



CALIFORNIA ENVIRONMENTAL QUALITY ACT (CEQA)

Initial Study and Tiered Negative Declaration

for the

RCRA Corrective Measures – Remedy Selection Project

Lawrence Berkeley National Laboratory
CA-EPA ID No: CA4890008986
ENVIRONMENTAL RESTORATION PROGRAM

August 2005

TABLE OF CONTENTS

SUMMARY	iii
PROJECT DESCRIPTION.....	iii
PROJECT OBJECTIVES.....	iv
ENVIRONMENTAL ANALYSIS.....	iv
IMPACTS AND MITIGATION MEASURES	iv
ENVIRONMENTAL REVIEW PROCESS	vi
COMMENTS AND RESPONSES	vi
ENVIRONMENTAL CHECKLIST FORM.....	1
I. PROJECT INFORMATION	1
II. PROJECT DESCRIPTION.....	3
Background.....	4
Project Location and Surrounding Land Uses	6
Purpose and Need	6
Project Activities.....	6
<i>Corrective Measures Overview</i>	6
<i>Proposed and Ongoing Corrective Measures</i>	9
Project Schedule.....	16
III. DISCRETIONARY APPROVAL ACTION BEING CONSIDERED BY DTSC	18
IV. ENVIRONMENTAL FACTORS POTENTIALLY AFFECTED.....	18
V. EVALUATION OF ENVIRONMENTAL IMPACTS	19
Response Column Heading Definitions.....	19
Tiering.....	19
Impact Analyses.....	20
1. <i>Aesthetics</i>	20
2. <i>Agriculture</i>	23
3. <i>Air Quality</i>	24
4. <i>Biological Resources</i>	33
5. <i>Cultural Resources</i>	40
6. <i>Geology and Soils</i>	43
7. <i>Hazards and Hazardous Materials</i>	47
8. <i>Hydrology and Water Quality</i>	51
9. <i>Land Use and Planning</i>	55
10. <i>Mineral Resources</i>	58
11. <i>Noise</i>	58
12. <i>Population and Housing</i>	64
13. <i>Public Services</i>	65
14. <i>Recreation</i>	67
15. <i>Transportation/Traffic</i>	68
16. <i>Utilities and Service Systems</i>	75
17. <i>Mandatory Findings of Significance</i>	79
18. <i>Finding of De Minimis Impact to Fish, Wildlife and Habitat</i>	80
VI. DETERMINATION OF THE APPROPRIATE ENVIRONMENTAL DOCUMENT	81

LIST OF TABLES

II-1	Summary of Proposed and Ongoing Corrective Measures.....	10
II-2	Proposed Schedule for Implementation of Proposed Corrective Measures.....	17
V-1	Federal and State Ambient Air Quality Standards.....	26
V-2	Highest 4 Daily Maximum Hourly Ozone Measurements and Number of Days Above the Hourly Standard at Oakland (822 Alice Street) in Parts Per Million (PPM).....	27
V-3	Highest 4 Daily Maximum 8-Hour Carbon Monoxide Averages and Number of Days Above the 8-Hour Standard at Oakland (822 Alice Street) in Parts Per Million (PPM) ...	27
V-4	Highest 4 Daily Maximum PM ¹⁰ Measurements at Fremont (Chapel Way Station) in Micrograms Per Cubic Meter (µg/m ³)	28
V-5	Summary of Ozone Data Summaries for the San Francisco Bay Area Air Basin, 1994-2003	28
V-6	Noise Levels of Typical Excavation Equipment	62
V-7	Measured Noise Levels at Sensitive Receptor Locations	63

LIST OF FIGURES

II-1	RCRA Corrective Action Process.....	5
II-2	General Project Location	7
II-3	Project Site	8
V-1	Artificial Noise Source (ANS) Arrangement and Sensitive Receptor Measurement Locations.....	61

ATTACHMENT 1

Regional List of Special Status Plant and Animal Species

ATTACHMENT 2

References

SUMMARY

PROJECT DESCRIPTION

The Department of Toxic Substances Control (DTSC) is considering approval of a Corrective Measures Study (CMS) Report that would allow the U.S. Department of Energy (DOE) and the Ernest Orlando Lawrence Berkeley National Laboratory (Berkeley Lab or LBNL) to implement corrective measures that would remediate contaminants in soil and groundwater associated with historical chemical releases at the facility. If DTSC approves the CMS Report, the selected cleanup measures will be put in place.

As a condition of the Hazardous Waste Facility Permit issued by the DTSC, LBNL has been required to investigate and address historical releases of hazardous wastes and materials that may have occurred at the site. The investigation and cleanup process consists of multiple steps, some of which have already been completed. The areas that need to be addressed have been identified and investigated. Cleanup activities have already been conducted in some areas as part of Interim Corrective Measures (ICMs) that were implemented to protect human health or the environment. The final step of the RCRA Corrective Action cleanup process is to determine the best way to clean the remaining contamination and then to begin the final clean up.

The document evaluating possible cleanup methods and recommending which cleanup methods to implement, called the Corrective Measures Study Report, or CMS Report, is being made available to the public and other agencies for their review and comment, concurrent with the release of this Initial Study. After DTSC receives comments on the CMS Report and the Initial Study it will consider approval of the CMS Report. If DTSC approves the CMS Report, LBNL would be authorized to put into place the corrective actions recommended in that document. These activities would be completed as part of the Corrective Measures Implementation (CMI) phase of the Project.

Four areas of soil contamination and eleven areas of groundwater contamination are evaluated in the CMS Report. However, during the period the CMS Report was being prepared and finalized, LBNL conducted ICMs (soil excavation and off-site disposal) at two of the areas of soil contamination that resulted in the required cleanup levels being achieved. No additional corrective action was therefore recommended for either of these units. In addition, the CMS Report finds that four areas of groundwater contamination require no action because concentrations of contaminants are below the applicable cleanup levels. The remaining two areas of soil contamination and seven areas of groundwater contamination are subject to ongoing and/or future cleanup actions.

Different cleanup technologies are recommended in the CMS Report for the two areas with soil contamination and seven areas of groundwater contamination. The technology recommended for soil clean up is excavation and off-site disposal of contaminated soil. The primary technologies recommended for groundwater cleanup are *in situ* soil flushing and monitored natural attenuation (MNA).

Excavation and off-site disposal are recommended for the cleanup of the two contaminated soil areas near Buildings 7 and 51L. Contaminated soil in these areas would be excavated and placed in covered storage bins until the bins could be shipped off site for disposal in accordance with applicable local, state, and federal laws and regulations.

Soil flushing and/or MNA are recommended for the cleanup of contaminated groundwater near Buildings 51/64, 51L, 69, and 71B, and in the "Old Town Area" near Buildings 7, 25A, and 52. Soil flushing

consists of the simultaneous injection of clean water into, and extraction of contaminated water from, the subsurface. The purpose of soil flushing is to promote flow of contaminated groundwater towards extraction point(s) and to increase the rate that residual soil contaminants desorb into the flowing groundwater. The extracted groundwater would be treated to non-detectable levels on site using granular activated carbon (GAC) canisters, and then reinjected to flush contaminants from the subsurface or, if the water is not needed for flushing, discharged to the sanitary sewer under a permit issued by the East Bay Municipal Utility District. The initial construction or installation phases for most of the soil flushing systems recommended in the CMS Report have already been completed as part of pilot tests or ICMs conducted over the past few years. The corrective measures in most cases consist of adoption or expansion of these pilot tests and ICMs. MNA would be applied in areas where hydrochemical data indicate that natural processes (*e.g.*, biodegradation) are reducing the mass of contaminants, and consists of continued monitoring of the effectiveness of these processes.

Investigating and addressing radionuclide contamination are not included in the CMS and CMI since radionuclides and radioactive waste are not regulated under the Resource Conservation and Recovery Act (RCRA). Radiological contamination at LBNL is under the oversight of the DOE .

