for the Tien Center project would remain in the buildings in which they currently operate, or be allocated to other campus buildings as space becomes available.

Within the context of the 2020 LRDP, the Tien Center project was itself found to have no significant and unavoidable impacts. Moreover, the significant and unavoidable impacts identified for the 2020 LRDP as a whole would remain significant and unavoidable whether or not the Tien Center was constructed. Alternative T-1 would avoid the site-specific impacts of tree loss and potential loss of subsurface cultural resources, but with the mitigation measures and best practices prescribed in Chapter 4 these impacts would be less than significant.

T-1 RELATIONSHIP TO PROJECT OBJECTIVES

Alternative T-1 would not, however, meet the Objectives for the Tien Center described in Chapter 3.2. These Objectives include:

- **Create a central location for research and scholarship by students and faculty in all fields of the arts, humanities, social sciences and professional disciplines with a focus on East Asia.**
- **Provide a single and consolidated, state of the art facility on the Campus Park to house the collections of the East Asian Library, including adequate storage, research, office and conference space for both current requirements and future growth.**
- **Provide a single and consolidated, state of the art facility on the Campus Park to house the Institute of East Asian Studies and the Department of East Asian Languages and Culture, including adequate teaching, research, office and conference space for both current requirements and future growth.**

If the Tien Center is not constructed as proposed, its programs would either remain in their current inadequate and scattered locations, or be housed in other future space built under the 2020 LRDP. The first option is not feasible given the Objectives of the project and the requirements of the programs to be housed in it.

The option of an alternate site is evaluated in T-2, below, while the option of pursuing only Phase 1 rather than both phases of the project is evaluated in T-3.

5.2.2 ALTERNATIVE T-2: ALTERNATE SITE

Under Alternative T-2, the Tien Center would be built on the existing surface parking lot west of Dwinelle.

T-2 AESTHETICS

The project site under Alternative T-2 is a surface parking lot. Like the proposed project, this alternative would place the Tien Center within the established Campus Park. The site is not within the classical core as designated in the 2020 LRDP Campus Park Framework, but an oblique view of the project from within the classical core would be visible from the lawn west of California Hall, so the project would have some limited potential to affect the visual experience of the classical core, if not designed to be compatible with its composition and character.

T-2 BIOLOGICAL RESOURCES

As a parking lot, the T-2 site does not contain any known significant biological resources. The T-2 site does not provide a movement corridor for species, and habitat for plants or animals would not be significantly diminished by constructing the Tien Center on this site. As under the proposed project, sensitive construction practices would be used to avoid possible damage to trees that may be retained on site. Given the provisions of the 2020 LRDP and the Best Practices and Mitigation Measures described in Chapter 4.3, impacts to biological resources are anticipated to be less than significant, as they are for the proposed project.

T-2 CULTURAL RESOURCES

The T-2 site is not known to contain archaeological or paleontological resources, whereas the proposed Tien Center site does include some historic archaeological resources that would be lost as a result of the project. The provisions of the 2020 LRDP and the Best Practices and Mitigation Measures outlined in Chapter 4.4 would ensure that impacts to cultural resources remain less than significant, as they are for the proposed project.

T-2 HYDROLOGY

Under Alternative T-2, the Tien Center would be constructed on an existing parking lot and thus would not substantially increase the impervious surface area at that site. The proposed Tien Center site would entail some increase in impervious surface, primarily due to Phase 2. The hydrology and water quality impacts of the proposed project were found to be less than significant because of the many Best Practices in place at UC Berkeley to minimize potential impacts. The provisions of the 2020 LRDP and the Best Practices described in Chapter 4.7 would reduce potential hydrology and water quality impacts to less than significant, as they are for the proposed project.

T-2 OTHER ANTICIPATED EFFECTS

The potential impacts of Alternative T-2 in other categories are not expected to differ appreciably from the impacts of the proposed project.

T-2 RELATIONSHIP TO PROJECT OBJECTIVES

Like the proposed project, Alternative T-2 would provide a single, consolidated home for the various campus programs with a focus on East Asia. However, the L-shaped configuration of the proposed Tien Center site at the base of Observatory Hill allows for a larger footprint than the T-2 site.

A siting analysis for the East Asian Library prepared in 1991 found the T-2 site could accommodate a building with 3 above-grade and one below-grade levels, yielding 67,700 GSF. This finding was similar to previous studies for the 1990-2005 LRDP which suggested a site capacity of roughly 66,000 GSF.¹ This capacity is roughly equal to the current program for Phase 1 alone (67,500 GSF). Thus, use of the T-2 site would require either more stories above or below grade, or an alternate, separate site for Phase 2. Neither is feasible in relation to the Objectives.

Increasing the height and/or depth of the building would not only increase the cost of the project - particularly for the below-grade levels - but would also constrain or preclude its being constructed in two phases, which is critical to its financial feasibility. A separate site for Phase 2, on the other hand, would not meet the Objective to:

- **Create a central location for research and scholarship by students and faculty in all fields of the arts, humanities, social sciences and professional disciplines with a focus on East Asia.**

The T-2 site also differs from the proposed site in terms of its potential positive effects on the visual experience of the classical core. Another objective for the Tien Center project is to:

- **Design the Center to enhance the image and experience of the Campus Park, and preserve and complement its historic legacy of landscape and architecture.**

Given its visibility and prominence, the proposed site offers the opportunity to enhance the visual character of the classical core, with a new building sited and designed to respect and complement its historic buildings and open spaces, and strengthen the integrity of the classical ensemble. While a project on the T-2 site could also be designed to enhance the Campus Park environment, given its less prominent location it does not have the same potential for positive impact as the proposed site.

