Computational Research and Theory Facility

Draft Environmental Impact Report

SCH # 2007072106

Prepared for:

University of California
Lawrence Berkeley National Laboratory

Prepared by:

Impact Sciences, Inc.
2101 Webster Street, Suite 1825
Oakland, California 94612
(510) 267-0494

NOVEMBER 2007

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1.0 INTRODUCTION

This Environmental Impact Report (EIR) has been prepared to provide an assessment of the potentially significant environmental effects of the proposed Computational Research and Theory Facility Project (hereinafter termed CRT or proposed project). As required by California Environmental Quality Act (CEQA), this Draft EIR: (1) assesses the potentially significant environmental effects of the proposed project, including cumulative impacts of the proposed project in conjunction with other development; (2) identifies feasible means of avoiding or substantially lessening significant adverse impacts; and (3) evaluates a range of reasonable alternatives to the proposed project, including the No Project Alternative. The University of California (the University) is the "lead agency" for the project evaluated in this Draft EIR. The Board of Regents of the University of California (The Regents) has the principal responsibility for approving this project.

1.1 PURPOSE OF THIS EIR

The Berkeley Lab has commissioned this EIR on the CRT project for the following purposes:

- To inform the general public, the local community, and responsible, trustee, and other public agencies of the nature of the proposed project, its potentially significant environmental effects, feasible measures to mitigate those effects, and its reasonable and feasible alternatives;
- To enable the University to consider the environmental consequences of approving the CRT project;
- For consideration by responsible agencies in issuing permits and approvals for the proposed project; and
- To satisfy CEQA requirements.

As described in CEQA and the CEQA Guidelines, public agencies are charged with the duty to avoid or substantially lessen significant environmental effects, where feasible. In discharging this duty, a public agency has an obligation to balance the project's significant effects on the environment with its benefits, including economic, social, technological, legal, and other benefits. This EIR is an informational document, the purpose of which is to identify the potentially significant effects of the proposed project on the environment and to indicate the manner in which those significant effects can be avoided or significantly lessened; to identify any significant and unavoidable adverse impacts that cannot be mitigated; and to identify reasonable and feasible alternatives to the proposed project that would eliminate significant adverse environmental effects or reduce the impacts to a less than significant level.

The lead agency is required to consider the information in the EIR, along with any other relevant information, in making its decisions on the proposed project. Although the EIR does not determine the

ultimate decision that will be made regarding implementation of the project, CEQA requires the University to consider the information in the EIR and make findings regarding each significant effect identified in the EIR. The Regents must certify the Final EIR prior to approving the proposed project. Other agencies may also use this EIR in their review and approval processes.

1.2 SUMMARY OF THE PROPOSED PROJECT

Lawrence Berkeley National Laboratory (LBNL) proposes to construct and operate the CRT Facility Project that would be located in the western portion of LBNL in Berkeley, Alameda County, California. The proposed project includes an approximately 140,000-gross-square-foot building and associated infrastructure. The proposed facility would provide new advanced computational equipment and office space to support LBNL and UC Berkeley's research and academic programs and the needs of computer scientists, mathematicians, computer scientists, and theoreticians who are currently engaged in high performance computing and high performance production computing and computational research.

1.3 RELATIONSHIP BETWEEN LBNL, UNIVERSITY OF CALIFORNIA, AND THE U.S. DEPARTMENT OF ENERGY

LBNL is a federal facility managed and operated by the University of California under a U.S. Department of Energy (DOE)-UC contract. The research, service, and training work conducted at LBNL is within the University's mission and the land is owned by The Regents of the University of California. The federal government leases land at the Berkeley Lab from The Regents and constructs federally owned buildings on the leased lands. The University is a Management and Operating (M&O) contractor of LBNL as defined under the U.S. DOE Acquisition Regulations. As the Laboratory's M&O Contractor, the University is responsible for providing the intellectual leadership and management expertise necessary and appropriate to manage, operate, and staff the Laboratory; accomplish the missions and activities assigned and funded by DOE to the Laboratory; administer the DOE-UC Prime Contract; and provide University oversight of the Laboratory's contract compliance and performance. The Prime Contract (Contract 31) provides the overall statement of work to be performed and the terms and conditions of its performance for the federal government. The contract calls for budget and program planning that is coupled to the Department of Energy and its plans and the federal budgeting process.

LBNL's programs advance four distinct goals for DOE and the nation:

- To perform leading multidisciplinary research in the computing sciences, physical sciences, energy sciences, biosciences, and general sciences in a manner that ensures employee and public safety and protection of the environment;
- To develop and operate unique national experimental facilities for qualified investigators;

- To educate and train future generations of scientists and engineers by promoting national science and education; and

- To transfer knowledge and technological innovations and to foster productive relationships among the LBNL research programs, universities, and industry in order to promote national economic competitiveness.

Classified research is not conducted at LBNL.

Because The Regents may re-acquire full responsibility for the lands should the federal government close LBNL, and for effective ongoing management, The Regents hold themselves accountable for the stewardship of LBNL within the State of California. The Regents require and approve the University-defined Long Range Development Plan (LRDP) and require that its approval be consistent with the University's policy that an LRDP undergo CEQA review and approval. Therefore, in 2004, under the direction of the University, LBNL commenced the preparation of an update to its LRDP. The Regents certified the 2006 LRDP EIR and adopted the 2006 LRDP in July 2007; it is now the governing land use plan for the Berkeley Lab's hill site.

1.4 ENVIRONMENTAL REVIEW PROCESS

LBNL has filed a Notice of Completion (NOC) with the Governor's Office of Planning and Research State Clearinghouse indicating that this Draft EIR has been completed and is available for review and comment by the public.[1]

This Draft EIR is available for review by the public and interested parties, agencies, and organizations for a review period of 45 days, as required by California law. In reviewing the Draft EIR, reviewers should focus on the document's adequacy in identifying and analyzing significant effects on the environment and ways in which the significant effects of the project might be avoided or mitigated. To ensure inclusion in the Final EIR and full consideration by the lead agency, comments on the Draft EIR must be received during the 45-day public review period at the following address:

Lawrence Berkeley National Laboratory
One Cyclotron Road, MS 69-201
Berkeley, California 94720
Contact: Jeff Philliber, Environmental Planning Group Coordinator
planning@lbl.gov

[1] LBNL has also prepared another EIR for the Helios Energy Research (Helios) Facility project. Both Helios EIR and this EIR will be circulated for agency and public review for a period of 45 days. Both the CRT and the Helios projects would be located at LBNL's hill site location and would be built over approximately the same period of time. This EIR considers the Helios project in the cumulative impact analysis of the CRT project (see Section 5.0, Cumulative Impacts).

Pursuant to state law (Public Resources Code Section 21091(d)(3)), the Berkeley Lab will accept e-mail comments in addition to mailed comments or oral comments made at the Draft EIR public hearing. Reviewers are encouraged to follow up on any e-mail comments with letters. A public hearing will be held during the 45-day review period to provide the public with an opportunity to comment on the Draft EIR. Following the close of the 45-day review period, responses to comments on the Draft EIR will be prepared and published as a separate document. The Draft EIR text and appendices, together with responses to comments and any text changes made to the original Draft EIR, will constitute the Final EIR.

The Regents, the decision-making body for the University, will review LBNL's CRT Facility Project Final EIR for adequacy and consider it for certification pursuant to the requirements of Section 15090 of the State CEQA Guidelines. If The Regents certify the Final EIR, then The Regents will consider the project separately for approval or denial. If The Regents choose to approve the project, findings on the feasibility of reducing or avoiding significant environmental effects will be made and, if necessary, a Statement of Overriding Considerations will be prepared. If The Regents approve the project, a Notice of Determination (NOD) will also be prepared and will be filed with the State Clearinghouse. The NOD will include a description of the project, the date of approval, an indication of whether the Findings were prepared and a Statement of Overriding Considerations was adopted, and the address where the Final EIR and record of project approval are available for review.

1.4.1 Type of EIR

This is a project EIR prepared pursuant to Section 15161 of the CEQA Guidelines. Because the proposed project is an element of the growth projected under the 2006 LRDP, relevant mitigation measures identified in the 2006 LRDP EIR and adopted by The Regents in conjunction with the approval of the 2006 LRDP have been included in and made part of the CRT project. These mitigation measures are listed in each resource subsection of Section 4.0. The analysis presented in Section 4.0 evaluates environmental impacts that would result from project implementation following the application of these mitigation measures. These mitigation measures that are included in the project would be monitored pursuant to the Mitigation Monitoring and Reporting Plan that will be adopted for the proposed project.

The 2006 LRDP EIR was certified by the Regents on July 19, 2007. Several individuals have since filed a lawsuit challenging the Regents certification of the EIR (Jones et al. v. Regents, Alameda County Superior Court Case No. RG07341224). That case is currently pending and, unless and until the court determines otherwise, the Regents certification of the EIR remains in effect.

1.4.2 Public and Agency Review

On July 26, 2007, a Notice of Preparation (NOP), including an Initial Study, was published for the Computation Research and Theory Facility Project EIR. The 30-day comment period ended on August 24, 2007. A copy of the NOP and the Initial Study is included in Appendix 1.0. All comments received on the NOP are available on file with LBNL.

An EIR scoping meeting was held at the North Berkeley Senior Center on August 8, 2007. This meeting served the purpose of informing the public and interested agencies of the proposed project, soliciting comments, and identifying areas of concern.

Copies of this EIR and the 2006 LRDP are available for review online at http://www.lbl.gov/Community/env-rev-docs.html or at the following locations:

- Berkeley Public Library, 2090 Kittredge Street, 2nd Floor Reference Desk, Berkeley, CA 94704
- Berkeley Laboratory Main Library, One Cyclotron Road, Building 50, Room 4034, Berkeley, CA 94720

1.4.3 Intended Uses of this EIR

This document serves two purposes. The Regents will use this EIR to evaluate the environmental implications of approving the CRT project for implementation. Secondly, this document may be used as a source of information by responsible agencies with permitting or approval authority over the project.

1.5 SCOPE OF THIS EIR

The Berkeley Lab completed a preliminary review of the project, as described in Section 15060 of the CEQA Guidelines, and determined that an environmental review was required. The Berkeley Lab prepared an Initial Study in July of 2007 and determined that an EIR was necessary. Based on the Initial Study and the comments received at the scoping meeting and in response to the NOP, it was determined that the EIR would evaluate the following environmental topics in further detail:

- Aesthetics;
- Air Quality;
- Biological Resources;
- Cultural Resources;
- Geology and Soils;
- Hazards and Hazardous Materials;
- Hydrology and Water Quality;
- Land Use and Planning;
- Noise;
- Population and Housing;
- Public Services and Recreation;
- Transportation and Traffic; and
- Utilities, Service Systems, and Energy.

1.6 REPORT ORGANIZATION

This Draft EIR is organized into the following sections:

Section 1.0, Introduction, provides an introduction and overview describing the purpose and scope of topics addressed in this EIR and the environmental review process.

Section 2.0, Executive Summary, summarizes environmental consequences that would result from the proposed project, provides a summary table that denotes anticipated significant environmental impacts, describes identified mitigation measures, and indicates the level of significance of impacts before and after mitigation.