A separate project on the LBNL site is scheduled to begin in FY 2006 or FY 2007. This separate project will involve the demolition of Building 51 and interior Building 51A structures. The project will include removal of all utility connections, equipment and slab foundations (please see Notice of Preparation, Draft Environmental Impact Report, Building 51 and Bevatron Demolition dated March 15, 2005).

The present project, RCA Corrective Measures, involves the remediation of soil and groundwater contamination at former building 51L which is adjacent to Building 51/51A. However, soil and groundwater remediation activities that are analyzed in the DTSC Initial Study for Building 51L do not overlap the footprint (the space beneath Building 51/51A) of the Bevatron project. A separate environmental analysis would be performed once those buildings are demolished, the soil and groundwater have been characterized, and it is determined that remediation measures are necessary.

PROJECT OBJECTIVES

The objective of the Project is to construct and complete the corrective measures (cleanup activities) recommended in the CMS Report. These activities would be implemented to reduce or eliminate the potentially adverse effects to human health or the environment caused by historic releases of chemicals to soil and groundwater at LBNL. They would be completed as part of the RCRA Corrective Measures Implementation phase of the Project.

ENVIRONMENTAL ANALYSIS

This Initial Study is tiered from the 1987 Long Range Development Plan Environmental Impact Report (1987 LRDP EIR), as amended in 1992 and 1997, and relies on the 1987 LRDP EIR, as amended, for: (1) a discussion of general background and setting information for environmental topic areas; (2) an evaluation of overall growth-related issues; and (3) issues that were evaluated in sufficient detail in the 1987 LRDP EIR, as amended, for which there is no significant new information or there are no changes in circumstances that would require further analysis. The Initial Study analyzes the potential impacts of the Project and the adequacy of the analysis in the LRDP EIR, as amended, with regard to the following environmental topic areas as required by California Environmental Quality Act (CEQA): (1) aesthetics; (2) agricultural resources; (3) air quality; (4) biological resources; (5) cultural resources; (6) geology and soils; (7) hazards and hazardous materials; (8) hydrology and water quality; (9) land use and planning;

(10) mineral resources; (11) noise; (12) population and housing; (13) public services; (14) recreation; (15) transportation and traffic; (16) utilities and service systems; and (17) cumulative impacts.

IMPACTS AND MITIGATION MEASURES

Based on the analysis contained in this Initial Study, it was determined that for all resource areas, the proposed Project would not result in any impacts that are not sufficiently addressed by mitigation measures contained in the 1987 LRDP EIR, as amended. Based on this analysis, DTSC prepared a Tiered Negative Declaration.

Impacts identified in the analysis were determined to be less-than-significant for the reasons set forth in the Initial Study / Tiered Negative Declaration (IS/ND). There are no Project-specific mitigation measures required for the Project. Existing Mitigation Measures from LRDP EIR, as amended, that are included as part of the Project are as follows:

<p>MITIGATION MEASURES FROM THE 1987 LRDP EIR, AS AMENDED, INCLUDED AS PART OF THE RCRA CORRECTIVE MEASURES PROJECT</p>
<p>AESTHETICS <i>Mitigation Measure III-D-2a:</i> Revegetation of disturbed areas, including slope stabilization sites, using native shrubs, trees, and grasses will be included as part of all new projects. <i>Mitigation Measure III-D-2f:</i> Periodic monitoring of disturbed areas, fill slopes, and other areas of exposed soil treated under the revegetation program will be conducted and [these areas will be] fixed.</p>
<p>AIR QUALITY <i>Mitigation Measure III-J-1:</i> Construction contract specifications would require that during construction exposed surfaces would be wetted twice daily or as needed to reduce dust emissions. In addition, contract specifications would require covering of excavated materials.</p>
<p>BIOLOGICAL RESOURCES <i>Mitigation Measure III-D-2a:</i> Revegetation of disturbed areas, including slope stabilization sites, using native shrubs, trees, and grasses will be included as a part of all new projects. <i>Mitigation Measure III-D-2f:</i> Periodic monitoring of disturbed areas, fill slopes, and other areas of exposed soil treated under the revegetation program will be conducted and [these areas will be] fixed.</p>
<p>GEOLOGY AND SOILS <i>Mitigation Measure III-B-1:</i> Geologic and soils studies will be undertaken during the design phase of each LBNL building project. Recommendations contained in those studies would be followed to ensure that the effects of landsliding, lurching, and liquefaction potential will not represent a significant adverse impact during a seismic event. <i>Mitigation Measure III-B-2a:</i> Excavation and earth moving will be designed for stability, and accomplished during the dry season when feasible. Drainage will be arranged to minimize silting, erosion, and landsliding. Upon completion, all land will be restored, covering exposed earth with planting. <i>Mitigation Measure III-B-2c:</i></p>

MITIGATION MEASURES FROM THE 1987 LRDP EIR, AS AMENDED, INCLUDED AS PART OF THE RCRA CORRECTIVE MEASURES PROJECT

Excavations will be shored as required by law to preclude minor short-term landslides during construction.

Mitigation Measure III-B-2d:

Revegetation of disturbed areas, including slope stabilization sites, using native shrubs, trees, and grasses will be included as part of all new projects.

HAZARDS AND HAZARDOUS MATERIALS

Mitigation Measure IV-K-2a:

Prior to shipping any hazardous materials to any hazardous waste treatment, storage or disposal facility, LBNL will confirm that the facility is licensed to receive the type of waste LBNL is proposing to ship to that facility.

Mitigation Measure IV-K-3:

LBNL will require hazardous waste haulers to provide evidence that they are appropriately licensed to transport the type of wastes being shipped from LBNL.

NOISE

Mitigation Measure III-K-2:

Noise-generating construction equipment will be located as far as possible from existing buildings. If necessary, windows of laboratories or offices will be temporarily covered to reduce interior noise levels on-site.

ENVIRONMENTAL REVIEW PROCESS

The IS/ND was prepared in accordance with CEQA and the DTSC procedures for implementation of CEQA. The draft IS/ND will be circulated for agency and public review on April 25, 2005; comments are requested to be received by June 8, 2005.

COMMENTS AND RESPONSES

This document will be circulated for public comment beginning April 25, 2005, and ending June 8, 2005. Comments will be considered in the finalization of the document and will be referenced.

ENVIRONMENTAL CHECKLIST FORM

The Department of Toxic Substances Control (DTSC) has completed the following Initial Study for this Project in accordance with the California Environmental Quality Act (CEQA) (Section 21000 *et seq.*, California Public Resources Code) and Guidelines for Implementation (Section 15000 *et seq.*, Title 14, California Code of Regulations).

I. PROJECT INFORMATION

Project title:	CORRECTIVE MEASURES PROJECT
Lead agency name and address:	Department of Toxic Substances Control 700 Heinz Avenue, Suite 300 Berkeley, CA 94710-2721
Contact person and phone number:	Waqar Ahmad, Project Manager 510-540-3932
Project location:	University of California Lawrence Berkeley National Laboratory Alameda County City of Berkeley and City of Oakland
Project sponsor's name and address:	University of California Lawrence Berkeley National Laboratory One Cyclotron Road Berkeley, CA 94720
Custodian of the administrative record:	Waqar Ahmad, Project Manager 510-540-3932

This environmental analysis is an Initial Study and proposed Negative Declaration (IS/ND) for the Implementation of Corrective Measures at Lawrence Berkeley National Laboratory (proposed Project). The IS/ND is tiered from three programmatic, site-wide CEQA documents:

- The *Site Development Plan* EIR, August 1987 (State Clearinghouse No. [19]85112610);
- The *Proposed Renewal of the Contract between the United States Department of Energy and The Regents of the University of California for Operation and Management of the Lawrence Berkeley National Laboratory*, Supplemental EIR, September 1992 (State Clearinghouse No. [19]91093068); and
- The *Proposed Renewal of the Contract between the United States Department of Energy and The Regents of the University of California for Operation and Management of the Lawrence Berkeley National Laboratory*, Supplemental EIR Addendum, September 1997 (State Clearinghouse No. [19]91093068).