5.2.3 ALTERNATIVE T-3: PHASE I AS PROPOSED, NO PHASE 2

Under this alternative, the size of the Tien Center project would be reduced. The Phase 1 component would be built as planned under the proposed project, and released and other space in existing buildings would be used for the DEAL/IEAS programs. Phase 2 would not be constructed.

T-3 AESTHETICS

The aesthetic impacts and mitigations under Alternative T-3 would be the same as for the proposed project except that fewer trees and landscaping would need to be removed since Phase 2 would not be constructed. The open space that would have housed the Phase 2 building would be left as it exists presently. Since the Phase 2 building is envisioned as being set into the western base of Observatory Hill to minimize the visual impact of the structure, its absence would not significantly reduce the visual impact of the project.

T-3 BIOLOGICAL RESOURCES

The biological resource impacts and mitigations under Alternative T-3 would be the same as for the proposed project except that fewer trees and landscaping would need to be removed since Phase 2 would not be constructed.

T-3 CULTURAL RESOURCES

The proposed Tien Center site does include some historic archaeological resources that would be lost as a result of the project, primarily as a result of Phase 1. The provisions of the 2020 LRDP and the Best Practices and Mitigation Measures outlined in Chapter 4.4 would ensure that impacts to cultural resources remain less than significant, as they are for the proposed project, although the magnitude of the impact would be less under T-3.

T-3 HYDROLOGY

The proposed Tien Center site would entail some increase in impervious surface, primarily due to Phase 2. The provisions of the 2020 LRDP and the Best Practices described in Chapter 4.7 would ensure hydrology and water quality impacts remain less than significant, as they are for the proposed project. However, the elimination of Phase 2 in T-3 would reduce the amount of site disturbance and impervious surfaces.

T-3 OTHER ANTICIPATED EFFECTS

The potential impacts of Alternative T-3 in other categories are not expected to differ appreciably from the impacts of the proposed project.

T-3 RELATIONSHIP TO PROJECT OBJECTIVES

Under Alternative T-3, the proposed occupants of Phase 2 would either remain in their current inadequate and scattered locations, or be rehoused in other existing campus space. In either case, however, the synergies in research and scholarship made possible by a single consolidated facility in the proposed project would not be achievable in T-3. Alternative T-3 would not, therefore, meet the fundamental project Objective to:

- **Create a central location for research and scholarship by students and faculty in all fields of the arts, humanities, social sciences and professional disciplines with a focus on East Asia.**

5.2.4 TIEN CENTER ENVIRONMENTALLY SUPERIOR ALTERNATIVE

An EIR is required to identify the environmentally superior alternative from among the range of reasonable and feasible alternatives evaluated. As a rule this would be the alternative that results in fewer or no significant and unavoidable impacts.

The Tien Center project would not, in itself, cause any significant and unavoidable impacts. Either T-2 or T-3 would, on balance, be superior to the proposed project with respect to reducing the magnitude of its environmental effects, with T-3 being slightly preferable since it would entail less new construction than T-2. However, those effects are not significant, and neither T-2 nor T-3 would fully meet the Objectives for the project.

For this reason, despite the potential modest environmental advantages of Alternatives T-2 and T-3 in reducing the magnitude of impacts determined to be less than significant, the Tien Center as proposed represents the best balance of institutional objectives and environmental stewardship.

5.2.5 REFERENCES

¹ Helfand, Harvey, *East Asian Library Siting Analysis*, UC Berkeley, Office of Physical Resources, January 22, 1991, page 12.

6 CEQA-REQUIRED ASSESSMENT CONCLUSIONS

As required by Section 15126 of the CEQA Guidelines, this chapter provides an overview of the impacts of the proposed 2020 LRDP based on the technical analyses presented in this EIR. The topics covered in this chapter include unavoidable significant effects; expected significant irreversible changes; and growth inducement. A more detailed analysis of the effects the 2020 LRDP would have on the environment is provided in Chapter 4: Environmental Evaluation. Project alternatives are discussed in Chapter 5.

6.1 UNAVOIDABLE SIGNIFICANT IMPACTS

Section 15126.2(b) of the CEQA Guidelines requires that an EIR describe any significant impacts that cannot be avoided, even with the implementation of feasible mitigation measures. This section lists the impacts for the 2020 LRDP that were found to be significant and unavoidable. No significant and unavoidable impacts were found for the Tien Center.

2020 LRDP

Development under the 2020 LRDP would result in the following significant and unavoidable impacts:

AIR

- Operational emissions from implementation of the 2020 LRDP may hinder the attainment of the Clean Air Plan.
- With the incorporation of diesel particulate matter into air risk analyses, the 2020 LRDP would contribute to a cumulatively considerable increase in toxic air contaminants from stationary and area sources.

CULTURAL RESOURCES

- Under certain circumstances warranted by public benefits in furtherance of the university's educational mission, projects developed under the 2020 LRDP could cause substantial adverse changes in the significance of historical resources.
- Under certain circumstances warranted by public benefits in furtherance of the university's educational mission, projects developed under the 2020 LRDP could cause substantial adverse changes in the significance of archaeological resources.