Section 3.0, Project Description, describes the proposed project.

Section 4.0, Environmental Setting, Impacts, and Mitigation Measures, describes the environmental setting, including applicable plans and policies; provides an analysis of the potential environmental impacts of the proposed project; and identifies mitigation measures to reduce their significance.

Section 5.0, Cumulative Impacts, presents the cumulative environmental impacts of the proposed project, in conjunction with other approved, pending, or reasonably foreseeable near term and long term development in the project area.

Section 6.0, Alternatives, summarizes alternatives to the project and the comparative environmental consequences and benefits of each alternative. This section includes an analysis of the No Project Alternative, among others, as required by CEQA.

Section 7.0, Other CEQA Considerations, provides a discussion of the potential for growth inducement from the project and provides a brief description of the environmental effects that were found not to be significant and, therefore, not evaluated in further detail.

Section 8.0, Organizations and Persons Consulted, provides a list of organizations and individuals who were contacted in the preparation of the EIR.

Section 9.0, Report Preparation, provides a list of the individuals involved in the preparation of this EIR.

Section 10.0, Acronyms and Abbreviations, identifies and defines frequently used acronyms and abbreviations used in the EIR.

2.0 EXECUTIVE SUMMARY

2.1 PURPOSE

This Draft EIR evaluates the potential for significant environmental impacts from the construction and operation of the Computational Research and Theory (CRT) Facility project (CRT project) proposed by the Lawrence Berkeley National Laboratory (LBNL).[1] It is the intent of this Executive Summary to provide decision makers, responsible agencies, and the public with a clear, simple, and concise description of the proposed project and its potential significant environmental impacts. Section 15123 of the *California Environmental Quality Act (CEQA) Guidelines* requires that the summary identify each significant effect, recommended mitigation measure(s), and alternatives that would minimize or avoid potential significant impacts. The summary is also required to identify areas of controversy known to the lead agency, including issues raised by agencies and the public and issues to be resolved. These issues include the choice among alternatives and whether or how to mitigate significant effects. This section focuses on the major areas of importance in the environmental analysis for the proposed project and uses non-technical language to promote understanding.

2.2 PROJECT LOCATION

The approximately 2.25-acre CRT project site is located on the LBNL site. LBNL is located east of the main campus of the University of California (UC), Berkeley, within the cities of Berkeley and Oakland in Alameda County, and is located on approximately 200 acres that are owned by the University of California and leased to the U.S. Department of Energy (DOE). The project site is located near the western entrance to the LBNL property in the city of Berkeley and has frontage on Seaborg Road. The project site comprises sloped terrain and is vegetated with non-native grasses and eucalyptus, immature redwood, bay, and oak trees.

The CRT project site is flanked on three sides by Buildings 70 and 70A to the east, the Building 50 complex to the north, and Cyclotron Road and the Berkeley Lab's Blackberry Canyon entrance gate to the west. The LBNL 2006 Long Range Development Plan (LRDP) designates the site for Research and Academic uses.

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1 LBNL has also published another EIR for the Helios Energy Research (Helios) Facility project. Both the Helios EIR and this one are being circulated for agency and public review. Both the CRT and the Helios projects would be located at LBNL's hill site location and would be built over approximately the same period of time. The cumulative impacts of both projects are considered in this EIR.

The LBNL site itself is surrounded by a mix of land uses, including open space, institutional uses, and residential and neighborhood commercial areas. The University of California, Berkeley, including the Strawberry Canyon open space areas, lies west and south of the LBNL site. Residential neighborhoods and a small neighborhood commercial area in the city of Berkeley lie to the north and northwest, and regional open space, including the 2,000-acre Tilden Regional Park, lies to the northeast and east.

2.3 PROJECT DESCRIPTION

The CRT project includes development of a new building, access driveways and pedestrian access, and associated infrastructure to accommodate (1) the National Energy Research Scientific Computing (NERSC) Center, (2) the associated High Performance Computing (HPC) center, and (3) researchers and students from the Lab's Computational Research Division and the joint UC/Berkeley Lab Computational Science and Engineering program. The approximately 140,000-gross-square-foot (gsf), multi-story building would include both a supercomputer equipment floor and an office structure, with space for computing, offices, and conference rooms. The proposed building abuts a steep hillside, and the upper floor of the office structure would be accessible from the existing parking lot that connects the Building 50 and 70 complexes (see **Figure 3.0-3, CRT Conceptual Project Design**). The new advanced computational equipment and office space would support UC Berkeley's academic programs in computational science and engineering and the needs of computer scientists, mathematicians, and theoreticians who are currently engaged in high performance computing and high performance production computing and computational research.

2.4 PROJECT OBJECTIVES

Key objectives of the proposed project are to:

- Provide an integrated and appropriately designed facility that would allow for the continued operation and future advancement of the Berkeley Lab's NERSC High Performance Computing national users facility, Computational Research Division and joint Berkeley Lab/UC Berkeley Computational Science & Engineering programs;

- Provide adequate space, chilling capacity, and infrastructure to accommodate next-generation computing equipment and to allow for continual future upgrades to such equipment;

- Provide accessibility to a large, reliable, and economical electrical power source. The power source should be capable of serving both the immediate and potential future needs of Berkeley Lab's computing program;

- Provide researchers with convenient access to other Lab scientific facilities, programs, researchers, and services; locate the facility such that it fosters interaction and collaboration between the project and UC Berkeley programs; and
- Meet University of California policies on sustainability and achieve efficiencies in energy conservation, temperature control, operational and maintenance services, and transportation (i.e., near public transportation, and without provision of large amounts of parking).

2.5 TOPICS OF KNOWN CONCERN

To determine which environmental topics should be addressed in this EIR, LBNL prepared an Initial Study and circulated it along with a Notice of Preparation (NOP) in order to receive input from interested public agencies and private parties. Copies of the NOP and Initial Study are presented in **Appendix 1.0** of this EIR. Based on both the Initial Study and the NOP comments, this EIR addresses the following environmental topics in depth:

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

2.6 IMPACT SUMMARY

Pursuant to the findings of the Initial Study, this EIR assesses each potentially significant impact to the environment that could result from implementation of the proposed project. A detailed discussion regarding potential impacts is provided in **Section 4.0, Environmental Setting, Impacts, and Mitigation Measures**. In accordance with the *CEQA Guidelines*, a summary of the project's impacts is provided in **Table 2.0-1, Summary Table of Significant Impacts, Mitigation Measures, and Level of Significance after Mitigation**, presented at the end of this section. Also provided in **Table 2.0-1** are mitigation measures that are recommended to avoid or reduce significant project impacts. The table indicates whether or not implementation of the recommended mitigation measures would reduce the level of impact to a less than significant level.

2.7 ALTERNATIVES TO THE PROPOSED PROJECT

The alternatives evaluated in this EIR focus on avoiding or further reducing potentially significant project impacts associated with aesthetics, noise, and traffic and circulation as compared to the proposed project. Project alternatives include the following:

Alternative 1: No Project Alternative. CEQA requires that a "No Project" alternative be considered. "No Project" is generally considered to be equivalent to a "no development" alternative. With this alternative, the proposed project would not be implemented. However, the site is designated for development by the 2006 LRDP, and thus future development could be constructed at the project site. The existing LBNL facility in Oakland would continue to be utilized.

Alternative 2: Low Profile Design Alternative. This alternative would configure the supercomputer facilities (equipment floors) and office facilities components of the CRT facility as a single wide building mass approximately three stories high. The intent of this alternative is to reduce the perceived bulk and height of the proposed multi-story building. The supercomputer facilities would be constructed in roughly the same footprint designated for the proposed project. This building would consist of two machine floors with approximately 20,000 gsf for a mechanical basement space and approximately 32,000 gsf for the HPC equipment floor. The main office block (office facilities) would rise two to three stories above the computer level and would provide a variety of general office, computer configuration and support, software support, videoconferencing, meeting, and visualization laboratory spaces, similar to the proposed project.

The total square footage of the building would be approximately 113,000 gsf. The amount of office space would be reduced compared to the proposed project. In addition, the amount of common space would be reduced with this alternative since there would be no upper-level loggia or pedestrian connection with the Building 70 complex. Access, parking, circulation, and landscape features would be generally similar to those including in the proposed project.

Alternative 3: Alternate LBNL Location. This alternative would make use of other space within LBNL to develop the CRT facility project. Alternative 3 would place a multi-story building on the current Building 25 and 25A location, near the geographical center of the Berkeley Lab site. Buildings 25 and 25A and associated ancillary buildings would be demolished. Slope filling would be required as part of the site preparation. The building would consist of 32,000 gsf of computer space, with a high ceiling, and three additional floors to house office space, totaling up to 140,000 gsf. Electrical utilities and chillers would be located in a 24,000 gsf basement level; cooling towers would be placed on the roof. Electrical power would be extended from the Grizzly Peak substation.

Detailed description of these alternatives and their comparative merits are presented in **Section 6.0** of this EIR. **Table 6.0-1, Summary Comparison of CRT Project Alternatives,** presents a comparison of the environmental impacts of each alternative to those that are expected to result from the proposed project.

Based on the analysis presented in the EIR, Alternative 2, Low Profile Design, was selected as the Environmentally Superior Alternative (see **Section 6.0** of this EIR).

2.8 ISSUES TO BE RESOLVED/AREAS OF CONTROVERSY

This EIR addresses environmental issues associated with the proposed project that are known to the lead agency or were raised by other public agencies or interested parties during the EIR scoping process. Comment letters and the transcript of the scoping meeting are on file with LBNL. More comprehensive descriptions of issues raised during project scoping are presented in the appropriate environmental analysis section of this EIR. Following is a listing of issues raised in the scoping comments received:

- Past landslides in the project vicinity should be analyzed and likelihood of future landslides should be addressed. The EIR should address the potential for LBNL development to increase the likelihood of landslides (s*ee **Section 4.5, Geology and Soils**);*
- The probability of an earthquake on the Hayward fault should be discussed and analyzed (s*ee **Section 4.5, Geology and Soils**);*
- Aging roads, sewers, culverts and infrastructure to serve the hill site at buildout (s*ee **Section 4.13, Utilities, Service Systems and Energy** and **Section 4.12, Transportation and Traffic**);*
- Strawberry Canyon is alleged to have active faults evidenced by the location of epicenters of earthquakes on the Berkeley Lab site. A discussion of the project site's location in an Alquist-Priolo Earthquake Fault Zone should be included (s*ee **Section 4.5, Geology and Soils**);*
- The EIR should consider impacts to Cafeteria Creek and its implications to the watershed (s*ee **Section 4.7, Hydrology and Water Quality**);*
- The LBNL site is within an area of high fire danger and the project would require vegetation removal to reduce fire danger (s*ee **Section 4.6, Hazards and Hazardous Materials**);*
- The EIR should address emergency evacuation procedures for LBNL personnel (s*ee **Section 4.6, Hazards and Hazardous Materials**);*
- Contaminants from LBNL under upset conditions can enter surface and groundwater and can adversely affect Strawberry Creek and the Bay (s*ee **Section 4.7, Hydrology and Water Quality**);*
- The Berkeley Lab should evaluate the extent of Lennert Aquifer on the LBNL site. The EIR should include a discussion of the project's effect on hydraugers and groundwater in the project area (s*ee **Section 4.7, Hydrology and Water Quality**);*