These documents are referred to herein as the “LRDP EIR, as amended.” The LRDP or Long Range Development Plan is the University of California’s term for a campus-wide planning document. Each UC campus is required to periodically re-examine its academic goals and devise physical plans to support them. The LRDP is the planning tool to guide the physical development of the campus—in this case, LBNL.

References in this IS/ND to mitigation measures in the LRDP EIR, as amended, are based on the numbering system used in the 1992 and 1997 documents. The LRDP EIR, as amended, is available at the following location:

Berkeley Public Library
2nd floor Reference Desk
2090 Kittredge Street
Berkeley, CA 94704

In accordance with Sections 15152 and 15168 of the CEQA *Guidelines*, and Public Resource Code Section 21094, the IS/ND is tiered from the LRDP EIR, as amended. The LRDP EIR, as amended, is a Program EIR, prepared pursuant to Section 15168 of the CEQA Guidelines (Title 14, California Code of Regulations, Sections 15000 et seq.). The programmatic LRDP EIR, as amended, analyzes full implementation of uses and physical development proposed under the 1987 LRDP through the year "20XX," which is an indeterminate horizon year flexibly projected to occur within the current century. Measures are identified in the LRDP EIR, as amended and adopted by The UC Regents, to mitigate the significant adverse project and cumulative impacts associated with that growth.

Under CEQA, "tiering" refers to the coverage of general environmental matters in broad program-level analysis, with subsequent focused environmental documents for individual projects that implement the program. This environmental document is tiered from the LRDP EIR, as amended, and concentrates on project-specific issues. CEQA and the CEQA Guidelines encourage the use of tiered environmental documents to reduce delays and excessive paperwork in the environmental review process. This is accomplished in documents by eliminating repetitive analyses of issues that are adequately addressed in the Program EIR and by incorporating those analyses by reference.

Section 15168(d) of the CEQA *Guidelines* provides direction for simplifying the preparation of environmental documents by incorporating by reference factors that apply to the program as a whole. In reference to CEQA *Guidelines* Section 15152(d), the environmental review for a later activity consistent with the program or plan should be limited to effects that were not analyzed as significant effects in the prior EIR or that are susceptible to substantial reduction or avoidance. Therefore, the environmental analysis for the proposed Project allows this Tiered IS/ND to rely on the LRDP EIR, as amended, for the following:

- a discussion of general background and setting information for environmental topic areas;
- overall growth-related issues;
- issues that were evaluated in sufficient detail in the LRDP EIR, as amended, for which there is no significant new information or change in circumstances that would require further analysis;
- long-term cumulative impacts assessment; and
- mitigation measures from the 1987 LRDP EIR, as amended, which are applicable to the proposed Corrective Measures Implementation (CMI) Project and are included in the CMI Project Description.

The purpose of this Tiered IS/ND is to evaluate the potential environmental impacts of the proposed Project with respect to the LRDP EIR, as amended.

A list of the LRDP EIR, as amended, mitigation measures that are incorporated into the project description is provided at the end of each topic section under Summary of Impacts and Mitigation Measures.

Discretionary approval authority and other public agencies whose approval is required:

Agency	Approval or permit
Department of Toxic Substances Control, California Environmental Protection Agency	CEQA Lead Agency and Project approval Adoption of Initial Study and Tiered Negative Declaration
U.S. Department of Energy	NEPA Lead Agency and funding approval Incorporation of NEPA values into the Corrective Measures Study

Public and Agency Review:

The Draft IS/ND was circulated for public and agency review from April 25, 2005 to June 8, 2005. Copies of the IS/ND, along with programmatic tiering documents, were made available for review at the following location:

Berkeley Public Library
2nd floor Reference Desk
2090 Kittredge Street
Berkeley, California.

In addition, the IS/ND is available on-line at: <http://www.dtsc.ca.gov/HazardousWaste/LBNL/index.html>

To have been considered in the decision making for this Project, all comments on the Draft IS were to have been received by June 8, 2005 at the following address:

Waqar Ahmad, Project Manager
Department of Toxic Substances Control
700 Heinz Avenue, Suite 300
Berkeley, CA 94710-2721

The State of California's Office of Planning and Research State Clearinghouse acknowledged receipt of the Initial Study and Tiered Negative Declaration and on June 1, 2005 issued State Clearinghouse number 2005042160 for this Project.

II. PROJECT DESCRIPTION

The Department of Toxic Substances Control (DTSC) is considering approval of a Corrective Measures Study (CMS) Report that would allow the U.S. Department of Energy (DOE) and the Ernest Orlando Lawrence Berkeley National Laboratory (Berkeley Lab or LBNL) to implement corrective measures that would remediate contaminants in soil and groundwater associated with historical chemical releases at the facility. The corrective measures include excavation and off-site disposal of contaminated soil, soil flushing, extraction of groundwater and removal of contaminants using granular activated carbon (GAC), monitored natural attenuation of contaminants in groundwater, and extraction and treatment of soil gases with a soil vapor extraction and treatment system. Localized application of chemical oxidants and Hydrogen Release Compounds[®] (HRC[®]) would also be used to enhance natural degradation processes.

This action is being taken in accordance with requirements of the Resource Conservation and Recovery Act (RCRA). LBNL's Hazardous Waste Handling Facility operates under a RCRA Hazardous Waste Facility Permit issued by DTSC. Section 3004(u) of RCRA, as amended by the Hazardous and Solid Waste Amendments and Title 40 of the Code of Federal Regulations Section 264, require that permits issued after November 8, 1984 address corrective action for all releases of hazardous wastes at RCRA facilities. Therefore, the Permit requires that LBNL investigate and address its historic releases of hazardous waste.

The requirements for completing the CMS and preparing the CMS Report were based on the provisions of LBNL's Hazardous Waste Facility Permit and RCRA corrective action guidance provided by the U.S. Environmental Protection Agency. Those requirements were incorporated into the CMS Plan, which was approved by the DTSC on June 18, 2002. The CMS Report was prepared in accordance with the CMS Plan.

Background

LBNL began research activities at its present location during the 1940s. As a result of past operations, hazardous materials such as degreasers and petroleum products were released to soil and groundwater, primarily by spills and leaks in piping systems. LBNL now has improved operation control systems and practices to prevent spills and unwanted releases. Still, some chemicals from these historical releases remain in the soil and groundwater. In 1993, DTSC issued a Hazardous Waste Facility Permit to LBNL. As a condition of that permit, LBNL was required to investigate and address all historical releases of hazardous waste and chemicals that may have occurred at the site.