NOISE

- University housing developed under the 2020 LRDP could expose residents to excessive noise levels.
- Noise resulting from demolition and construction activities necessary for implementation of the 2020 LRDP would, in some instances, cause a substantial temporary or periodic increase in noise levels, in excess of local standards prescribed in Section 13.40.070 of the City of Berkeley noise ordinance, at affected residential or commercial property lines.

TRAFFIC

- The 2020 LRDP would increase vehicle trips and traffic congestion at seven intersections to unacceptable levels, and exacerbate unacceptable conditions at an eighth. Implementation of proposed mitigations to reduce these impacts is outside the jurisdiction of The Regents.

- The 2020 LRDP would increase vehicle trips and traffic congestion at two intersections, leading to substantial degradation in level of service that cannot be mitigated.
 - The signalized **University Avenue / Sixth Street** intersection, which is projected to operate at LOS F during both AM and PM peak hours regardless of the project. The project would increase the intersection volume by 7 percent during the AM peak hour, and 6 percent during the PM peak hour.
 - The signalized **University Avenue / San Pablo Avenue** intersection, which is projected to operate at LOS F during both AM and PM peak hours regardless of the project. The project would increase the intersection volume by 8 percent during the AM peak hour, and 6 percent during the PM peak hour.
- Development under the 2020 LRDP would cause the following Alameda County CMP Designated System roadways to exceed the level of service standard established by the CMA:
 - **Ashby Avenue eastbound**, between College Avenue and Domingo Street
 - **Ashby Avenue westbound**, between Adeline Street and San Pablo Avenue
 - **University Avenue westbound**, between MLK Jr. Way and I-80
 - **San Pablo Avenue northbound**, between Gilman Street and Marin Avenue
 - **Shattuck Avenue southbound**, between Dwight Way and Adeline Street.
 - **Shattuck Avenue southbound**, between Hearst Avenue and University Avenue (MTS only)
 - **Dwight Way westbound**, between MLK Jr. Way and Sixth Street (MTS only)

6.2 SIGNIFICANT IRREVERSIBLE IMPACTS

Section 15126.2(c) of the CEQA Guidelines requires a discussion of the extent to which a proposed project will commit nonrenewable resources to uses that future generations will probably be unable to reverse. An example of such an irreversible commitment is the construction of highway improvements that will provide public access to previously inaccessible areas.

A project would generally result in a significant irreversible impact if:

- Primary and secondary impacts would commit future generations to similar uses.
- The project would involve a large commitment of nonrenewable resources.
- The project would involve uses in which irreversible damage could result from any potential environmental accidents associated with the project.
- The proposed consumption of resources is not justified.

Under the 2020 LRDP, the university would continue to commit university land and buildings to university-related uses, thereby precluding any other uses for at least the lifespan of the 2020 LRDP. Although the 2020 LRDP would continue and reinforce this commitment, through capital investment in renewing and expanding university facilities, it does not represent a change from existing conditions.

Project implementation and operation will require the consumption of resources such as water, natural gas, and electricity. However, the amount and rate of consumption of these resources would not be wasteful due to the university's current policies ensuring responsible resource conservation and recycling, and to 2020 LRDP objectives, policies

and mitigation measures to minimize resource consumption. Nonetheless, construction under the 2020 LRDP would require the irretrievable commitment of nonrenewable energy resources such as construction materials and fuels for construction vehicles and equipment.

As described in Chapter 4.6, UC Berkeley uses, stores and transports hazardous materials. The university complies with all applicable state and federal regulations addressing hazardous materials and has an extensive campus program in place for the safe use, handling and disposal of these materials. UC Berkeley's safety record indicates that current practices with respect to hazardous materials handling are adequate and thus the potential for the 2020 LRDP to cause irreversible environmental damage from a hazardous materials accident is less than significant.

Implementation of the 2020 LRDP would not result in the wasteful or unjustifiable use of energy or other resources. UC Berkeley has implemented various water conservation and energy efficiency measures and best management practices. UC Berkeley has also implemented various reuse and recycling measures, such as a materials exchange program. Furthermore, the 2020 LRDP includes several policies that would improve current practices. For example, the 2020 LRDP includes policies to develop new buildings to a LEED 2.1 equivalent standard; to design new buildings to outperform the required provisions of Title 24 by 20 percent; and to design future projects to minimize energy and water consumption and wastewater production.

6.3 GROWTH INDUCEMENT

Section 15126.2(d) of the CEQA Guidelines requires that an EIR consider the ways in which a proposed project could foster economic or population growth, or the construction of additional housing, either directly or indirectly, in the surrounding environment. Typical growth inducements might be the extension of urban services or transportation infrastructure to a previously unserved or underserved area, or the removal of major obstacles to development.

The 2020 LRDP would induce population growth, as described in Chapter 4.10. However, the increment due to the 2020 LRDP is not significant in relation to projected regional growth. Moreover, the growth under the 2020 LRDP would occur in an already urbanized area and would not itself result in the need for new roads or utilities, which could in turn induce further growth.