- The Berkeley Lab should evaluate impact on a Strawberry Canyon cultural landscape (*see* ***Section 4.4, Cultural Resources****)*;

- The EIR should discuss carbon emissions associated with tree removal from the project site and Strawberry Canyon (*see* ***Section 4.2, Air Quality****);*

- The use of public transit should be emphasized as a way to conserve energy (*see* ***Section 4.12, Transportation and Traffic****);*

- The East Bay Municipal Utility District (EBMUD) indicated that it proposes to build a new water storage tank near the project site and that the cumulative impacts of that project should be considered in this EIR (*see* ***Section 5.0, Cumulative Impacts****);*

- The EIR should address the cumulative impact of past LBNL development combined with the current projects on human and ecological health and safety (*see* ***Section 5.0, Cumulative Impacts****);*

- Roadways in Strawberry Canyon are already overburdened with traffic and would be more hazardous with the addition of project traffic and large construction trucks from the various projects, especially during an emergency (*see* ***Section 4.12, Transportation and Traffic****);*

- Cumulative construction activities, including the Stadium project, and intensification of land uses in the project area could affect quality of life *(see* ***Section 5.0, Cumulative Impacts****);* and

- Alternative locations for the proposed project with fewer potential impacts related to aesthetics, biological resources, cultural resources, geology and soils, population and housing, and traffic should be considered. Sites specifically identified in the scoping comments include the UC Berkeley Richmond Field Station, the former Alameda Air Base, the former Mare Island Shipyard in the City of Vallejo, the former Hunters Point Shipyard in the City of San Francisco, and locations in Merced and Nevada *(see* ***Section 6.0, Alternatives****).*

The following areas of controversy were raised during the scoping process for this project that do not relate to the environmental impacts of the proposed project and therefore are not discussed in this EIR. According to various commenters:

- A one-year moratorium should be implemented on development at LBNL to analyze projected growth and clean up of previous hazardous material releases.

  For a discussion of clean-up of previous hazardous materials releases, please see the 2006 LRDP EIR, Section IV.F. The environmental effects of the projected growth at the Berkeley Lab are evaluated in ***Section 5.0****,* ***Cumulative Impacts****.*

- The EIR should address the global implications of supplying energy to facilities.

  Evaluation of global impacts is outside the scope of this EIR. The commenter's view is noted.

Table 2.0-1
Summary Table of Significant Impacts, Mitigation Measures, and Level of Significance after Mitigation

Environmental Topic and Impact	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance after Mitigation
4.1 Aesthetics			
Impact VIS-1		**Mitigation Measure VIS-1**	
Construction activities associated with the project would create temporary aesthetic nuisances for adjacent land uses.	Potentially Significant	LBNL and its contractors shall minimize the use of on-site storage and when necessary store building materials and equipment away from public view and shall keep activity within the project site and laydown areas.	Less than Significant
Impact VIS-2		**Mitigation Measure**	
The proposed project could alter views of the LBNL site but would not result in a substantial adverse effect to a scenic vista or substantially damage scenic resources.	Less than Significant	No project-level mitigation measure required.	Less than Significant
Impact VIS-3		**Mitigation Measure**	
The proposed project would alter the existing visual character of the Laboratory site but would not substantially degrade the existing visual character and quality of the site and its surroundings.	Less than Significant	No project-level mitigation measure required.	Less than Significant
Impact VIS-4		**Mitigation Measure**	
The proposed project would not create a new source of substantial light or glare that would adversely affect day or nighttime views in the area.	Less than Significant	No project-level mitigation measure required.	Less than Significant
4.2 Air Quality			
Impact AIR-1		**Mitigation Measure**	
Construction of the proposed project would generate short-term emissions of fugitive dust and criteria air pollutants that would not adversely affect local air quality in the vicinity of the construction site.	Less than Significant	No project-level mitigation measure required.	Less than Significant

Environmental Topic and Impact	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance after Mitigation
4.2 Air Quality (continued)			
Impact AIR-2		**Mitigation Measure**	
The proposed project would generate long-term operational emissions of criteria pollutants from increases in traffic and stationary and area sources that would not adversely affect air quality.	Less than Significant	No project-level mitigation measure required.	Less than Significant
Impact AIR-3		**Mitigation Measure**	
The proposed project would increase carbon monoxide concentrations at busy intersections and along congested roadways in the project vicinity but would not expose sensitive receptors to substantial pollutant concentrations.	Less than Significant	No project-level mitigation measure required.	Less than Significant
Impact AIR-4		**Mitigation Measure**	
The proposed project would not create objectionable odors affecting a substantial number of people.	Less than Significant	No project-level mitigation measure required.	Less than Significant
Impact AIR-5		**Mitigation Measure**	
The proposed project would not expose maximally exposed individuals to cancer risks exceeding 10 in 1 million.	Less than Significant	No project-level mitigation measure required.	Less than Significant
Impact AIR-6		**Mitigation Measure**	
The proposed project would not generate ground level concentrations of non carcinogenic toxic air contaminants that would result in a Hazard Index greater than 1.0 for the maximally exposed individual.	Less than Significant	No project-level mitigation measure required.	Less than Significant
4.3 Biological Resources			
Impact BIO-1		**Mitigation Measure**	
Construction of the proposed project would result in the permanent removal of 2.25 acres of vegetation.	Less than Significant	No project-level mitigation measure required.	Less than Significant

Environmental Topic and Impact	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance after Mitigation
4.3 Biological Resources (continued)			
Impact BIO-2		**Mitigation Measure**	
The proposed project would not result in indirect adverse effects to nearby creeks and seeps subject to U.S. Army Corps of Engineers (ACOE) and the California Department of Fish and Game (CDFG) jurisdiction and also considered to be sensitive plant communities and habitats.	Less than Significant	No project-level mitigation measure required.	Less than Significant
Impact BIO-3		**Mitigation Measure**	
The proposed project would not adversely affect special-status nesting birds (including raptors) such that nests are destroyed, they abandon their nests, or that their reproductive efforts fail.	Less than Significant	No project-level mitigation measure required.	Less than Significant
Impact BIO-4		**Mitigation Measure**	
Removal of trees and other proposed construction activities during the breeding season would not result in direct mortality of special-status bats. In addition, construction noise could cause maternity roost abandonment and subsequent death of young.	Less than Significant	No project-level mitigation measure required.	Less than Significant
Impact BIO-5		**Mitigation Measure**	
Construction of the proposed project would not result in take or harassment of Alameda whipsnake.	Less than Significant	No project-level mitigation measure required.	Less than Significant
4.4 Cultural Resources			
Impact CUL-1		**Mitigation Measure**	
The proposed project would not cause a substantial adverse change in the significance of a historical resource as defined in §15064.5.	Less than Significant	No project-level mitigation measure required.	Less than Significant
Impact CUL-2		**Mitigation Measure**	
The proposed project would not cause a substantial adverse change in the significance of an archaeological resource pursuant to §15064.5.	Less than Significant	No project-level mitigation measure required.	Less than Significant

Environmental Topic and Impact	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance after Mitigation
4.4 Cultural Resources (continued)			
Impact CUL-3		**Mitigation Measure**	
The proposed project would not disturb any human remains, including those interred outside of formal cemeteries.	Less than Significant	No project-level mitigation measure required.	Less than Significant
4.5 Geology and Soils			
Impact GEO-1		**Mitigation Measure**	
The proposed project would construct a research facility within the Hayward Fault zone but would not expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death due to rupture of the Hayward Fault.	Less than Significant	No project-level mitigation measure required.	Less than Significant
Impact GEO-2		**Mitigation Measure**	
The proposed project would expose people and structures to substantial adverse effects related to seismic ground shaking.	Potentially Significant	In addition to damage assessment of the CRT building structural elements (which is covered in the LBNL Master Emergency Program Plan), assessment of stormwater conveyance systems and hydromodification vaults shall be conducted by the Damage Assessment Team following earthquakes strong enough to cause damage.	Less than Significant with Mitigation
Impact GEO-3		**Mitigation Measure**	
The proposed project would not expose people and structures to substantial adverse effects associated with seismic-related liquefaction or landslides.	Less than Significant	No project-level mitigation measure required.	Less than Significant
Impact GEO-4		**Mitigation Measure**	
The proposed project would not result in substantial soil erosion or loss of topsoil.	Less than Significant	No project-level mitigation measure required.	Less than Significant
Impact GEO-5		**Mitigation Measure**	
The proposed project is not located on a geologic unit that may be unstable or could become unstable as a result of the project.	Less than Significant	No project-level mitigation measure required.	Less than Significant

Environmental Topic and Impact	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance after Mitigation
4.5 Geology and Soils (continued)			
Impact GEO-6		**Mitigation Measure**	
The CRT building would not be located on expansive soils.	Less than Significant	No project-level mitigation measure required.	Less than Significant
4.6 Hazard and Hazardous Materials			
Impact HAZ-1		**Mitigation Measure**	
The proposed project would not impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan. The proposed project would not expose people or structures to a significant risk of loss, injury, or death involving wildland fires.	Less than Significant	No project-level mitigation measure required.	Less than Significant
4.7 Hydrology and Water Quality			
Impact HYDRO-1		**Mitigation Measure HYDRO-1**	
Development of the project site would increase the area of impervious surfaces (i.e., pavements and hardscapes, building roofs, and compacted soil surfaces) and would result in increased peaks and duration of stormwater flows, potentially contributing to erosion and/or siltation in Strawberry Creek.	Potentially Significant	Using the Bay Area Hydrology Model, calculations shall be provided following approval of the final project design to show that the proposed hydromodification vaults are sized appropriately to control flows such that 'flow duration control' is provided between 10-percent of the two-year recurrence storm and the 10-year recurrence storm.	Less than Significant
Impact HYDRO-2		**Mitigation Measure HYDRO-2**	
Development of the site would alter surface drainage patterns on the site and could result in increased peak flows and induce flooding in downstream reaches.	Potentially Significant	The hydromodification vaults or stormwater pipe system shall be oversized to allow detention of peak flows for the 25-, 50- and 100-year design storms and release at a rate no greater than the pre-development condition, or equivalent separate facilities will be incorporated to provide such control. Final design calculations showing no increases in peak runoff for the 25-, 50-, and 100-year events will be provided to and reviewed by LBNL staff upon finalization of the project design.	Less than Significant