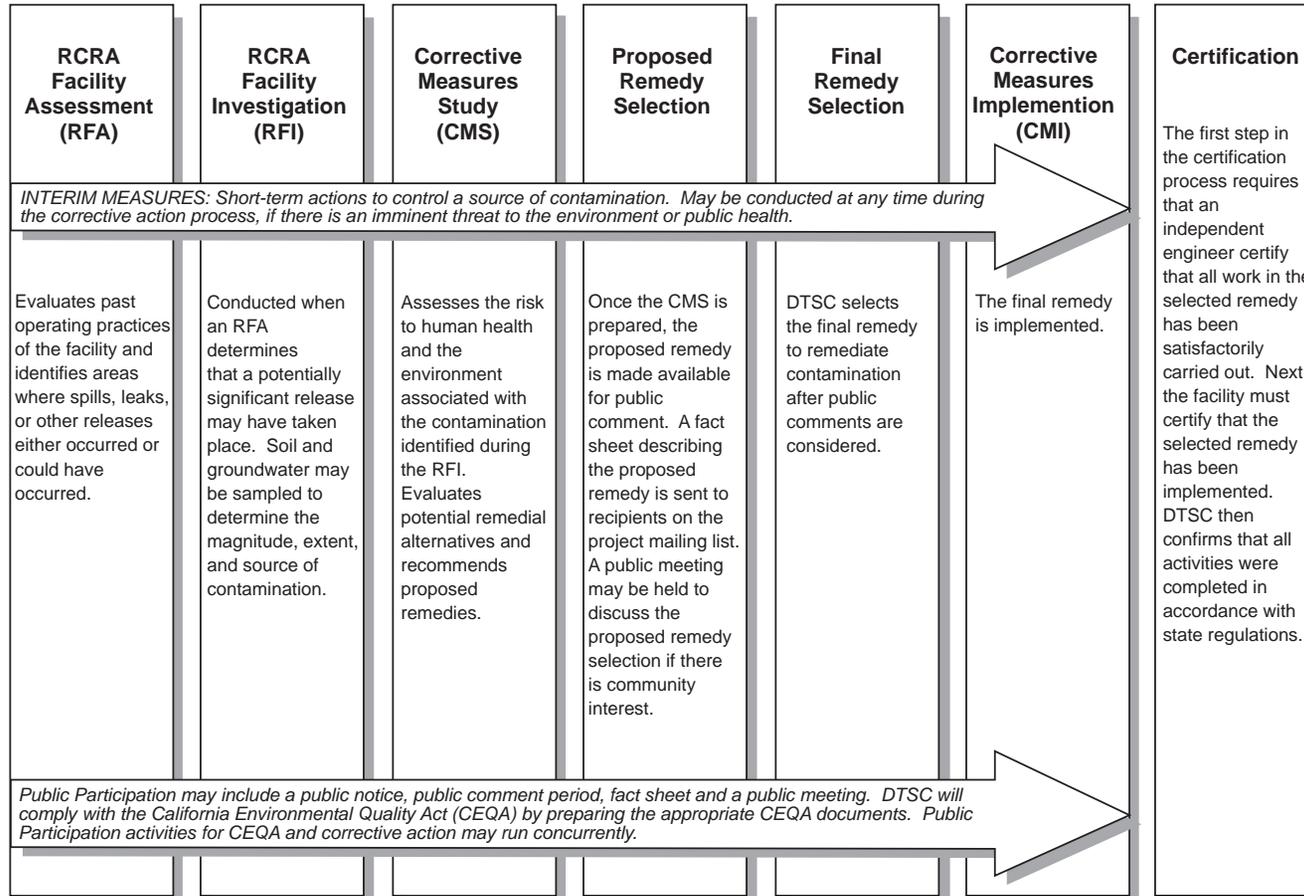
Clean up of areas that have been contaminated is a multi-step process (Figure II-1). The areas that need to be addressed have been identified and investigated. Cleanup activities have already been conducted in some areas as part of Interim Corrective Measures (ICMs) that were implemented to protect human health or the environment. The final step of the process is to determine the best way to clean up the remaining contamination and to begin the final cleanup. The document evaluating final cleanup methods—the CMS Report—is being made available to the public and other agencies for their review and comment, concurrent with the release of this Initial Study.

The initial draft of the CMS Report was submitted by LBNL to DTSC in July 2004 and DTSC has completed a technical review of the document. This review was made to ensure that the document has complete information and that the information is technically accurate. The San Francisco Bay Region of the California Regional Water Quality Control Board (RWQCB) and the City of Berkeley also reviewed the document and provided their comments to DTSC. LBNL responded to the agency comments and revised the draft document in February 2005. After completing its review of the revised draft, DTSC has (1) prepared a Statement of Basis of its decision regarding Remedy Selection, (2) completed the environmental documentation (i.e., this Initial Study) pursuant to the California Environmental Quality Act (CEQA), and (3) revised the Corrective Action Section of LBNL's Hazardous Waste Facility Permit. DTSC is now formally soliciting public comments on these documents during a 45-day comment period. After all comments have been received, DTSC will make a decision on the best cleanup alternative for each area with soil or groundwater contamination. If DTSC approves the CMS Report, the selected cleanup measures will be put in place.

Figure II-1: RCRA Corrective Action Process

Corrective Action Process

(modified from the DTSC fact sheet dated November 2000)



August 2004, Berkeley Lab

Project Location and Surrounding Land Uses

LBNL is located in the cities of Berkeley and Oakland in Alameda County on property owned by the University of California (UC) (Figure II-2). The proposed corrective measures would be implemented within the developed portion of LBNL near existing buildings (Figure II-3). Most activities would occur near Buildings 51, 51L, 64, 69A, and 71B, and in the “Old Town Area” near Buildings 7, 25A and 52. The Project site is primarily located within the City of Berkeley portion of LBNL, with one small area, where MNA is the proposed corrective measure, located in the City of Oakland. In addition to the LBNL facilities surrounding the Project area, adjacent land uses include residential areas to the north, UC Berkeley athletic fields and recreational facilities to the south, residential areas and UC Berkeley student housing, amphitheater, and classrooms to the west, and the UC Berkeley Lawrence Hall of Science Museum to the east.

Purpose and Need

The purpose of the Project is to construct or complete the corrective measures (cleanup activities) recommended in the CMS Report. Implementation of the cleanup activities is needed to reduce or eliminate the potentially adverse effects to human health or the environment caused by historic releases of chemicals to soil and groundwater at LBNL. Cleanup activities would be conducted as part of the Corrective Measures Implementation (CMI) phase of the Project. If the CMS Report is approved by DTSC, LBNL would be authorized to implement the corrective measures recommended in that document.