The project would not require the urbanization of land in remote locations and would not encourage premature or unplanned growth. On the contrary, the 2020 LRDP would accommodate future growth in campus programs by more intensive development on land on and adjacent to the Campus Park, and would provide substantial amounts of new student housing within convenient walking or transit distance of the Campus Park.

The Tien Center would not result in any growth-inducing impacts because it would be constructed on campus and would primarily house employees who already work elsewhere on campus; only five new employees are expected as a result of the project. Space vacated by employees moving to the Tien Center would be reassigned to existing staff or students.

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8 GLOSSARY AND LIST OF ABBREVIATIONS

Ambient Noise Level

The composite of noise from all sources near and far. The normal or existing level of environmental noise at a given location.

Assignable Square Feet (ASF)

Assignable square feet is a physical planning term referring to the amount of floor space in a building that is usable by programs. ASF does not include hallways, bathrooms, or floor space used by heating, ventilating, and air conditioning equipment.

Attainment Area

A geographic area in which levels of a criteria air pollutant meet the health-based primary standard (national ambient air quality standard, or NAAQS) for the pollutant. An area may have an acceptable level for one criteria air pollutant, but may have unacceptable levels for others. Thus, an area could be both attainment and nonattainment at the same time. Attainment areas are defined using federal pollutant limits set by EPA.

A-Weighted Sound Level, dBA

The sound pressure level in decibels as measured on a sound level meter using the A-weighting filter network. The A-weighting filter de-emphasizes the very low and very high frequency components of the sound in a manner similar to the frequency response of the human ear and correlates well with subjective reactions to noise. All sound levels in this report are A-weighted, unless reported otherwise.

Baseline Emissions

The emissions that would occur without policy intervention (in a business-as-usual scenario). Baseline estimates are needed to determine the effectiveness of emissions reduction programs (often called mitigation strategies).

Bicycle Lane (Class II facility)

A corridor expressly reserved for bicycles, existing on a street or roadway in addition to any lanes for use by motorized vehicles.

Bicycle Path (Class I facility)

A paved route not on a street or roadway and expressly reserved for bicycles traversing an otherwise unpaved area. Bicycle paths may parallel roads but typically are separated from them by landscaping.

Bicycle Route (Class III facility)

A facility shared with motorists and identified only by signs, a bicycle route has no pavement markings or lane stripes.

Biohazardous Material

A biohazardous material is a biological agent that poses a hazard to humans or the environment. Biohazardous materials include infectious agents, microbiological specimens, and cultures of microorganisms capable of causing disease; microbiological specimens or cultures included in National Institutes for Health (NIH)/Centers for Disease Control and Prevention (CDC) Risk Group 2, 3, or 4; recombinant organisms containing deoxyribonucleic acid (DNA) from infectious agents; human blood, body fluids, or unfixed tissue; laboratory waste contaminated with biohazards; animal parts, tissues or flu-

ids suspected of containing an agent infectious to humans, whether deliberately introduced or naturally occurring; and discarded materials suspected of contamination with infectious agents.

Biohazardous Waste

Biohazardous waste is any liquid and solid waste generated through the handling of specimens from humans or animals that may contain infectious agents. Cultures of infectious agents, human anatomical remains, and animal carcasses that may be infectious are also considered biohazardous waste.

California Environmental Quality Act (CEQA)

A State law requiring State and local agencies to regulate activities with consideration for environmental protection. If a proposed activity has the potential for a significant adverse environmental impact, an Environmental Impact Report (EIR) must be prepared and certified as to its adequacy before taking action on the proposed project.

Carbon Dioxide (CO₂)

Colorless, odorless, non-poisonous gas that is a normal part of the ambient air. Carbon dioxide is a product of fossil fuel combustion. Although carbon dioxide does not directly impair human health, it is a greenhouse gas that traps terrestrial (i.e., infrared) radiation and contributes to the potential for global warming.

Carbon Monoxide

A colorless, odorless, highly poisonous gas produced by automobiles and other machines with internal combustion engines that imperfectly burn fossil fuels such as oil and gas.

Clean Air Act (CAA)

The principle national legislation passed by Congress for air quality management. Originally passed in 1963, it was greatly changed and strengthened in 1970 and 1977. In 1990, the Clean Air Act Amendments (CAAA) introduced significant changes in the federal approach to air quality management.

Congestion Management Plan (CMP)

A mechanism employing growth management techniques, including traffic level of service requirements, standards for public transit, trip reduction programs involving transportation systems management and jobs/housing balance strategies, and capital improvement programming, for the purpose of controlling and/or reducing the cumulative regional traffic impacts of development. AB 1791, effective August 1, 1990, requires all cities, and counties that include urbanized areas, to adopt by December 1, 1991, and annually update a Congestion Management Plan.

Criteria Air Pollutants

A group of very common air pollutants regulated by EPA on the basis of criteria (information on health and/or environmental effects of pollution). Criteria air pollutants are widely distributed all over the country.

Day/Night Noise Level, Ldn

The average A-weighted noise level during a 24-hour day, obtained after addition of 10 decibels to levels measured in the night between 10:00 pm and 7:00 am.

dBA

The "A weighted" scale for measuring sound in decibels; weighs or reduces the effects of low and high frequencies in order to simulate human hearing. Every increase of 10 dBA doubles the perceived loudness though the noise is actually ten times more intense.