Environmental Topic and Impact	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance after Mitigation
4.7 Hydrology and Water Quality (continued)			
Impact HYDRO-3		**Mitigation Measure**	
Project construction would not result in increased erosion and sedimentation, the potential release of chemicals to stormwater, or a temporary increase in turbidity or decrease in water quality in surface waterways.	Less than Significant	No project-level mitigation measure required.	Less than Significant
Impact HYDRO-4		**Mitigation Measure HYDRO-4**	
Stormwater runoff from the proposed driveway and other impervious surfaces could potentially contribute to long-term pollutant discharges to surface waters, including Cafeteria Creek, Strawberry Creek, and the Bay.	Potentially Significant	**Mitigation Measure HYDRO-4a**: An in-line pollution prevention device (such as a Continuous Deflective Separation unit or Stormceptor) shall be installed within the storm drain system to control sediment and floatables from the access driveway and loading dock area in the northern portion of the project site prior to release of stormwater to the storm drain at Cyclotron Road. **Mitigation Measure HYDRO-4b:** If feasible, vegetated swales or a stormwater garden shall be incorporated into the project to maintain water quality of roof runoff and avoid exceeding water quality objectives prior to discharge to creeks. LBNL shall provide calculations showing that design of these features meets recognized criteria for design of water quality Best Management Practices (BMPs). Should it be determined that appropriately sized vegetated swales are not feasible, then alternative Regional Water Quality Control Board-approved methods of treating stormwater runoff, such as in-line pollution prevention devices or infiltration galleries, shall be incorporated into the project. All water quality treatment and source controls shall be summarized in the project-specific Storm Water Pollution Prevention Plan (SWPPP), which will be available to regulatory agencies for inspection.	Less than Significant

Environmental Topic and Impact	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance after Mitigation
4.8 Land Use and Planning			
Impact LU-1		**Mitigation Measure**	
The proposed project would not conflict with the applicable land use plan or policy (i.e., 2006 LBNL LRDP, and 2006 LBNL Design Guidelines adopted for the purpose of avoiding or mitigating an environmental effect.	Less than Significant	No project-level mitigation measure required.	Less than Significant
4.9 Noise			
Impact NOISE-1		**Mitigation Measure**	
Construction activities would temporarily elevate noise levels at the project site and surrounding areas.	Potentially Significant	None available.	Significant and Unavoidable
Impact NOISE-2		**Mitigation Measure**	
Temporary vibration impacts related to construction activities would not cause a significant impact.	Less than Significant	No project-level mitigation measure required.	Less than Significant
Impact NOISE-3		**Mitigation Measure**	
Vehicular traffic associated with the CRT project would result in an incremental, but imperceptible, long-term increase in ambient noise levels.	Less than Significant	No project-level mitigation measure required.	Less than Significant
Impact NOISE-4		**Mitigation Measure**	
The operation of heating, ventilating, and air conditioning equipment at the CRT site would not result in a substantial long-term increase in ambient noise levels.	Less than Significant	No project-level mitigation measure required.	Less than Significant
4.10 Population and Housing			
Impact POP-1		**Mitigation Measure**	
The proposed project would not induce substantial population growth, either directly or indirectly.	Less than Significant	No project-level mitigation measure required.	Less than Significant

Environmental Topic and Impact	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance after Mitigation
4.11 Public Services			
Impact PUB-1		**Mitigation Measure**	
The proposed project would not result in substantial adverse physical impacts associated with the provision of new or physically altered fire protection facilities in order to maintain acceptable service ratios, response times, or other performance objectives, the construction of which could cause significant environmental impacts.	Less than Significant	No project-level mitigation measure required.	Less than Significant
Impact PUB-2		**Mitigation Measure**	
The proposed project would not result in substantial adverse physical impacts associated with the provision of new or physically altered police protection facilities in order to maintain acceptable service ratios, response times, or other performance objectives, the construction of which could cause significant environmental impacts.	Less than Significant	No project-level mitigation measure required.	Less than Significant
Impact PUB-3		**Mitigation Measure**	
The proposed project would not result in substantial adverse physical impacts associated with the provision of new or physically altered school facilities in order to maintain acceptable service ratios or other performance objectives, the construction of which could cause significant environmental impacts.	Less than Significant	No project-level mitigation measure required.	Less than Significant
Impact PUB-4		**Mitigation Measure**	
The proposed project would not result in substantial adverse physical impacts associated with the provision of new or physically altered park or recreational facilities in order to maintain acceptable service ratios or other performance objectives, the construction of which could cause significant environmental impacts.	Less than Significant	No project-level mitigation measure required.	Less than Significant

Environmental Topic and Impact	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance after Mitigation
4.11 Public Services (continued)			
Impact PUB-5		**Mitigation Measure**	
The proposed project would not increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facilities would occur or be accelerated.	Less than Significant	No project-level mitigation measure required.	Less than Significant
4.12 Transportation and Traffic			
Impact TRANS-1		**Mitigation Measure**	
The proposed CRT project would not cause an increase in traffic that is substantial in relation to the existing traffic load and capacity of the street system under the Near-Term conditions.	Less than Significant	No project-level mitigation measure required.	Less than Significant
Impact TRANS-2		**Mitigation Measure**	
The proposed CRT project would result in increases in transit ridership.	Less than Significant		Less than Significant
Impact TRANS-3		**Mitigation Measure**	
The proposed CRT project would result in increased parking demand that may exceed the available parking supply.	Less than Significant		Less than Significant
Impact TRANS-4		**Mitigation Measure TRANS-4**	
The proposed CRT project would potentially result in increased hazards to pedestrians or bicyclists or conflicts with adopted policies, plans, or programs promoting walking or bicycling.	Potentially Significant	Final design of the CRT building shall provide a minimum of 32 bicycle parking spaces to further encourage bicycling and walking to the site.	Less than Significant with Mitigation
Impact TRANS-5		**Mitigation Measure TRANS-5**	
The construction of the proposed CRT project would temporarily and intermittently result in impacts on vehicles, pedestrians, or bicyclists, and parking.	Less than Significant	LBNL shall include the following in the CTMP prepared for the proposed project: • For trucks hauling fill material internal to the LBNL site, trucks should use internal truck routes within the LBNL site to minimize disruption to vehicle, bicycle, and pedestrian circulation and parking. • Consider stacked parking within the LBNL site or off-site parking for construction workers to minimize parking demand.	Less than Significant

Environmental Topic and Impact	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance after Mitigation
4.13 Utilities, Service Systems, and Energy			
Impact UTILS-1		**Mitigation Measure**	
Implementation of the CRT project would not exceed wastewater treatment requirements of the applicable RWQCB and would not require an expansion of the East Bay Municipal Utility District (EBMUD) wastewater treatment plant or an expansion of the City's sewer conveyance facilities.	Less than Significant	No project-level mitigation measure required.	Less than Significant
Impact UTILS-2		**Mitigation Measure**	
The proposed project would result in an increase in storm water flows but would not require or result in the construction of new storm water drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects.	Less than Significant	No project-level mitigation measure required.	Less than Significant
Impact UTILS-3		**Mitigation Measure**	
Implementation of the proposed CRT project would increase the demand for water but could be served by existing resources. The project-related demand for water supply would not result in the need for new or upgraded water facilities.	Less than Significant	No project-level mitigation measure required.	Less than Significant
Impact UTILS-4		**Mitigation Measure**	
The proposed project would result in the need for additional chilled water facilities, the construction and operation of which would not result in a significant environmental impact.	Less than Significant	No project-level mitigation measure required.	Less than Significant
Impact UTILS-5		**Mitigation Measure**	
Implementation of the proposed CRT project would increase the demand for electricity and natural gas but would not result in the expansion of existing or construction of new electrical and natural gas facilities.	Less than Significant	No project-level mitigation measure required.	Less than Significant

Environmental Topic and Impact	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance after Mitigation
5.0 Cumulative Impacts			
Cumulative Impact VIS-1		**Mitigation Measure**	
Construction activities associated with the proposed project, in conjunction with other near-term development, would not substantially affect visual resources.	Less than Significant	No project-level mitigation measure required.	Less than Significant
Cumulative Impact VIS-2		**Mitigation Measure**	
The proposed project, in conjunction with reasonably foreseeable near-term and long-term development, would not substantially affect visual resources.	Less than Significant	No project-level mitigation measure required.	Less than Significant
Cumulative Impact AIR-1		**Mitigation Measure**	
The proposed project would not result in a cumulatively considerable net increase of any criteria pollutant for which the project region is in nonattainment under an applicable federal or state ambient air quality standard.	Less than Significant	No project-level mitigation measure required.	Less than Significant
Cumulative Impact AIR-2		**Mitigation Measure**	
Although the proposed project would result in greenhouse gas emissions, its contribution to the significant cumulative impact associated with greenhouse gas emissions would not be cumulatively considerable.	Less than Significant	No project-level mitigation measure required.	Less than Significant
Cumulative Impact AIR-3		**Mitigation Measure**	
The proposed project would not result in a cumulatively considerable contribution to cumulative cancer risk impacts associated with future development of LBNL and UC Berkeley.	Less than Significant	No project-level mitigation measure required.	Less than Significant

Environmental Topic and Impact	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance after Mitigation
5.0 Cumulative Impacts (continued)			
Cumulative Impact AIR-4		**Mitigation Measure**	
The proposed project would not result in a cumulatively considerable contribution to cumulative non-cancer health impacts associated with future development of LBNL and UC Berkeley.	Less than Significant	No project-level mitigation measure required.	Less than Significant
Cumulative Impact BIO-1		**Mitigation Measure**	
The proposed project, in conjunction with other reasonably foreseeable near-term projects and long term development, would not result in a significant cumulative impact on biological resources.	Less than Significant	No project-level mitigation measure required.	Less than Significant
Cumulative Impact CUL-1		**Mitigation Measure**	
The proposed project, in conjunction with other reasonably foreseeable near-term and long-term development, would not result in a significant cumulative impact on cultural resources.	Less than Significant	No project-level mitigation measure required.	Less than Significant
Cumulative Impact GEO-1		**Mitigation Measure**	
The proposed project, in conjunction with reasonably foreseeable near-term and long-term development, would place new structures and introduce an increased population in a seismically active region.	Less than Significant	No project-level mitigation measure required.	Less than Significant
Cumulative Impact HAZ-1		**Mitigation Measure**	
The proposed project, in conjunction with reasonably foreseeable near-term and long-term development, would result in a cumulative impact related to evacuation along Centennial Drive during emergencies associated with a wildland fire or a major earthquake, but the project's contribution to the cumulative impact would not be considerable.	Less than Significant	No project-level mitigation measure required.	Less than Significant

Environmental Topic and Impact	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance after Mitigation
5.0 Cumulative Impacts (continued)			
Cumulative Impact HYDRO-1		**Mitigation Measure**	
The proposed project, in conjunction with reasonably foreseeable near-term and long-term development, would not result in a significant cumulative impact on surface water resources.	Less than Significant	No project-level mitigation measure required.	Less than Significant
Cumulative Impact LU-1		**Mitigation Measure**	
The proposed project, in conjunction with other reasonably foreseeable near-term and long-term development, would not involve a significant cumulative impact related to land use.	Less than Significant	No project-level mitigation measure required.	Less than Significant
Cumulative Impact NOISE-1		**Mitigation Measure**	
Near-term development in the vicinity of the project site would not cause a significant cumulative increase in exterior noise levels during construction.	Less than Significant	No project-level mitigation measure required.	Less than Significant
Cumulative Impact NOISE-2		**Mitigation Measure**	
The proposed project, in conjunction with reasonably foreseeable near-term and long-term development, would not result in a significant cumulative permanent increase in ambient noise levels.	Less than Significant	No project-level mitigation measure required.	Less than Significant
Cumulative Impact POP-1		**Mitigation Measure**	
The proposed project, in conjunction with reasonably foreseeable near-term and long-term development, would not result in a significant cumulative impact on population or housing.	Less than Significant	No project-level mitigation measure required.	Less than Significant
Cumulative Impact PUB-1		**Mitigation Measure**	
The proposed project, in conjunction with reasonably foreseeable near-term and long-term development, would not result in a significant cumulative demand for public services.	Less than Significant	No project-level mitigation measure required.	Less than Significant

Environmental Topic and Impact	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance after Mitigation
5.0 Cumulative Impacts (continued)			
Cumulative Impact TRANS-1		**Mitigation Measure**	
The proposed project, in conjunction with reasonably foreseeable near-term and long-term development, would degrade intersection levels of service.	Potentially Significant	Further mitigation is not feasible.	Significant and Unavoidable
Cumulative Impact TRANS-2		**Mitigation Measure**	
Construction traffic associated with the proposed project and other near-term projects would not result in significant congestion on city streets.	Less than Significant	No project-level mitigation measure required.	Less than Significant
Cumulative Impact TRANS-3		**Mitigation Measure**	
The proposed project, in conjunction with other reasonably foreseeable near-term and long-term development, would not substantially affect transit, parking, or pedestrian and bicycle circulation.	Less than Significant	No project-level mitigation measure required.	Less than Significant
Cumulative Impact UTILS-1		**Mitigation Measure**	
The proposed project, in conjunction with reasonably foreseeable near-term and long-term development, would not result in a significant cumulative demand for utilities and service systems.	Less than Significant	No project-level mitigation measure required.	Less than Significant

3.0 PROJECT DESCRIPTION

3.1 INTRODUCTION

This section presents the details of the proposed Computational Research and Theory (CRT) Facility project in terms of the project objectives, the facility's design features, the population associated with the proposed project, and its construction schedule and activities.