Project Activities

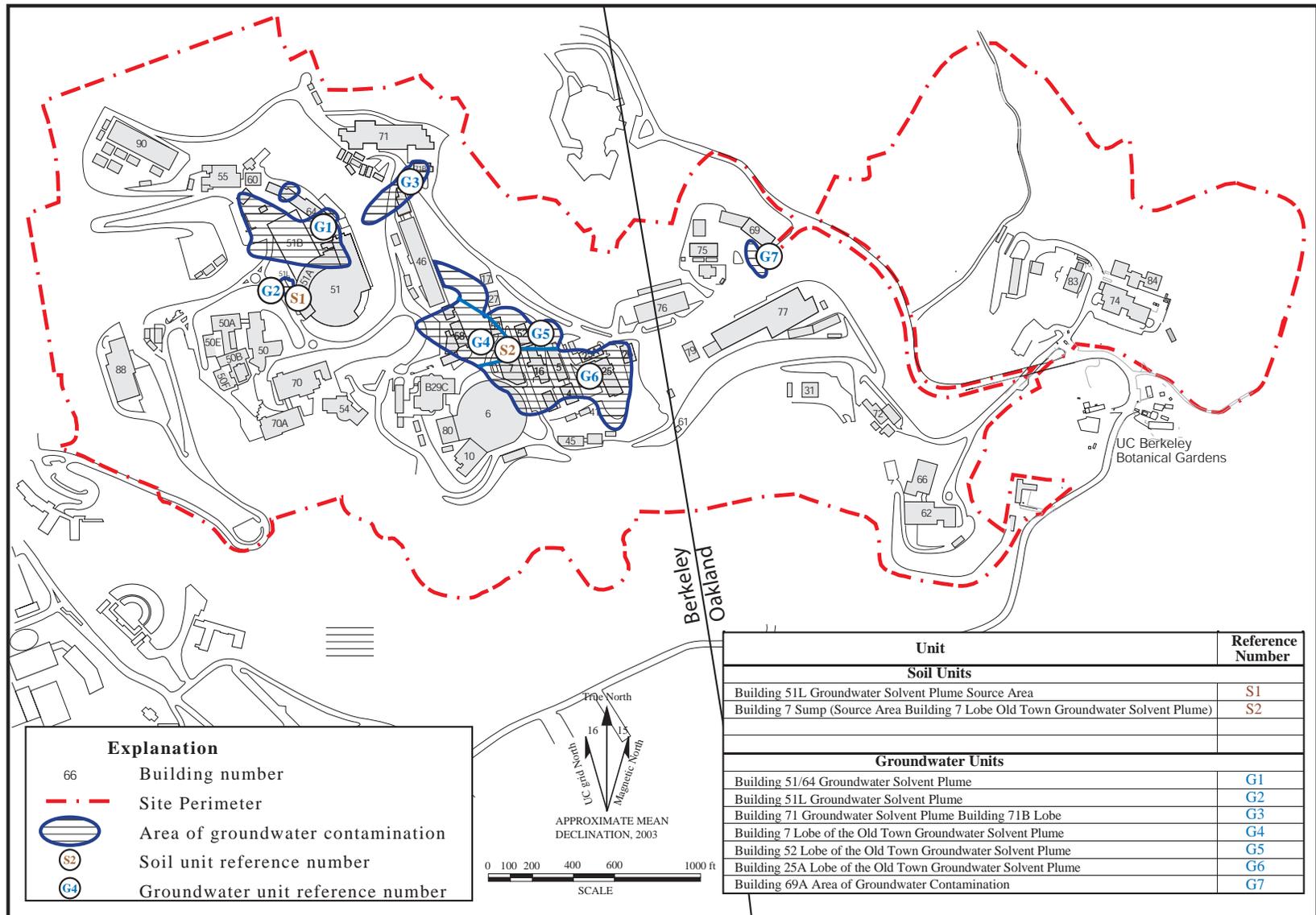
Corrective Measures Overview

Four areas of soil contamination and eleven areas of groundwater contamination are evaluated in the CMS Report. During the period the CMS Report was being prepared and finalized, LBNL conducted ICMs (soil excavation and off-site disposal) at two of the areas of soil contamination that resulted in the required cleanup levels being achieved. No additional corrective action was therefore recommended for either of these units (the Building 88 Hydraulic Gate Unit and the Building 75 Former Hazardous Waste Handling and Storage Facility). In addition, the CMS Report found that four areas of groundwater contamination required no action since concentrations of contaminants are below the applicable cleanup levels. These areas are the Building 76, Building 75/75A, and Building 77 Areas of Groundwater Contamination, and Benzene Detected in Wells East of Building 75A. The remaining two areas of soil contamination and seven areas of groundwater contamination are subject to ongoing and/or future cleanup actions and are discussed in the following sections.

Different cleanup technologies are recommended for soil and groundwater. The technology recommended for soil cleanup is excavation and off-site disposal of contaminated soil. The primary technologies recommended for groundwater cleanup are *in situ* soil flushing and monitored natural attenuation (MNA). Localized injection of chemical oxidants and Hydrogen Release Compounds[®] (HRC[®]) is also being used to enhance natural degradation processes.

Excavation and off-site disposal are recommended for the cleanup of contaminated soil near Buildings 7 and 51L. Contaminated soil in these areas would be excavated and placed in covered storage bins until the bins could be shipped off site for disposal in accordance with applicable local, state, and federal laws and regulations.

Figure II-3: Project Site



Soil flushing or MNA are recommended for the cleanup of contaminated groundwater near Buildings 51/64, 51L, 69A, and 71B, and in the “Old Town Area” near Buildings 7, 25A and 52. Soil flushing would consist of simultaneous injection of clean water into, and extraction of contaminated water from, the subsurface. The purpose of soil flushing is to promote flow of contaminated groundwater towards extraction point(s) and to increase the rate that residual soil contaminants desorb into the flowing groundwater. The extracted groundwater would be treated to non-detectable levels on site using GAC canisters, and then reinjected to flush contaminants from the subsurface, or discharged to the sanitary sewer under a permit issued by the East Bay Municipal Utility District (EBMUD), if the water is not needed for flushing. The initial construction or installation phases for most of the soil flushing systems recommended in the CMS Report have been completed in the past few years as part of pilot tests or ICMs. The corrective measures in most cases consist of adoption or expansion of these pilot tests and ICMs. MNA would be applied in areas where hydrochemical data indicate that natural processes (*e.g.*, biodegradation) are reducing the mass of contaminants, and consists of continued monitoring of the effectiveness of these processes.

Pilot studies and ICMs that would be adopted or extended as final cleanup measures and additional corrective measure recommendations for specific sites are described in the Proposed and Ongoing Corrective Measures section that follows.

Proposed and Ongoing Corrective Measures

Corrective measures are recommended in seven areas where chemicals have been released to soil and/or groundwater. Two of these areas include both a groundwater unit and a soil unit that has been identified as the source of the contamination at the groundwater unit. As noted previously, most corrective measures would consist of the adoption or expansion of pilot tests or ICMs, while a few would involve new activities. The proposed actions for each area are summarized in Table II-1 and discussed in greater detail in the following subsections:

Building 51/64 Groundwater Solvent Plume

Ongoing Corrective Measure: In Situ Soil Flushing

Treated groundwater is injected into an infiltration trench inside Building 64 and extracted from a collection trench and a gravel-filled excavation located near the southeast corner of the building.

The extraction trench is approximately 34 feet long, 2 feet wide, and ranges from 25 feet deep at its southeast end to 36 feet deep at its northwest end. A 6-inch polyvinyl chloride (PVC) screen and riser were installed in the deepest (western) end of the trench to extract groundwater and the trench was backfilled with gravel to approximately 5 feet below the surface. Two layers of Tyvek™ were placed over the gravel, and then the trench was backfilled to approximately 6 inches below the surface with low-strength concrete. A layer of reinforced concrete was replaced at the surface.

The infiltration trench is approximately 17 feet long, 3.5 feet wide, and 11 to 12 feet deep. The bottom of the trench excavation was covered with a high-density polyethylene (HDPE) liner. Approximately 2 feet of gravel (drain rock) was placed on top of the HDPE liner and a 4-inch diameter perforated pipe was embedded in the gravel to distribute the water. The trench was backfilled with low strength concrete to within approximately 0.5 feet from the surface. A layer of reinforced concrete was replaced at the surface.

Table II-1

SUMMARY OF PROPOSED AND ONGOING CORRECTIVE MEASURES

AREAS WITH SOIL AND/OR GROUNDWATER CONTAMINATION	PROPOSED ACTIONS ¹
Building 51/64 Groundwater Plume	<p>Continue operation of <i>in situ</i> soil flushing system in Building 64.</p> <p>Continue collecting and treating water from the Building 51 subdrain system.</p> <p><i>Expand the in situ soil flushing system by constructing a new groundwater extraction trench on the southwest end of Building 64.</i></p> <p><i>Implement MNA for contaminants in the groundwater plume.</i></p>
Building 51L Groundwater Solvent Plume and Building 51L Source Area	<p>Continue operation of <i>in situ</i> soil flushing system.</p> <p><i>Excavate contaminated soil in the plume source area and dispose of off site. Backfill excavation with clean permeable material to allow extraction of contaminated groundwater, if required.</i></p> <p><i>Reconstruct Building 51L storm drain catch basin to prevent inflow of groundwater into storm drain system And remove existing extraction wells.</i></p> <p><i>Implement MNA for remaining groundwater contaminants.</i></p>
Building 71 Groundwater Solvent Plume - Building 71B Lobe	<p>Continue operation of <i>in situ</i> soil flushing system.</p> <p>Continue collecting and treating water from the hydraugers (hillside drains) in the hillside beneath Building 46A.</p> <p><i>Treat VOCs in soil adjacent to the Building 71 foundation with an in situ chemical oxidation process.</i></p>
Old Town Groundwater Solvent Plume – Building 7 Lobe and Former Building 7 Sump	<p>Continue operation of <i>in situ</i> soil flushing system (Building 7 Groundwater Collection Trench) in plume source area downgradient of the former Building 7 sump.</p> <p>Continue operation of <i>in situ</i> soil flushing system in the plume core downgradient of the Building 7 Groundwater Collection Trench).</p> <p>Continue operation of the groundwater collection trenches near the southeast corner and on the west site of Building 58.</p> <p>Continue operation of the dual phase extraction wells on the hillside below Building 7, which are used to extract and treat both groundwater and soil gas from the area near the downgradient edge of the Building 7 groundwater plume.</p> <p><i>Excavate contaminated soil in the plume source area and dispose of off site. Backfill base of excavation with clean gravel to allow extraction of contaminated groundwater, if required.</i></p> <p><i>Implement MNA for contaminants in the groundwater plume.</i></p>
Old Town Solvent Plume - Building 25A Lobe	<p>Continue operation of <i>in situ</i> soil flushing system (groundwater infiltration bed and extraction trench) near Buildings 25A and 44A.</p> <p>Continue to collect and treat groundwater from an electrical utility manhole near Building 6 to prevent potential migration of contaminants through electrical conduits.</p> <p><i>Implement MNA for contaminants in the groundwater plume.</i></p>

AREAS WITH SOIL AND/OR GROUNDWATER CONTAMINATION	PROPOSED ACTIONS ¹
Old Town Solvent Plume - Building 52 Lobe	Continue to collect and treat groundwater intercepted by the subdrain east of Building 46. Continue operation of <i>in situ</i> soil flushing system (injection and extraction wells) near Building 53 and 52.
Building 69A Groundwater Contamination	<i>Implement MNA for contaminants in the groundwater.</i>

Source: LBNL 2004

1. In addition to the actions described in the table, the following measures will be implemented:

- Hydrogen Release Compounds (HRC[®]) would be injected into selected wells or placed in excavations in some areas of groundwater contamination identified in the table to help accelerate the natural processes that biodegrade contaminants.
- Water in the Building 51A subdrain will continue to be collected and treated to prevent flow of contaminated drain water to surface water.