Decibel, dB

A unit describing the amplitude of sound, equal to 20 times the logarithm to the base 10 of the ratio of the pressure of the sound measured to the reference pressure, which is 20 micropascals (20 micronewtons per square meter).

Drainage

(1) Surface water runoff; and (2) the removal of surface water or groundwater from land by drains, grading, or other means that include runoff controls to minimize erosion and sedimentation during and after construction or development, the means for preserving the water supply, and the prevention or alleviation of flooding.

Earthquake Fault Zone

The State of California, Alquist-Priolo Earthquake Fault Zoning Act identifies sites within 1,000 foot wide zone with the fault at the center as Earthquake Fault Zones. The Alquist-Priolo Act requires that these sites undergo specialized geologic investigations prior to approval of certain new development. State law requires that these zones be incorporated into local general plans.

Ecological Study Area

Ecological Study Areas (ESAs) are areas at UC Berkeley that are generally free of development and landscape management programs, and where existing ecosystems are allowed to function relatively undisturbed. The ESAs provide valuable teaching, research and public service benefits, including hiking within walking distance of the Campus Park.

Emission

Discharges into the atmosphere from such sources as smokestacks, residential chimneys, motor vehicles, locomotives, and aircraft.

Endangered Species

A species of animal or plant is considered to be endangered when its prospects for survival and reproduction are in immediate jeopardy from one or more causes.

Environmental Impact Report (EIR)

A report required by the California Environmental Quality Act and which assesses all the environmental characteristics of an area and determines what effects or impacts will result if the area is altered or disturbed by a proposed action. (See "California Environmental Quality Act.")

Equivalent Noise Level, Leq

The average A-weighted noise level during the measurement period.

Erosion

(1) The loosening and transportation of rock and soil debris by wind, rain, or running water. (2) The gradual wearing away of the upper layers of earth.

Expansive Soils

Soils that swell when they absorb water and shrink as they dry.

Fault

A fracture in the earth's crust forming a boundary between rock masses that have shifted.

Flood Insurance Rate Map (FIRM)

For each community, the official map on which the Federal Insurance Administration has delineated areas of special flood hazard and the risk premium zones applicable to that community.

Flood, 100-Year

The magnitude of a flood expected to occur on the average every 100 years, based on historical data. The 100-year flood has a 1/100, or one percent, chance of occurring in any given year.

Frequency, Hz

The number of complete pressure fluctuations per second above and below atmospheric pressure.

Geological

Pertaining to rock or solid matter.

Geomorphic Province

A region with distinctive landforms, rock types, and geologic structure.

Grade

The average level of the finished surface of the ground adjacent to the exterior walls of the building.

Groundwater

Water under the earth's surface, often confined to aquifers capable of supplying wells and springs.

Habitat

The particular living place which provides an environment suitable for survival of an organism, a species or a community.

Hazardous Waste

Any refuse or discarded material or combinations of refuse or discarded materials in solid, semisolid, liquid, or gaseous form which cannot be handled by routine waste man-

agement techniques because they pose a substantial present or potential hazard to human health or other living organisms because of their chemical, biological, or physical properties.

Household

All those persons related or unrelated who occupy a single housing unit.

Infectious Agent

An infectious agent is any microorganism, bacteria, mold, parasite, or virus that normally causes or significantly contributes to increased human mortality (California Health and Safety Code Section 117675). Infectious agents have also been defined as any material that contains an organism capable of being communicated by invading and multiplying in body tissues (40 CFR 259.10).

Infrastructure

Public services and facilities, such as sewage disposal systems, water supply systems, other utility systems, and roads.

Jobs/Housing Balance

The availability of affordable housing for employees.

Jobs/Housing Ratio

The jobs/housing balance divides the number of jobs in an area by the number of employed residents. A ratio of 1.0 indicates a balance. A ratio greater than 1.0 indicates a net in-commute; less than 1.0 indicates a net out-commute.

L01, L10, L50, L90

The A-weighted noise levels that are exceeded 1%, 10%, 50%, and 90% of the time during the measurement period.

LEED

The LEED (Leadership in Energy and Environmental Design) Green Building Rating System™ is a voluntary, consensus-based national standard for developing high-performance, sustainable buildings.

Level of Service (LOS) Standard, Traffic

A scale that measures the amount of traffic that a roadway or intersection can accommodate, based on such factors as maneuverability, driver dissatisfaction, and delay.

LOS A

Indicates a relatively free flow of traffic, with little or no limitation on vehicle movement or speed.

LOS B

A steady flow of traffic, with only slight delays in vehicle movement and speed

LOS C

A reasonably steady, high-volume flow of traffic, with some limitations on vehicle movement and speed, and occasional backups on critical approaches.

LOS D

Designates where the level of traffic nears an unstable flow. Intersections still function but short queues develop and cars may have to wait through one cycle during short peaks.

LOS E

Traffic characterized by slow movement and frequent (although momentary) stoppages. This type of congestion is considered severe, but is not uncommon at peak hours, with frequent stopping, longstanding queues, and blocked intersections.

LOS F

Represents unsatisfactory stop-and-go traffic characterized by "traffic jams" and stoppages of long duration. Vehicles at signalized intersections usually have to wait through one or more signal changes, and "upstream" intersections may be blocked by the long queues.

Liquefaction

The transformation of loose water saturated granular materials (such as sand or silt) from a solid into a liquid state. A type of ground failure that can occur during an earthquake.