Lawrence Berkeley National Laboratory (LBNL) is proposing to construct a new 140,000-gross-square-foot (gsf) building and associated infrastructure to accommodate the National Energy Research Scientific Computing (NERSC) Center, the associated High Performance Computing (HPC) center, and researchers and students from the Berkeley Lab's Computational Research Division and the joint UC Berkeley/Berkeley Lab Computational Science and Engineering program. The proposed building would be constructed on an approximately 2.5-acre site, located on property owned by the University of California, within the Berkeley Lab site and adjacent to the University of California at Berkeley campus. The building would be constructed on a hillside and, at this time, is expected to be approximately 160 feet in height. The proposed building would include new advanced computational equipment and office space to support UC Berkeley's academic programs in computational science and engineering and the needs of computer scientists, mathematicians, and theoreticians who are currently engaged in high-performance computing and high-performance production computing and computational research. As a computer building, the facility will not include labs, and will not use or store chemicals or radiological compounds.

3.2 PROJECT OBJECTIVES

Key objectives of the proposed project are to:

- Provide an integrated and appropriately designed facility that would allow for the continued operation and future advancement of the Berkeley Lab's NERSC High Performance Computing national users facility, Computational Research Division and joint Berkeley Lab/UC Berkeley Computational Science & Engineering programs;

- Provide adequate space, chilling capacity, and infrastructure to accommodate next-generation computing equipment and to allow for continual future upgrades to such equipment;

- Provide accessibility to a large, reliable, and economical electrical power source. The power source should be capable of serving both the immediate and potential future needs of Berkeley Lab's computing program.

- Provide researchers with convenient access to other Lab scientific facilities, programs, researchers, and services; locate the facility such that it fosters interaction and collaboration between the project and UC Berkeley programs;

- Meet University of California policies on sustainability and achieve efficiencies in energy conservation, temperature control, operational and maintenance services, and transportation (i.e., near public transportation, and without provision of large amounts of parking).

3.3 PROJECT NEED

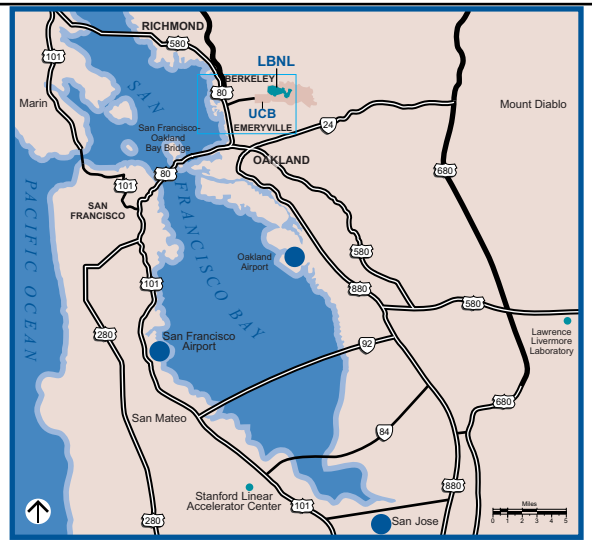
LBNL presently operates the NERSC Center at an off-site location in Oakland, and has a need to move the NERSC facility to the LBNL hill site in order to provide immediate access for researchers and meet power supply needs for future operation of NERSC programs. The proposed computer lab would increase the amount of floor space compared to the existing facility (the Oakland Scientific Facility) in order to accommodate two NERSC systems at one time and anticipated growth in the Scientific Cluster Support area. In addition, the present facility cannot accommodate space needs or power supply upgrades that would be required for next-generation computer equipment.

3.4 PROJECT LOCATION AND SURROUNDING USES

LBNL is situated in the eastern hills of the cities of Berkeley and Oakland in Alameda County, and is located on approximately 200 acres that are owned by the University of California and leased to the DOE (see **Figure 3.0-1, Regional Location Maps**). Existing buildings on LBNL are used for heavy equipment laboratories, wet and dry laboratories, office space, and other uses.

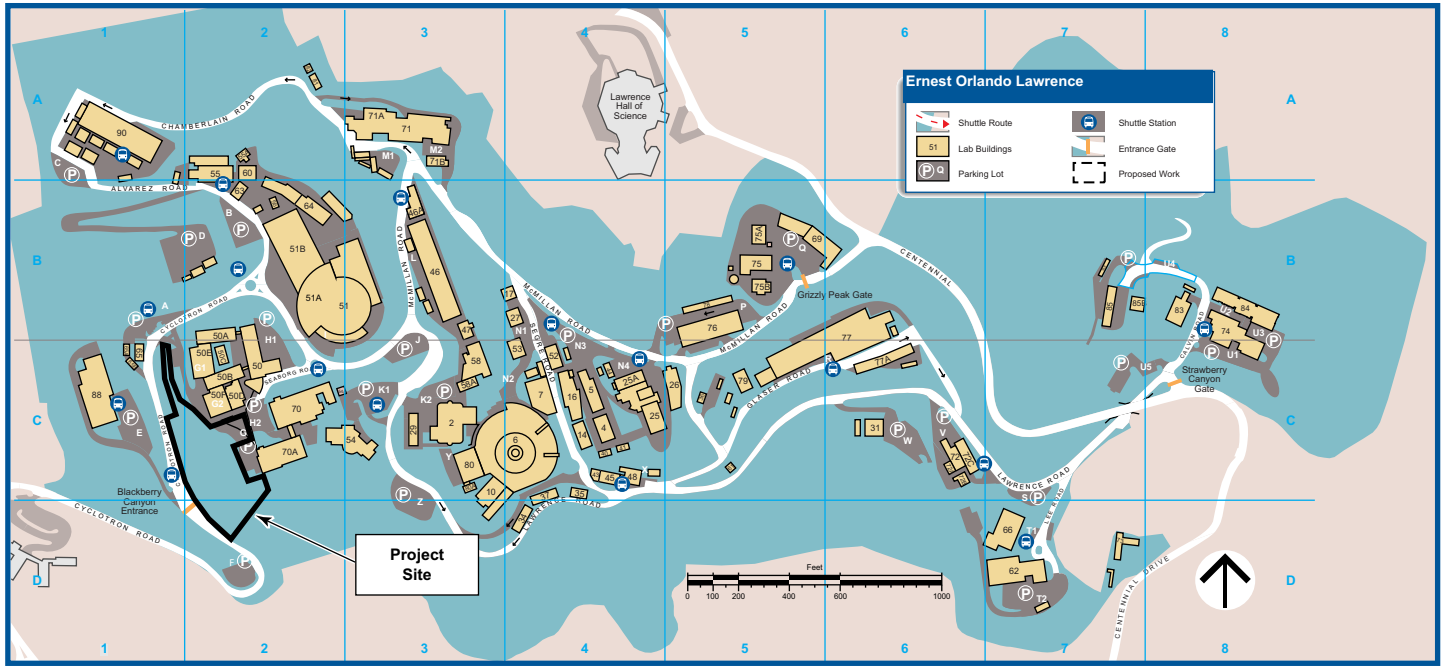
The LBNL site is surrounded by a mix of land uses, including open space, institutional uses, and residential and neighborhood commercial areas. The main campus of the University of California, Berkeley lies to the west, with other UC Berkeley lands, including the Strawberry Canyon open space areas, to the south and southeast of the LBNL site. Residential neighborhoods and a small neighborhood commercial area in the City of Berkeley lie to the north and northwest, and regional open space, including the 2,000-acre Tilden Regional Park, lies to the east and northeast.

The site proposed for the CRT Facility is located on the western portion of the LBNL property, and is flanked on three sides by Buildings 70 and 70A to the east, the Building 50 complex to the north, and Cyclotron Road and the Blackberry Canyon entrance gate to the west (see **Figure 3.0-2, Approximate Project Site**). The site is located in an area known as Blackberry Canyon.