Groundwater extracted from the collection-trench and gravel-filled excavation is treated to nondetectable levels of Volatile Organic Compounds (VOCs) using GAC. The Building 64 treatment system consists of a 1,000-pound GAC canister with an in-line 55-gallon GAC drum as backup. The treated groundwater is recirculated to the infiltration trench. The used carbon is shipped off site by a certified hazardous waste hauler for regeneration approximately annually. Treated water could also be disposed of in the sanitary sewer in accordance with LBNL's EBMUD Wastewater Discharge Permit, if the water was not needed for flushing.

Ongoing Corrective Measure: Building 51 Motor Generator Room Basement Discharge Sump Effluent Treatment

A GAC treatment system has been installed to treat the contaminated effluent from the Building 51 Motor Generator Room Basement discharge sump. The sump collects water from the Building 51 subdrain system. The Building 51 Motor Generator Room Basement treatment system consists of two in-line 1,000-pound GAC canisters. The treated effluent is discharged to the sanitary sewer in accordance with LBNL's Wastewater Discharge Permit. The used carbon is shipped off site by a certified hazardous waste hauler for regeneration approximately annually.

Proposed Corrective Measure: Expand In Situ Soil Flushing by Constructing Additional Groundwater Extraction Trench

An additional groundwater extraction trench would be constructed in the paved area along the southwest end of Building 64. The trench would be approximately 25-feet deep, 40-feet long, and 2-feet wide and would be slightly deeper towards the northeast end. The trench would be excavated by drilling a series of adjacent 2-foot diameter borings. A 6-inch PVC screen and riser would be installed in the deepest end of the trench to extract the groundwater and the trench would be backfilled with gravel to about 5 feet from the surface. The gravel would be covered with geotextile fabric. The trench would be backfilled to about 6 inches below the surface with low-strength concrete. The extracted groundwater would be treated by the Building 64 GAC system. Treated groundwater would be recirculated to the existing injection trench inside Building 64, or disposed of in the sanitary sewer in accordance with LBNL's Wastewater Discharge Permit if the water is not needed for flushing. The excavated soil removed during construction of the trench would be stored in covered bins on site, until shipped off site for disposal in accordance with applicable local, state, and federal laws and regulations.

Proposed Corrective Measure: Monitored Natural Attenuation

Available hydrochemical data indicate that natural attenuation processes are degrading contaminants in the area downgradient (west) of Building 64. Therefore, MNA would be used as the remediation method for this part of the plume. No construction would be required. The effectiveness of MNA would be assessed by collecting groundwater samples from existing groundwater monitoring wells.

Building 51L Groundwater Solvent Plume and Building 51L Source Area

Ongoing Corrective Measure: In Situ Soil Flushing

The soil flushing system extracts contaminated groundwater from a well, treats the extracted water by GAC and then reinjects the clean water into an upgradient groundwater monitoring well. This process creates a cycle that flushes contaminants from the soil as groundwater flows between the injection and extraction wells. The Building 51L treatment system consists of a 1,000-pound GAC canister with an in-line 55-gallon GAC drum as backup located at Building 51L. The used carbon is shipped off site by a certified hazardous waste hauler for regeneration approximately annually.

Proposed Corrective Measure: Soil Excavation in Plume Source Area with Off-site Disposal

Contaminated soil in the source area for the groundwater contamination would be excavated within an area of approximately 1,600 square feet to a depth of 10 to 20 feet. The ground surface in the excavation area is paved. Approximately 1,100 cubic yards of excavated soil would be stored in covered bins on site, until shipped off site for disposal in accordance with applicable local, state, and federal laws and regulations. Approximately 110 truck trips would be required to transport the excavated soil off site for disposal. Soil may also be temporarily stockpiled at the surface and covered with continuous heavy-duty plastic sheeting in accordance with requirements of the Bay Area Air Quality Management District (BAAQMD). Excavation would be completed using either a long-armed excavator or a drilling rig, which would auger closely-spaced, large-diameter borings. A loader would be used to place the excavated soil in the bins.

When the excavation is complete, drain rock would be installed in the bottom 5 to 10 feet of the excavation (below the water table) and covered with geotextile fabric. Six-inch PVC screens and risers would be installed in the deepest sections of the excavation to allow the extraction of contaminated groundwater. The upper portion of the excavation would be backfilled with low strength concrete. Extracted groundwater would be piped to the existing Building 51L treatment system. The treated effluent would be discharged to the sanitary sewer in accordance with LBNL's Wastewater Discharge Permit.

Proposed Corrective Measure: Reconstruct Storm Drain Catch Basin

The bottom of the Building 51L storm drain catch basin would be raised to prevent the inflow of contaminated groundwater into the storm drain system. Construction equipment would consist of a backhoe. Following completion of this activity, the two groundwater extraction wells that were used to prevent contaminated groundwater from entering the storm drain at Building 51L would be abandoned.

Proposed Corrective Measure: Monitored Natural Attenuation

MNA would be used for remediation of the residual groundwater contamination after the source area has been excavated. No construction would be required. The effectiveness of MNA would be assessed by collecting groundwater samples from existing groundwater monitoring wells.

Building 71 Groundwater Solvent Plume - Building 71B Lobe

Ongoing Corrective Measure: In Situ Soil Flushing

Treated water is being injected into a gravel-filled excavation in the Building 71B lobe source area and extracted from three downgradient wells. Groundwater extracted from the wells is treated using a GAC treatment system. The Building 71B treatment system consists of a 1,000-pound GAC canister with an in-line 55-gallon GAC drum as backup. The treated groundwater is recirculated to the excavation for injection. The used carbon is shipped off site by a certified hazardous waste hauler for regeneration approximately annually. Treated water could also be disposed of in the sanitary sewer in accordance with LBNL's Wastewater Discharge Permit, if the water is not needed for flushing.

Ongoing Corrective Measure: Capture and Treat Contaminated Hydrauger Effluent

The hillside beneath Building 71B is drained by several hydraugers (subhorizontal drains), which intercept contaminated groundwater near Building 71B. The hydrauger effluent is currently piped to the Building 51 Firetrail Treatment System. The treatment system consists of two in-line 1,000-pound GAC canisters. The used carbon is shipped off site by a certified hazardous waste hauler for regeneration approximately annually. Treated water is disposed of in the sanitary sewer in accordance with LBNL's Wastewater Discharge Permit.

Proposed Corrective Measure: Localized Application of Chemical Oxidants

In situ chemical oxidation is proposed to treat soil in limited areas adjacent to the Building 71B foundation. *In situ* chemical oxidation consists of the injection of chemicals into the subsurface to destroy (oxidize) soil contaminants. The reagents that would be injected are citric acid and hydrogen peroxide. Based on the pilot test results, it is estimated that approximately 100 gallons of 12% citric acid and 150 gallons of 17% hydrogen peroxide solution, would be injected. The chemical oxidant solution would be injected using a high-pressure injection system, including a chemical tank, pump, distribution manifold (for distributing chemicals to up to 4 injection points simultaneously), high-pressure hoses and fittings for connecting the hoses to the injection points, and a control panel to monitor and adjust pressure and volume of injection at each point. The injection well points would be installed using direct push drilling methods.