Lmax, Lmin

The maximum and minimum A-weighted noise level during the measurement period.

Maximum Credible Earthquake

The maximum credible earthquake is defined as the earthquake which produces the greatest levels of ground motion at the site as a result of the largest magnitude earthquake that could reasonably occur along the recognized faults or within a particular seismic source.

Medical Waste

Medical waste is a general term that includes both biohazardous and sharps waste (California Health and Safety Code Section 117690). Medical waste mixed with hazardous chemical waste is also referred to as *mixed waste*. Medical waste includes *pathology waste*, recognizable human anatomical parts and fixed human surgery specimens and tissues, and *chemotherapy waste*, waste such as gloves, towels, empty bags, and intravenous tubing that contains or is contaminated with chemotherapeutic agents.

Mercalli Intensity Scale

A subjective measure of the observed effects (human reactions, structural damage, geologic effects) of an earthquake. Expressed in Roman numerals from I to XII.

Mitigation

As defined in the CEQA Guidelines, "Mitigation" includes:

- Avoiding the impact altogether by not taking a certain action or parts of an action.
- Minimizing impacts by limiting the degree or magnitude of the action and its implementation.

- Rectifying the impact by repairing, rehabilitating, or restoring the impacted environment.
- Reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action.
- Compensating for the impact by replacing or providing substitute resources or environments.

Mobile Sources

Moving objects that release pollution; mobile sources include cars, trucks, buses, planes, trains, motorcycles and gasoline-powered lawn mowers. Mobile sources are divided into two groups: road vehicles, which includes cars, trucks and buses, and non-road vehicles, which includes trains, planes and lawn mowers.

Moment Magnitude (M_w)

Moment magnitude is based on the seismic moment at the source, or hypocenter, of the earthquake. The moment magnitude scale is a way of rating the seismic moment of an earthquake with a simple, logarithmic numerical scale similar to the original Richter magnitude scale. Because it does not "saturate" the way local magnitude does, it is used for large earthquakes -- those that would have a local magnitude of about 6 or larger.

National Pollutant Discharge Elimination System (NPDES)

The national program for controlling discharges of pollutants from point sources (e.g., municipal sewage treatment plants, industrial facilities) into the waters of the United States.

National Register of Historic Places

The listing maintained by the US National Park Service of sites and structures that have been designated as historically significant.

Nitrogen Oxide(s)

A reddish brown gas that is a byproduct of combustion and ozone formation processes. Often referred to as NO_x, this gas gives smog its "dirty air" appearance.

Noise

Any sound that is undesirable because it interferes with speech and hearing, or is intense enough to damage hearing, or is otherwise annoying. Noise, simply, is "unwanted sound."

Noise Attenuation

Reduction of the level of a noise source using a substance, material, or surface, such as earth berms and/or solid concrete walls.

Noise Contour

A line connecting points of equal noise level as measured on the same scale. Noise levels greater than the 60 Ldn contour (measured in dBA) require noise attenuation in residential development.

Nonattainment Area

A geographic area in which the level of a criteria air pollutant is higher than the level allowed by the federal standards. A single geographic area may have acceptable levels of one criteria air pollutant but unacceptable levels of one or more other criteria air pollutants; thus, an area can be both attainment and nonattainment at the same time. It has been estimated that 60% of Americans live in nonattainment areas.

Non-Ionizing Radiation

Non-ionizing radiation (NIR) is radiative energy that is not created by radioactive materials and does not impart ionizing energy in a biological medium such as the body. Many devices throughout the modern world either directly or indirectly act as sources of non-ionizing radiation. Many sources of NIR are present on the UC Berkeley campus in research applications or in ancillary equipment. These sources include lasers, large magnets, microwave generators, and radio-frequency radiation. In general, NIR tends to be less hazardous to humans than ionizing radiation. However, depending on the wavelength/frequency and the irradiance (or power density) value, NIR sources may present a human health hazard.

Open Space

Land and water areas retained for use as active or passive recreation areas or for resource protection in an essentially undeveloped state.

Parking Ratio

The number of parking spaces provided per 1,000 square of floor area, e.g., 2:1 or “two per thousand.”

Particulate Matter (PM)

Solid particles or liquid droplets suspended or carried in the air (e.g., soot, dust, fumes, mist).

Particulates Particulate Matter (PM-10)

A criteria air pollutant. Particulate matter includes dust, soot and other tiny bits of solid materials that are released into and move around in the air. Particulates are produced by many sources, including burning of diesel fuels by trucks and buses, incineration of garbage, mixing and application of fertilizers and pesticides, road construction, industrial processes such as steel making, mining operations, agricultural burning (field and slash burning), and operation of fireplaces and woodstoves. Particulate pollution can cause eye, nose and throat irritation and other health problems.

Pollution, Non Point

Sources for pollution that are less definable and usually cover broad areas of land, such as agricultural land with fertilizers that are carried from the land by runoff, or automobiles.

Pollution, Point

In reference to water quality, a discrete source from which pollution is generated before it enters receiving waters, such as a sewer outfall, a smokestack, or an industrial waste pipe.

Radioactive Materials

Radioactive materials are materials that give off radiant energy in the form of particles (alpha or beta radiation) or rays (gamma radiation) by the spontaneous disintegration of the nuclei of atoms.