LBNL Regional Location

LBNL Local Location



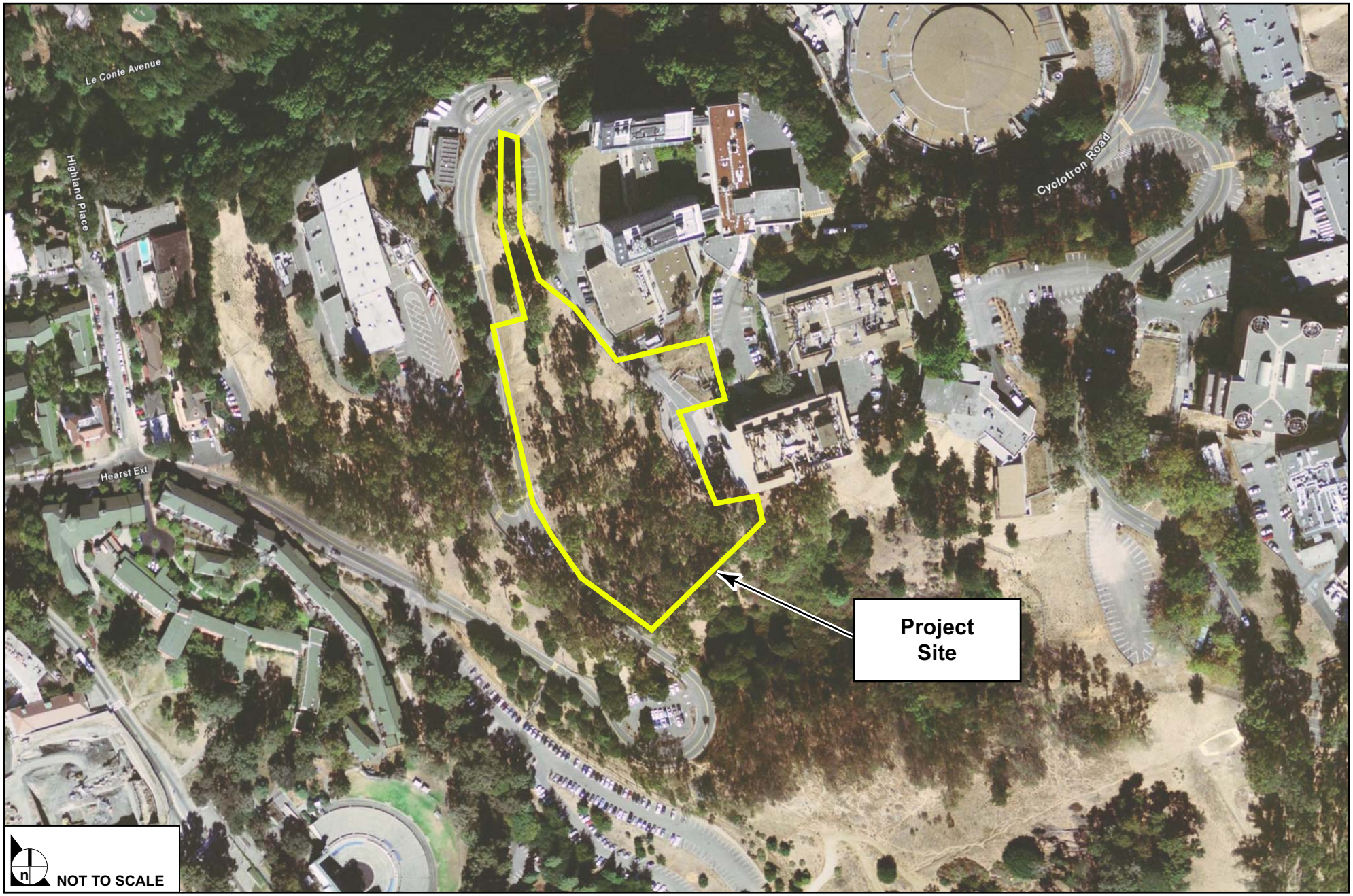
LBNL Site

NOT TO SCALE

SOURCE: Lawrence Berkeley National Laboratory, 2004

FIGURE **3.0-1**

Regional Location Maps



SOURCE: Google Earth - July 2007, Perkins+Will - September 2007

FIGURE **3.0-2**

Approximate Project Site

924-002•09/07

The sloped terrain of the project site drops roughly 100 feet from east to west and is vegetated with approximately 60 eucalyptus and a few immature redwood, bay, and oak trees (less than 20 inches circumference when measured at breast height (approximately 4 feet above grade). No jurisdictional wetlands, intermittent waterways, drainages, or blue-line streams exist on the site. The site contains habitat suitable for various avian, bat, and reptile species. Although the project site is in close proximity to the Hayward Fault, and within a defined Earthquake Hazard Zone, a geologic fault investigation performed in September 2006 in conformance with the Alquist-Priolo Act revealed no traces of an active fault on the proposed project site (see **Section 4.5, Geology and Soils**). The site features a filtered view of San Francisco Bay. The project site has a frontage on Seaborg Road and is within walking distance or a short shuttle bus trip of the UC Berkeley Physical and Computer Science Departments. The Building 50 stairway (also known as the Seaborg stairway) currently provides pedestrian access from the Blackberry Canyon entrance gate to the Building 50 complex and Buildings 70/70A.

3.5 PROJECT CHARACTERISTICS

The proposed project includes the construction of a new building, access driveways, and pedestrian access. The approximately 140,000-gsf, multi-story building would include both a supercomputer equipment floor and an office structure, with space for computing, offices, and conference rooms. The proposed building abuts a steep hillside, and the upper floor of the office structure would be accessible from the existing parking lot that connects the Building 50 complex and Buildings 70 and 70A by way of a pedestrian bridge (see **Figure 3.0-3, CRT Conceptual Project Design**). The facility would have a main computing floor footprint of approximately 32,000 gsf and smaller floor areas, ranging from approximately 12,000 to 21,000 gsf, for the upper floors, for a total of about 81,400 gsf of office and support space. As proposed in the conceptual design, the project would consist of two main building components: a lower-lying, wide structure extending north-south across the site to house the HPC equipment and mechanical spaces and a narrow, multi-story office structure above it on an east-west axis. The office portion includes extended upper floors connecting to the Building 50/70 complexes. The plaza between these buildings would be a shared space that would serve the CRT Facility and other existing buildings in the Building 50/70 complexes. Provision of some of the required electrical power by on-site cogeneration equipment is being considered as an option for the project. **Figure 3.0-4, Site Plan with Mechanical Equipment Locations**, shows the proposed location of the building and major project features.

The building site and size of the facility are consistent with the LBNL 2006 Long Range Development Plan (LRDP). The building would be designed in accordance with the LRDP Design Guidelines and respect the scale, rhythm, and patterns of the surrounding context by being responsive to its environment, architectural context, and solar orientation. Exterior materials would be chosen to be compatible with the surrounding neighborhood. A 50-foot, no-build zone would be maintained from the nearby drainage, locally known as Cafeteria Creek, and a 60-foot setback would be maintained from all

adjacent structures to meet building code requirements and minimize the impact of the new development on adjoining neighborhoods.

Small portions of the proposed project site are located within parcels that are currently leased to the DOE. The proposed project would include a parcel line adjustment to transfer these areas into adjacent parcels. The project would be located entirely on University-controlled land, and no ground leases would apply.

A detailed description of the conceptual project design is provided below.

3.5.1 Supercomputer Facilities (Equipment Floor)

The supercomputer equipment level would include the HPC equipment floor with approximately 32,000 assignable square feet (asf).[1] Additional space would be provided for loading, storage, and support functions for the HPC floor. The HPC level would be a contiguous, largely column-free floor and would have additional headroom to maximize flexibility in configuring future supercomputer arrays. A raised floor system would provide access to data and electrical cabling, and would also serve as a supply air chase for air-cooled equipment. Secondary electrical distribution would be accomplished either within the raised floor area or via floor-mounted power distribution units. Self-contained substations with dry-type transformers located at the exterior of the machine floor would provide primary electrical distribution.

3.5.2 Office Facilities

The main office block would rise six stories above the computer floor level and would provide a variety of general office, computer configuration and support, software support, videoconferencing, meeting, and visualization laboratory spaces. Specifically, the Visualization Lab would be a 300- to 400-square-foot room that would accommodate up to 40 people, with back projection so that output from the computational calculations could be generated to show pictures of visual models to be analyzed. The office floors range in size from approximately 12,000 to 21,000 gsf. Fixed building areas such as stairs, toilet cores, elevator shafts, and structural framing would be designed to support reconfiguration of the research facility expected throughout the life of the building. The building would support a variety of workplace settings from largely open office spaces to largely private offices. Building core mechanical

1 Assignable square feet is the total floor or surface area of a room assigned to or available for assignment to an occupant or specific use. It does not include common areas such as restrooms, hallways, or mechanical space.

NOT TO SCALE

SOURCE: Perkins+Will - 2007

FIGURE **3.0-3**

CRT Conceptual Project Design

SOURCE: Perkins + Will - 2007

FIGURE **3.0-4**

Site Plan with Mechanical Equipment Locations

spaces would extend approximately four stories below the HPC level; these levels would also accommodate a staircase to provide direct pedestrian access from Cyclotron Road to the building.

3.5.3 Common Areas

The building and surrounding area would include common areas accessible to staff and students from other Berkeley Lab buildings, the University campus, and building occupants. These areas would include a main entrance plaza and pedestrian bridge to the top floor, near the existing Building 70 and 70A entrances; an entry plaza with a staircase connecting to the existing Seaborg stairs at the lower entry level near Cyclotron Road; and a loggia around the top level of the building exterior that would be accessible to building occupants.

3.5.4 Project Design and Landscaping Features

Building Design

The mission of the project design is to develop a building that is consistent with the proposed research and to employ materials and implement practices that reduce reliance upon fossil fuels. In order to achieve green building principles and to be consistent with the 2006 LRDP, the design of the proposed facility would integrate the building into the hillside.

The CRT Facility would be designed in conformance with requirements for Group B (office) occupancies as defined by the 2007 California Building Code (CBC), Type I Fire Resistive Construction, and with applicable seismic safety and fire safety code requirements. The proposed project would also comply with accessibility requirements in accordance with the Americans with Disabilities Act (ADA).

The building would include the following structural elements:

- A reinforced concrete substructure integrally tied to the hillside retaining walls, which would house the mechanical deck and equipment and serve as a "podium" for the HPC and the office portion of the building.
- A long-span, steel-framed, single-story HPC.
- A multistory steel- or concrete-framed structure for the office building which would be integrally tied to the HPC (i.e., no seismic joints) and would include a pedestrian walkway extending to the plaza level of Building 70.

Lateral forces in the HPC and the office building would be resisted by either "buckling restrained braced frames" (BRBF) if the office structure is steel framed or reinforced concrete shear walls if the office structure is concrete framed. Hillside stability for both "at rest" and seismic-induced loadings would be

provided by concrete retaining walls with grouted tiebacks. Where feasible, the grading would be maintained at the "angle of repose" (the maximum angle at which the surface material remains stable) to preclude the need for retaining structures.

Materials and Colors

The exterior of the building would be durable, water-resistant, compatible with the surrounding buildings, and appropriate for the intended uses of the site. The exterior cladding would include the use of concrete, metal, and glass. The office area exteriors would be primarily glass. High performance glazing and shading would be used to reduce the effects of afternoon heat gains. The exterior of the HPC portion of the building would be primarily of metal with minimal fenestration to reduce temperature changes to the interior. **Figure 3.0-5, Conceptual South Elevation**, shows conceptual building exterior features and the building's relationship to the site.

Lighting

Exterior lighting features would be installed at both entrances, in the disabled parking area, at the loading dock, and along exterior walkways. All exterior lighting would be designed to minimize glare.

Landscaping and Tree Removal

The proposed project site would be landscaped consistent with LBNL Construction Standards and Design Requirements. The landscaping would conform to and complement the existing character of planting in the project area, including the use of drought-tolerant and low water use plant materials and native trees. No lawn areas are proposed. The landscaping materials to be used in the project would also be reviewed by the LBNL Fire Marshal to ensure that fire fuel loads around the project site are not increased as a result of project landscaping.

Approximately 72 trees would be removed for the construction of the project. These include 64 eucalyptus, 2 California bay, 1 plum, and 5 oak trees. About 40 trees are moderate to small in size (with trunk diameters less than 20 inches at breast height) while 32 trees (all eucalyptus) have trunk diameters greater than 20 inches. All of the oak trees that would be removed are small to moderate in size and do not exceed 20 inches in diameter. Removed trees requiring replacement under Berkeley Lab Guidelines would be replaced at a 1:1 ratio, with replacement trees planted on the project site or in other parts of the Berkeley Lab site, in compliance with the LBNL Construction Standards and Design Requirements. The replacement trees would be 48-inch box specimens.