Old Town Groundwater Solvent Plume - Building 7 Lobe and Former Building 7 Sump

Ongoing Corrective Measure: In Situ Soil Flushing in Plume Source Area

Groundwater is being extracted from the Building 7 Groundwater Collection Trench immediately downgradient (west) from the former Building 7 sump location, the source of the groundwater contamination. The collection trench is 40 feet long by 2 feet wide, and intercepts contaminated water flowing westward from the former sump area. The trench increases from a depth of approximately 40 feet at the southern end to 60 feet at the northern end. Four PVC well casings are installed in the gravel-filled trench to extract groundwater. The extracted groundwater is piped to the Building 7 treatment system, which consists of two in-line 1,000-pound GAC canisters. The treated effluent is either discharged to the sanitary sewer in accordance with LBNL's Wastewater Discharge Permit or recirculated into the upgradient gravel-backfilled excavation to flush contaminants from the subsurface. The used carbon is shipped off site by a certified hazardous waste hauler for regeneration approximately every six months to a year.

Ongoing Corrective Measure: In Situ Soil Flushing in Plume Core Area

A line of six 24-inch diameter injection wells was drilled to depths of approximately 50 to 56 feet, a short distance downgradient from the Building 7 Groundwater Collection Trench. Six-inch-diameter PVC screens were installed in five of the borings and a 4-inch-diameter PVC screen was installed in the sixth boring. The area around the casing of each borehole was backfilled with gravel. Groundwater that has been treated at the Building 7 treatment system is injected into the wells. Three groundwater extraction wells are installed downgradient from the injection trench. Water injected into the wells either flows westward where the water is captured by the extraction wells or eastward where the water is captured by the Building 7 Collection Trench. The extracted groundwater is piped to the Building 7 treatment system.

Ongoing Corrective Measures: Groundwater Extraction Trench and Dual Phase Extraction Wells

A groundwater collection trench located at the southeast corner of Building 58 is used to control the downgradient migration of the core of the Building 7 lobe. The trench is approximately 13 feet in length and ranges from 29 to 31 feet in depth. An 8-inch extraction well is installed in the deepest part of the trench, which is filled with crushed rock. An automatic pumping system extracts groundwater from the trench and pumps it to the Building 7 treatment system.

A groundwater collection trench installed west of Building 58 is used to control the downgradient migration of the Building 7 lobe. The trench is approximately 40 feet long and 20 feet deep. Two 6-inch pipes in the trench extract groundwater, which is piped to the Building 51 Firetrail Treatment System. The Building 51 Firetrail System is described above under the Building 71B Lobe of the Building 71 Groundwater Solvent Plume.

Eight dual phase (groundwater and soil vapor) extraction wells are installed at the downgradient edge of the Building 7 lobe core area. The wells are 35 to 40 feet deep and run in a north-south line on 4-foot centers. Each consists of a PVC casing surrounded by gravel. The bottom 20 feet of each casing is screened. Contaminated groundwater is extracted and treated at the Building 7 Treatment System. A retaining wall and a concrete slab are located adjacent to the extraction wells to accommodate two in-line 1,000-pound GAC canisters that are used to treat the extracted soil vapor. The used carbon is shipped off site by a certified hazardous waste hauler for regeneration approximately annually. The soil vapor extraction (SVE) system operates under a permit issued by BAAQMD.

Proposed Corrective Measure: Soil Excavation in Plume Source Area with Off-site Disposal

Contaminated soil would be excavated to a depth of approximately 50 feet from an area of approximately 100 square feet. The ground surface in the excavation area is currently paved. Excavation would be completed using a drilling rig, which would auger closely-spaced, large-diameter borings. Approximately 180 cubic yards of excavated soil would be stored in covered bins on site, until shipped off site for disposal in accordance with applicable local, state, and federal laws and regulations. Approximately 18 round trip truck trips would be required to transport the excavated soil off site for disposal. A loader would be required to place the excavated soil in the bins. The excavation will be backfilled with clean gravel and concrete.

Proposed Corrective Measure: Monitored Natural Attenuation in Downgradient Area

MNA is the proposed corrective measure in the downgradient areas of the Building 7 lobe. No construction would be required. The effectiveness of the MNA would be assessed by collecting groundwater samples from existing groundwater monitoring wells.

Old Town Solvent Plume - Building 25A Lobe

Ongoing Corrective Measure: In Situ Soil Flushing

A 40-foot long by 40-foot deep groundwater collection trench controls the migration of contaminated groundwater from the source area on the west side of Building 25A. The gravel-filled trench contains an 8-inch well that is used to extract contaminated groundwater. Groundwater is also extracted from a groundwater monitoring well north of Building 25A. The extracted groundwater is pumped to a treatment system, which is located next to the trench and consists of a 1,000-pound GAC canister with an in-line 55-gallon GAC drum as backup. The treated groundwater is recirculated into a shallow gravel-filled infiltration bed to help flush contaminants from the soil. The infiltration bed is located between Buildings 25A and 44A, upgradient of the trench. The used carbon is shipped off site by a certified hazardous waste hauler for regeneration approximately annually.

Ongoing Corrective Measure: Plume Migration Control

Contaminated groundwater that is present in an electrical utility manhole east of Building 6 is pumped from the manhole to the Building 37 treatment system. This system is used to prevent the potential migration of contaminants through electrical conduits to the Building 37 area. The system consists of two 55-gallon GAC drums in parallel, with an in-line 55-gallon GAC drum as backup. The treated water is used in the Building 37 cooling tower. The used carbon is shipped off site by a certified hazardous waste hauler for regeneration approximately annually.

Proposed Corrective Measure: Monitored Natural Attenuation in Downgradient Area

MNA is the proposed corrective measure outside the plume source area. No construction would be required. The effectiveness of the MNA would be assessed by collecting groundwater samples from existing groundwater monitoring wells.

Old Town Solvent Plume - Building 52 Lobe

Ongoing Corrective Measures: Groundwater Extraction from Subdrain

A subdrain was installed east of Building 46 in the early 1950s to collect subsurface water draining from the hillside as part of landslide mitigation. The subdrain intercepts the downgradient edge of the Building 52 lobe. The subdrain is 4 feet deep at one end and approximately 11 feet deep at the other. The Building 46 treatment system treats the water extracted from the drain and consists of two in-line 1,000-pound GAC canisters. The treated groundwater is recirculated to injection wells in the source area of the Building 52 lobe or disposed of in the sanitary sewer in accordance with LBNL's Wastewater Discharge Permit if the water is not needed for flushing. The used carbon is shipped off site by a certified hazardous waste hauler for regeneration approximately annually.

Ongoing Corrective Measure: In Situ Soil Flushing

Two large diameter injection wells were drilled in the source area of the Building 52 lobe and three large diameter extraction wells were drilled in the downgradient plume core area near Buildings 27 and 53. Six-inch diameter PVC casing was installed in the borings. Groundwater extracted from the wells is treated by the Building 53 treatment system, which consists of two in-line 1,000-pound GAC canisters. The treated groundwater is recirculated to the injection wells for flushing. The used carbon is shipped off site by a certified hazardous waste hauler for regeneration approximately annually.

Building 69A Area of Groundwater Contamination

Proposed Corrective Measure: Monitored Natural Attenuation

Available hydrochemical data indicate that natural attenuation processes are degrading contaminants in the groundwater in the Building 69A area. Therefore, MNA would be used as the remediation method in this area. No construction would be required. The effectiveness of MNA would be assessed by collecting groundwater samples from existing groundwater monitoring wells.