Radioactive Waste

Radioactive waste is any waste that emits radiation in excess of normal background levels. Radioactive waste mixed with hazardous chemical waste is known as *mixed waste*. *Biological waste* contains both biohazardous and radioactive waste.

Remediation

The action or measures taken, or to be taken, to lessen, clean-up, remove, or mitigate the existence of hazardous materials existing on the property to such standards, specifications, or requirements as may be established or required by federal, state, or county statute, rule, or regulation.

Resources, Non-renewable

Refers to natural resources, such as fossil fuels and natural gas, which, once used, cannot be replaced and used again.

Richter Scale

A measure of the size or energy release of an earthquake at its source. The scale is logarithmic; the wave amplitude of each number on the scale is 10 times greater than that of the previous whole number.

Riparian Lands

Riparian lands are comprised of the vegetative and wildlife areas adjacent to perennial and intermittent streams. Riparian areas are delineated by the existence of plant species normally found near freshwater.

Runoff

That portion of rain or snow that does not percolate into the ground and is discharged into streams instead.

Sediments

Soil, sand, and minerals eroded from land by water or air. Sediments settle to the bottom of surface water.

Seiche

An earthquake generated wave in an enclosed body of water such as a lake, reservoir, or bay.

Seismic

Caused by or subject to earthquakes or earth vibrations.

Seismic Hazard Zone

The State of California, Seismic Hazards Mapping Act identifies areas within the state where landslides and liquefaction are most likely to occur. The Act requires special investigation of these sites before some types of buildings may be constructed. Property owners must disclose that property lies within such a zone at the time of sale.

Select Agents and Toxins

Select agents and toxins are agents and toxins listed by the Secretary of the U.S. Department of Health and Human Services as having the potential to pose a severe threat to public health and safety, in accordance with section 351A(a)(1) of the Public Health Service Act.

Sharp Waste

Sharp waste includes devices capable of cutting or piercing, such as hypodermic needles, razor blades, and broken glass (California Health and Safety Code Section 117755).

Slope

Land gradient described as the vertical rise divided by the horizontal run, and expressed in percent.

Solid Waste

Any unwanted or discarded material that is not a liquid or gas. Includes organic wastes, paper products, metals, glass, plastics, cloth, brick, rock, soil, leather, rubber, yard wastes, and wood, but does not include sewage and hazardous materials. Organic wastes and paper products comprise about 75 percent of typical urban solid waste.

State Implementation Plan (SIP)

A detailed description of the programs a state will use to carry out its responsibilities under the Clean Air Act. State implementation plans are collections of the regulations used by a state to reduce air pollution. The Clean Air Act requires that EPA approve each state implementation plan. Members of the public are given opportunities to participate in review and approval of state implementation plans.

Stationary Source

A place or object from which pollutants are released and which does not move around. Stationary sources include power plants, gas stations, incinerators, houses etc.

Surface Water

All water open to the atmosphere (e.g., rivers, lakes, reservoirs, streams, impoundments, seas, estuaries) and all springs, wells, or other collectors that are directly influenced by surface water.

Transgenic Materials

Transgenic materials include microorganisms, plants, and animals that have been genetically engineered or modified. Recombinant DNA techniques create new genetic combinations by changing, adding, or subtracting DNA genes, but this methodology does not necessarily mean that new organisms are created.

Transportation Demand Management (TDM)

The implementation of programs, plans or policies designed to encourage changes in individual travel behavior. TDM can include alternatives to the single occupant vehicle such as carpools, vanpools, bicycles, transit, reduction or elimination of the number of vehicle trips, or shifts in the time of vehicle commutes to other than the peak period.

Trip Generation

The dynamics that account for people making trips in automobiles or by means of public transportation. Trip generation is the basis for estimating the level of use for a transportation system and the impact of additional development or transportation facilities on an existing, local transportation system.

Tsunami

A large ocean wave generated by an earthquake in or near the ocean.

Uniform Building Code (UBC)

A national, standard building code that sets forth minimum standards for construction.

Unique Archaeological Resource

California Environmental Quality Act (CEQA), Section 21083.2(g) defines “unique archaeological resources” as “any archaeological artifact, object, or site about which it can be clearly demonstrated that it contains information needed to answer important scientific research questions and that there is a demonstrable public interest in that information, it has a special and particular quality such as being the oldest of its type or the best available example of its type or it is directly associated with a scientifically recognized prehistoric or historic event.”

Unique Paleontological Resource

California Environmental Quality Act (CEQA) does not define a “unique Paleontological Resource” however, the California Public Resource Code section 5097.2. discusses paleontological sites in the following terms, “lands [which] may contain any historic or prehistoric ruins, burial grounds, archaeological or vertebrate paleontological sites, including fossilized footprints, inscriptions made by human agency, rock art, or any other archaeological, paleontological or historical feature.”

View Corridor

The line of sight identified as to height, width, and distance of an observer looking toward an object of significance to the community (e.g., ridgeline, river, historic building, etc.); the route that directs the viewers attention.

Viewshed

The area within view from a defined observation point.

Wastewater

The spent or used water from individual homes, a community, a farm, or an industry that often contains dissolved or suspended matter.

Wetlands

Habitats where the influence of surface or groundwater has resulted in development of plant or animal communities adapted to aquatic or intermittently wet conditions. Wetlands include tidal flats, shallow subtidal areas, swamps, marshes, wet meadows, bogs, and similar areas.