SOURCE: Perkins+Will - 2007

FIGURE **3.0-5**

Conceptual South Elevation

3.5.5 Access, On-Site Circulation, and Parking

Automobile access to the project site would be from Cyclotron Road. Pedestrians would access the project site from Cyclotron Road via the Seaborg stairs, which connect Cyclotron Road to the upper plaza. A pedestrian walkway or an extension of the Seaborg stairs would also connect the stairs to the lower entry plaza at the level of the HPC portion of the building. Approximately four parking spaces would be provided for disabled guests near the proposed building. Additional, limited-time parking spaces would be provided for use by delivery and maintenance vehicles. No additional new general-use parking spaces would be included in the project. Staff parking would be provided in the existing parking lots. The site is within 500 feet of both the Horseshoe Parking Lot F to the south and Blackberry Canyon Parking Lot D to the north. The project would also include parking for approximately 30 bicycles.

Guests, employees, and suppliers of services would be provided access to the site under the same policies and procedures that exist today. No changes to the Berkeley Lab's security and safeguards are anticipated.

3.6 UTILITIES AND INFRASTRUCTURE

Infrastructure improvements would be necessary for water, sanitary sewer services and storm drainage. The project would connect to an existing water main located in Seaborg Road. Sanitary sewer service would be provided by a connection to the existing main in Cyclotron Road. The storm drain system would include roof drains, overflow drains and interior downspouts that would be connected to the existing on-site storm drain system.

The project would require relocation of several major utility lines that cross the project site and serve the adjacent buildings. **Figure 3.0-6, Conceptual Utility Relocation Plan**, shows the proposed relocation of these lines and the new utility connections that would serve the proposed project.

3.6.1 Domestic and Fire Suppression Water

Domestic water service (including water for fire suppression) for the CRT project would be supplied from an existing 8-inch high-pressure water main along Seaborg Road. The existing water main would be extended to the project site to provide water service. Additionally, the water main would be extended approximately 200 feet to provide fire hydrant coverage at the lower level of the proposed building.

During initial project operation, water consumption for the CRT project is estimated at approximately 14.2 million gallons per year (mgy) or an average of 38,900 gallons per day (gpd). At project buildout, water consumption would be approximately 29.3 mgy or an average of 80,300 gpd. This includes

demand for domestic water, fire suppression water, and cooling tower water. The proposed project includes high-efficiency fixtures and waterless urinals and recirculation of cooling water, which would reduce water demand.

3.6.2 Wastewater

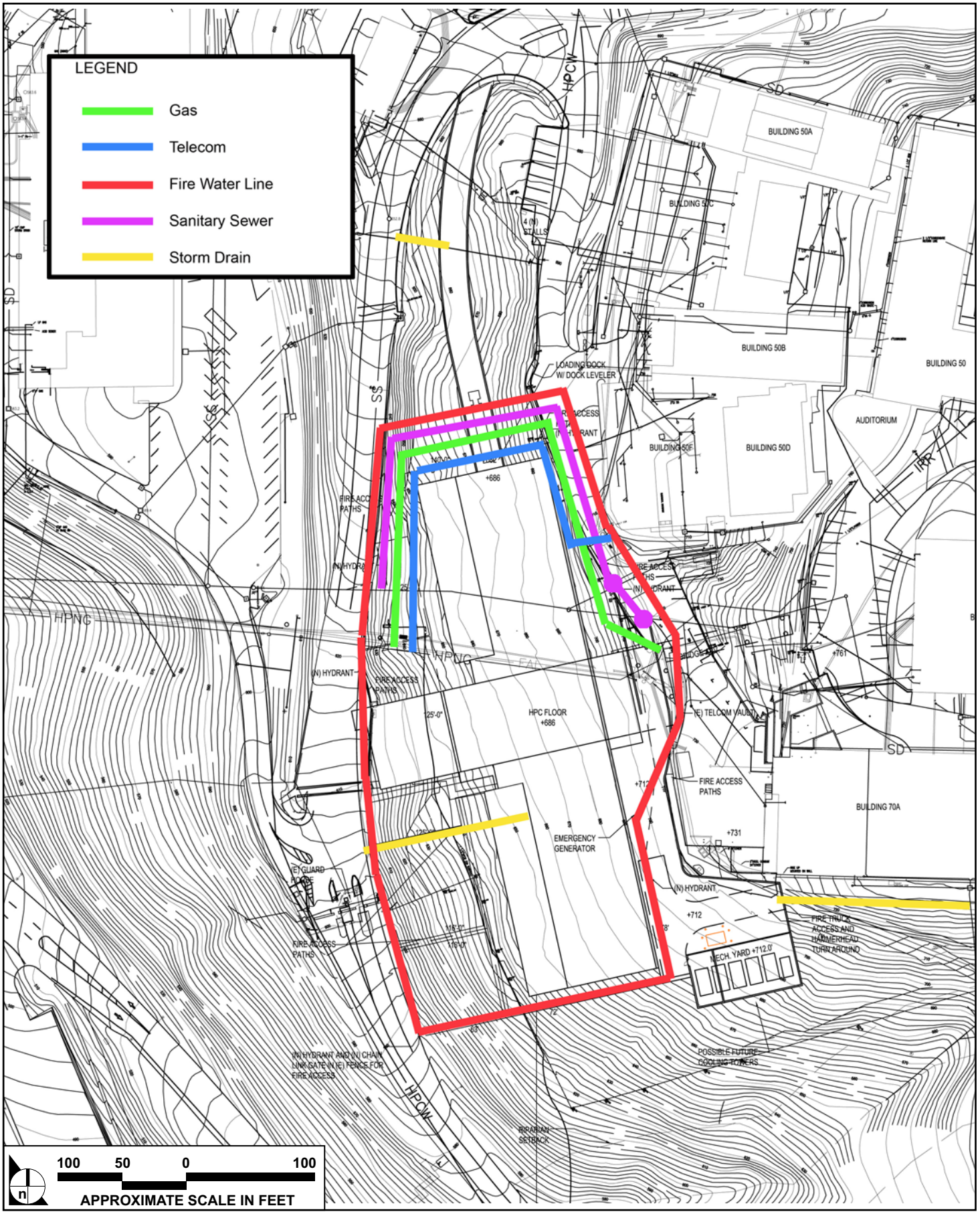
Wastewater (sewage) generation from the project is expected to range from approximately 5,600 to 9,000 gpd during initial project operations and from 6,000 to 21,000 gpd at buildout. The project would include a connection to the existing LBNL sanitary sewer system located in Cyclotron Road. Wastewater from the western portion of LBNL, including the CRT site area, flows to the Hearst Monitoring Station. From this point, wastewater flows to just above the intersection of Highland Place and Cyclotron Road, where it ties into the City of Berkeley's sewer system at City sanitary sewer sub-basin 17-013. The City of Berkeley's sewer system transports the effluent from this monitoring station to EBMUD's north interceptor sewer and then to the treatment facility in Oakland. Sub-basin 17-013 is not currently constrained during peak wet weather flows.

3.6.3 Storm Water

The CRT site design would minimize the amount of impervious surfaces by limiting the footprint of the building and minimizing creation of new parking areas. The net increase in impervious surfaces for the project site would be approximately 1.36 acres (59,100 square feet).

The storm drainage system would be constructed to control discharge and to direct flows away from Cafeteria Creek and toward on-site collection facilities. Storm flows would be captured by a network of inlets and drainage pipes and directed to a series of subsurface hydromodification vaults large enough to hold peak storm flows and release them at a rate no greater than the pre-development condition. Some storm flows would be directed into one or more vegetated swales, in which stormwater would be filtered through vegetation and soil and then flow to a subsurface hydromodification vault. These vaults would discharge to the existing Lab storm-drain system. The vaults would be closed systems designed to avoid any infiltration of storm water into surrounding soils. **Figure 3.0-7, Conceptual Stormwater System Plan**, shows the storm drainage features and connections.

The construction of the project would also require relocating existing storm drainage facilities, including concrete swales, gutters, and subdrains along the west sides of Buildings 50D and 70A.



SOURCE: Perkins + Will - 2007

FIGURE **3.0-6**

Conceptual Utility Relocation Plan

SOURCE: Perkins + Will - October 2007

FIGURE **3.0-7**

Conceptual Stormwater Management Plan

3.6.4 Chilled and Hot Water

Machine floor and office building cooling would be provided by a series of high-efficiency evaporative cooling towers approximately 15 feet high located near the exterior southeast side of the HPC portion of the facility. This system would serve liquid and air-cooled computational equipment. Depending on whether electrical cogeneration is implemented, one to three cooling towers would be installed prior to the first phase of project operations. At full project implementation, additional cooling towers would be needed (five total without cogeneration and nine total with cogeneration). The cooling towers would operate at full capacity only during the warmest days of the year, typically in August.

Waste heat from the cogeneration facility or waste heat from a heat recovery chiller would be used to provide hot water and heating within the building. No boiler is proposed.

3.6.5 Electricity

The existing LBNL electrical power supply currently extends to the Building 50/Building 70 area. The project would connect to the existing electrical underground lines. At the time of initial building occupancy, the power supply would be 7.5 megawatts (MW); this supply would be upgraded to 17 MW at full buildout of the project. Building systems and utility connections would be designed to accommodate this expansion. The additional power supply would be provided from the existing grid. Upgrades to the Grizzly Peak substation and transmission facilities within LBNL would be needed in order to accommodate the project's power needs with either option. These upgrades would be accomplished entirely within the footprint of existing utilities or the CRT project site and would include use of existing spare breakers at the Grizzly Peak substation, installation of new conductors from the substation to the proposed CRT facility using spare conduits though an existing electrical manhole, and extension of a new duct bank from the existing manhole to the CRT building.

A cogeneration system is being considered as an option to provide up to 3 megawatts (MW) of power. With the cogeneration equipment, the CRT Facility would generate approximately 18 percent of its electricity demand. Cogeneration would be provided by two 1.5 MW engine-generator units powered by natural gas; they would be located southeast of the building in the same area as the cooling towers and would be enclosed by masonry or concrete walls to provide security and noise shielding.

Emergency electrical power would be provided through a back-up generator located on the ground floor of the HPC portion of the building, near the cooling towers. A 250-kilowatt diesel generator with an approximately 2,200-gallon above-ground fuel storage tank would provide electricity for basic building functions for up to 72 hours. The HPC equipment would be equipped with an uninterruptible power supply that would allow operation of the equipment for at least one hour to allow it to be properly shut

down; this would be provided by an array of large battery power packs that would be installed on site. If the cogeneration option is implemented, an emergency generator would not be required, and the uninterruptible power supply would be provided by cogeneration.

3.6.6 Natural Gas

Natural gas would be required for use in powering the cogeneration equipment, if it is installed. An existing sub-grade 6-inch medium-pressure natural gas main crosses the CRT project site from a point between Buildings 50D and 70A to Cyclotron Road. This gas main would be relocated approximately 100 feet to the north to allow construction of the proposed project, and new connections would be established to serve the project.

3.6.7 Exhaust

Primary air intake for the computer facilities would consist of louvers on the exterior walls on the west side of the HPC portion of the building. Air-handling units would be built into the building structure, providing large air-intake surfaces. Supply fans would draw outside air through the louvers, filters, cooling water coils, and then circulate the cooled air beneath the raised computing floor. Equipment exhaust air would be drawn by air handler/exhaust fans through ceiling spaces and, depending on outside temperature, either be partially recirculated or discharge to the building roof.