Zoning

The division of a city or county by legislative regulations into areas, or zones, which

specify allowable uses for real property and size restrictions for buildings within these areas; a program that implements policies of the General Plan.

List of Abbreviations

µg/m ³	micrograms per cubic meter
AAALAC	Association for Assessment and Accreditation of Laboratory Animal Care International
AB	Assembly Bill
ABAG	Association of Bay Area Governments
ACGIH	American Conference of Governmental Industrial Hygienists
ACUC	(UC Berkeley) Animal Care and Use Committee
ANSI	American National Standards Institute
APHIS	Animal and Plant Health Inspection Service (of USDA)
AST	aboveground storage tank
BAAQMD	Bay Area Air Quality Management District
BEIR V	Biological Effects of Ionizing Radiation (1990 report from National Academy of Sciences)
BL	Biosafety Level
Bq	Becquerel
BTMP	(City of) Berkeley Toxic Management Program
BUA	Biohazard Use Authorization
CA FID	California Facility Inventory Database
CA FID UST	Facility Inventory Database (California Environmental Protection Agency)
Cal/OSHA	California Occupational Safety and Health Administration
CalARP	California Accidental Release Prevention (Program)
CAP	Clean Air Plan
CARB	California Air Resources Board
CARSA	Committee on Animal Research Space Assignment
CCR	California Code of Regulations
CDC	Centers for Disease Control and Prevention
CEQA	California Environmental Quality Act
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act (a.k.a. Superfund)
CFR	Code of Federal Regulations
CHEX	Chemical Exchange Program
CHP	Chemical Hygiene Plan
Ci	Curie
CISIS	(UC Berkeley) Chemical Inventory and Safety Information System
CO	carbon monoxide
CUPA	Certified Unified Program Agency
DHS	(California) Department of Health Services
DNA	deoxyribonucleic acid
DTSC	(California) Department of Toxic Substances Control
EBMUD	East Bay Municipal Utility District
EH&S	(UC Berkeley) Office of Environment, Health and Safety
EIR	Environmental Impact Report

EPA	(United States) Environmental Protection Agency
EPCRA	Emergency Planning and Community Right-to-Know Act
ERT	Emergency Response Team
FCC OET	Federal Communications Commission Office of Engineering and Technology
FDA	Food and Drug Administration
Fed/OSHA	Federal Occupational Safety and Health Administration
G	Gauss (magnetic unit)
GSF	gross square feet
HAPs	hazardous air pollutants
HAZNET	Hazardous Waste Information System
HAZWOPER	Hazardous Waste Operations and Emergency Response (OSHA program)
HEPA	high-efficiency particulate air
HIST UST	Hazardous Substance Storage Container Database
HIST UST	Historical UST Registered Database
HIV	Human Immunodeficiency Virus
HMMP	Hazardous Materials Management Plan
IACUC	Institutional Animal Care Use and Committees
IEEE	Institute of Electrical and Electronics Engineers
kW	kilowatts
lb/day	pounds per day
LD 50/30	lethal radiation dose within 30 days for 50 percent of exposed population (with no medical treatment)
LOD	limits of detection
LOS	Level of Service
LRDP	Long Range Development Plan
LUR	Laser Use Registration
LUST	Leaking Underground Storage Tank Information System (State Water Resources Control Board)
MACT	Maximum Achievable Control Technology
MEI	maximally exposed individual
mRad/hr	milliRad per hour
mRem/yr	milliRem per year
MSDS	material safety data sheet
NCI	National Cancer Institute
NESHAP	National Emission Standards for Hazardous Air Pollutants
NIH	National Institutes of Health
NIR	non-ionizing radiation
NIRSC	Non-Ionizing Radiation Safety Committee
NO ₂	nitrogen dioxide
NO _x	nitrogen oxides
NRC	U.S. Nuclear Regulatory Commission
O ₃	ozone
OEHHA	Office of Environmental Health Hazard Assessment
OES	(California) Office of Emergency Services
OLAC	Office of Laboratory Animal Care
ORS	(UC Berkeley) Office of Radiation Safety
OSHA	Occupational Safety and Health Administration

PHS	(U.S.) Public Health Service
PM ₁₀	particulate matter less than 10 micrometers in aerodynamic diameter
PM _{2.5}	particulate matter less than 2.5 micrometers in aerodynamic diameter
PP-CS	Physical Plant–Campus Services
ppm	parts per million
QF	quality factor
Rad	Roentgen absorbed dose (a measure of radiation energy absorbed per gram of medium)
RCRA	Resource Conservation and Recovery Act
REL	reference exposure level
Rem	Roentgen Equivalent Man (a measure of biological harm done by radiation)
RfD	reference dose
RMPP	(California) Risk Management and Prevention Program
ROG _s	reactive organic gases
RUA	Radiation Use Authorization
SARA	Superfund Amendments and Reauthorization Act
SB	Senate Bill
SIP	State Implementation Plan
SO ₂	sulfur dioxide
SPCC	Spill Prevention Control and Countermeasure
TACs	toxic air contaminants
TCMs	transportation control measures
TQ	threshold quantity
UC	University of California
URF	unit risk factor
USDA	U.S. Department of Agriculture
UST	underground storage tank