3.7 CHEMICAL USE ON-SITE

Operation of the CRT Facility would potentially require storage and use of limited quantities of hazardous chemicals for generator exhaust scrubbers, should the optional cogeneration facility be installed. Hazardous materials storage and use would occur in the mechanical enclosure outside the building.

Research that would be conducted in the proposed facility would be limited to computing and computing-related operations and would not involve radioactive materials, hazardous chemicals, non-hazardous organic or inorganic materials, nano-scale materials, or genetically modified/transgenic plant materials and microorganisms. No "wet" laboratories would be located in the building.

3.8 PROJECT POPULATION

The proposed CRT Facility would accommodate approximately 300 employees, of which approximately 225 would be LBNL staff and 75 would be UC Berkeley staff and students. Of the approximately 225 LBNL staff, about 135 would be existing staff relocated from the adjacent Building 50 Complex and 70 would be relocated from the off-site Oakland Scientific Facility; these staff members were located at the

Berkeley Lab site prior to 2000 and would be returning to the hill site. Approximately 20 staff could be new or relocated LBNL staff. The CRT Facility would therefore add up to approximately 165 additional persons (including both Berkeley Lab and UC Berkeley staff and students) to the Berkeley Lab site.

3.9 CONSTRUCTION

3.9.1 Site Grading

Because of the project's hillside location, project construction would involve both cuts and fills. **Figure 3.0-8, Conceptual Grading Plan**, shows the proposed site configuration. Based on the proposed design of the building, the proposed project would require approximately 2,000 cubic yards (CY) of cut and approximately 9,000 CY of fill, including approximately 7,000 CY of imported fill.

A dormant landslide was identified during subsurface investigations at the project site (see **Section 4.5, Geology and Soils**). A portion of the dormant landslide is located beneath the central-western and southwestern portion of the proposed building. The landslide deposits would be completely removed within the limits of the building pad and replaced with compacted engineered/structural fill.

3.9.2 Schedule

Project construction is anticipated to begin in April/May 2008 and continue for approximately 26 to 30 months. Construction would take place Monday through Friday and would involve typical construction hours that extend from early morning through mid-afternoon.

3.9.3 Construction Traffic

Project construction activities would generate daily construction vehicle trips. There would be an average of 5 large delivery truck trips per day, with a peak number of 18 trips per day, between April 2008 and April 2010 associated with the delivery of concrete, rebar, form work, structural steel, mechanical and electrical equipment, exterior siding and windows, drywall and studs, pipes and conduits, roofing materials, etc. On an average, there would be 100 round-trip construction worker trips each day, and there would be from 10 to 50 small truck deliveries to the project site daily during the construction period. Therefore, at peak there could be up to 18 large delivery truck trips, about 50 small delivery truck trips, and 100 construction worker vehicle trips to the site in one day.

Import of approximately 7,000 CY of dirt fill would be required. Assuming a truck capacity of 12 CY, this would require approximately 584 truck trips from the fill source area to the CRT project site and 584 return truck trips. These truck trips would follow designated truck routes in the City of Berkeley to and from the Berkeley Lab. In addition, the building's construction schedule may require that cut material

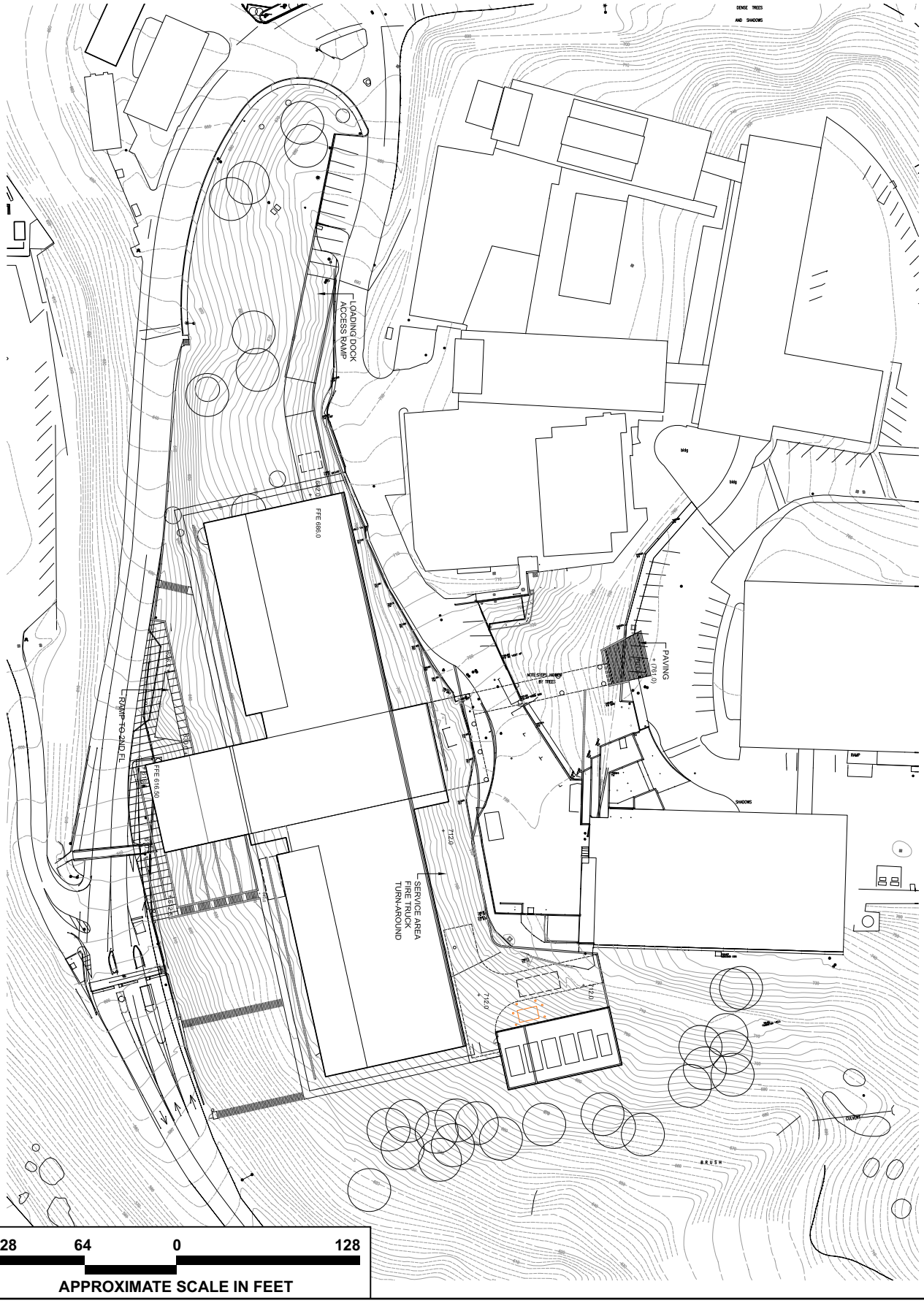
(excavated soil) be stored temporarily before being used on site as fill. If the amount of cut material to be stored exceeds the on-site storage capacity, the material would be trucked to a temporary storage location elsewhere on the Berkeley Lab site. The storage location being considered is the Blackberry parking lot, located on the west side of the Berkeley Lab site approximately 0.25 mile from the CRT project site. Trucks would use existing internal Berkeley Lab roadways to transport the fill materials to and from the storage site. Assuming a truck capacity of 12 CY, there could be up to 166 off-haul and 166 return truck trips between the storage area and the project site as a result of the transfer of fill. However, the number of such trips is likely to be far lower because a large proportion of the cut material could be either stored or immediately re-used on site. All of these trips would be internal to the LBNL site.

3.9.4 Construction Access, Staging, and Environmental Protections

Construction access to the project site would be via Cyclotron Road, Seaborg Road, and a new access driveway from Cyclotron Road. Staging areas would be established where feasible on the project site. Staging areas would be fenced and enclosed.

Environmentally Sensitive Area (ESA) fencing would be installed 50 feet from the Cafeteria Creek drainage to ensure that construction activities do not inadvertently affect this sensitive area. The root systems of all large oak trees that would not be removed in conjunction with the project but are in close proximity of project construction would also be protected by installing ESA fencing at the drip line, as required by the LBNL Construction Standards and Design Requirements. Because the project would require a stormwater construction permit, additional control measures and best management practices would also be implemented for the entire project site.

LBNL requires, and the proposed project would include, an array of construction-period "best management practices" to minimize the potential for accidental discharges of fill or other materials into jurisdictional waters. Active management of construction-related stormwater flows from development sites is a standard part of contract specifications on all construction projects undertaken by LBNL. The CRT project would incorporate control measures and construction would be monitored to manage stormwater flows and potential discharge of pollutants. LBNL's standard construction specifications would apply to the proposed project; these would include requirements for installation of erosion control netting and riprap to protect slopes and minimize adverse effects of runoff; protection of existing plant materials; application and maintenance of hydroseeding (sprayed application of seed and reinforcing fiber on graded slopes); no washout of concrete trucks to the storm drain system; and proper disposal of wastewater resulting from vehicle washing. LBNL also implements spill prevention and response programs to minimize pollutants in runoff. The project site would be replanted as soon as practicable



SOURCE: Perkins + Will - October 2007

FIGURE **3.0-8**

Conceptual Grading Plan

following construction. In addition, the Lab's construction specifications require that contractors properly maintain construction vehicles to minimize fluid leaks and that construction equipment not be refueled in proximity to waterways.

3.10 LRDP MITIGATION MEASURES

Because the proposed project is an element of the growth projected under the 2006 LRDP, relevant mitigation measures in the 2006 LRDP EIR adopted by The Regents in conjunction with the approval of the 2006 LRDP have been incorporated into and made part of the CRT project. The full text of the mitigation measures is provided in Appendix A of the Initial Study as well as in each resource section in **Section 4.0**. The analysis presented in **Section 4.0** evaluates environmental impacts that would result from project implementation following the application of the 2006 LRDP mitigation measures. The 2006 LRDP mitigation measures incorporated into the project would be monitored as specified in the Mitigation Monitoring and Reporting Plan adopted as part of the LRDP 2006 Final EIR.

3.11 PROJECT APPROVALS

LBNL is a federal facility operated by the University of California and conducting work within the University's mission on land owned or controlled by the University. The Board of Regents is the University's decision-making body and is responsible for approving the 2006 LRDP and the facilities to be built on University-owned land. The Regents will review and consider this EIR in conjunction with the review and consideration of the CRT project.

This EIR will also provide information to other agencies with permitting or approval authority over the proposed project. Other potential approvals that the project may need include the following:

- An Authority to Construct and a Permit to Operate for the emergency generator included in the proposed project.
- Coverage under the Statewide NPDES General Permit for Storm Water Discharges Associated with Construction Activity.
- In the unlikely event that the 2006 LRDP is set aside as a result of pending litigation challenging the LRDP EIR, then this EIR would serve as the environmental document for any required amendments to the 1987 LRDP, to the extent such amendments are needed for the CRT project.