Building 51A Storm Drain Protection

Ongoing Corrective Measure: Protection of Surface Water

VOC-containing water discharges from two tile drain lines to a storm drain catch basin inside Building 51A. To prevent the contaminated effluent from flowing to surface water, a concrete sump installed immediately upgradient from the storm drain catch basin collects the contaminated water from the two drain lines. The water extracted from the sump is treated at the Building 51L treatment system.

Other Corrective Measures Proposed

Application of Hydrogen Release Compounds[®] (HRC[®])

Hydrogen Release Compounds[®] (HRC[®]) would be injected into selected wells or placed in excavations in some areas of groundwater contamination to help accelerate the natural processes that biodegrade contaminants. HRC[®] is a food quality chemical manufactured for the slow release of lactic acid into groundwater upon hydration. HRC[®] would be injected using a high-pressure injection system, including a chemical tank, pump, high-pressure hoses and fittings for connecting the hoses to the injection points, and a method to monitor and adjust pressure and volume of injection at each point.

Project Schedule

The following table summarizes the proposed schedule for implementing corrective measures at LBNL (Table II-2).

Table II-2

PROPOSED SCHEDULE FOR IMPLEMENTATION OF PROPOSED CORRECTIVE MEASURES¹

LOCATION	ACTION	IMPLEMENTATION SCHEDULE
Building 51/64 Groundwater Plume	Expand the <i>in situ</i> soil flushing system by constructing a new groundwater extraction trench on the southwest end of Building 64. Implement MNA for contaminants in the groundwater plume.	Summer 2005 2005 through 2011
Building 51L Groundwater Solvent Plume and Building 51L Source Area	Excavate contaminated soil in the plume source area Reconstruct Building 51L storm drain catch basin to prevent inflow of groundwater into storm drain system. Implement MNA for contaminants in the groundwater plume.	Spring 2006 Fall 2005 2006 through 2011
Building 71 Groundwater Solvent Plume - Building 71B Lobe	Treat VOCs in soil adjacent to the Building 71 foundation with an <i>in situ</i> chemical oxidation process.	Summer through Fall 2005
Old Town Groundwater Solvent Plume – Building 7 Lobe and Former Building 7 Sump	Excavate contaminated soil in the plume source area and dispose of off site. Implement MNA for contaminants in the groundwater plume.	Summer through Fall 2005 2006 through 2011
Old Town Solvent Plume - Building 25A Lobe	Implement MNA for contaminants in the groundwater plume.	2006 through 2011
Old Town Solvent Plume - Building 52 Lobe	Continue ongoing actions; no new actions are proposed.	Not applicable
Building 69A Groundwater Contamination	Implement MNA for contaminants in the groundwater.	2005 through 2011
Building 51A Surface Water Protection	Continue ongoing actions; no new actions are proposed.	Not applicable

Source: LBNL 2004

1. Only *Proposed* Corrective Measures are identified in the schedule because *Ongoing* Corrective Measures are already in place and operating.

III. DISCRETIONARY APPROVAL ACTION BEING CONSIDERED BY DTSC

- | | | |
|--|---|--|
| <input type="checkbox"/> Initial Permit Issuance | <input type="checkbox"/> Closure Plan | <input type="checkbox"/> Removal Action Workplan |
| <input type="checkbox"/> Permit Renewal | <input type="checkbox"/> Regulations | <input type="checkbox"/> Interim Removal |
| <input type="checkbox"/> Permit Modification | <input type="checkbox"/> Remedial Action Plan | <input checked="" type="checkbox"/> Other (specify)
<u>Corrective Measures Study Report</u> |

IV. ENVIRONMENTAL FACTORS POTENTIALLY AFFECTED

The environmental factors checked below would be potentially affected by this Project, involving at least one impact that is a "Potentially Significant Impact" as indicated by the checklist on the following pages.

- | | | |
|---|--|---|
| <input checked="" type="checkbox"/> None Identified | <input type="checkbox"/> Aesthetics | <input type="checkbox"/> Agriculture Resources |
| <input type="checkbox"/> Air Quality | <input type="checkbox"/> Biological Resources | <input type="checkbox"/> Cultural Resources |
| <input type="checkbox"/> Geology/Soils | <input type="checkbox"/> Hazards/Hazardous Materials | <input type="checkbox"/> Hydrology/Water Quality |
| <input type="checkbox"/> Land Use/Planning | <input type="checkbox"/> Mineral Resources | <input type="checkbox"/> Noise |
| <input type="checkbox"/> Population/Housing | <input type="checkbox"/> Public Services | <input type="checkbox"/> Recreation |
| <input type="checkbox"/> Transportation/Traffic | <input type="checkbox"/> Utilities/Service Systems | <input type="checkbox"/> Mandatory Findings of Significance |

This Tiered IS/ND uses the analysis contained in the LRDP EIR, as amended, and concentrates on issues specific to the proposed Corrective Measures Project. Based on the analysis presented in this document, it has been determined that the proposed Project would not result in any impacts that are not sufficiently addressed by mitigation measures contained in the LRDP EIR, as amended, which are included as part of the Project. None of the conditions described in CEQA or the CEQA *Guidelines* calling for preparation of a subsequent EIR have occurred.

V. EVALUATION OF ENVIRONMENTAL IMPACTS

Response Column Heading Definitions

A. Potentially Significant Impact is appropriate if there is substantial evidence that an effect may be significant. If there are one or more “Potentially Significant Impact” entries when the determination is made, an EIR is required.

B. Less than Significant with Mitigation Incorporated applies where the incorporation of mitigation measures has reduced an effect from “Potentially Significant Impact” to a “Less Than Significant Impact.” The lead agency must describe the mitigation measures, and briefly explain how they reduce the effect to a less than significant level (mitigation measures from earlier analyses may be cross-referenced).

C. Impact for which the LRDP EIR is Sufficient applies where the impacts of the project were adequately addressed and mitigated to the extent feasible in the certified, programmatic LRDP EIR, as amended. (See also Tiering section below).

D. Less Than Significant Impact applies where the project creates no significant impacts, only Less than Significant impacts.

E. No Impact applies where a project does not create an impact in that category. “No Impact” answers do not require an explanation if they are adequately supported by the information sources cited by the lead agency which show that the impact simply does not apply to projects like the one involved (e.g., the project falls outside a fault rupture zone). A “No Impact” answer should be explained where it is based on project-specific factors as well as general standards (e.g., the project would not expose sensitive receptors to pollutants, based on a project specific screening analysis).

Tiering

- A. Earlier analyses may be used where, pursuant to the tiering, Program EIR, or other CEQA process, an effect has been adequately analyzed in an earlier EIR or negative declaration. Section 15063 (c)(3)(D). In this case a brief discussion should identify the following:
1. Earlier Analysis Used. Identify and state where they are available for review.
 2. Impacts Adequately Addressed. Identify which effects from the above checklist were within the scope of and adequately analyzed in an earlier document pursuant to measures based on the earlier analysis.
 3. Mitigation Measures. For effects that are “Less than Significant with Mitigation Measures Incorporated,” describe the mitigation measures which were incorporated or refined from the earlier document and the extent to which they address site-specific conditions for the project.
 4. The column labeled “*Impact for which LRDP EIR is Sufficient*” is meant to be used in the following situations:
 - a) The LRDP EIR, as amended, found the impact to be less than significant for all projects, including this project, assuming implementation of applicable LRDP EIR, as amended, mitigation measures,

- b) The LRDP EIR, as amended, concluded that the impact would be significant for some projects, but would not be significant for the project under review,
 - c) The impact is significant on a cumulative but not a project level, and the LRDP EIR, as amended, fully addressed the cumulative impact, or
 - d) The impact is significant and unavoidable on a project level, but the LRDP EIR, as amended, contained an adequate project-level analysis for the impact. This conclusion may also be appropriate where the particular impact and associated mitigation measures are sufficiently generic so that no further analysis is necessary or appropriate (i.e., the LRDP EIR, as amended, contains all of the analysis that reasonably could be included on the topic with respect to all projects generally, including the project), and where no additional mitigation is feasible.
- B. The guidance set forth in Guidelines 15152 (Tiering) should also be considered in making this determination. Where this column of the checklist is selected, an explanation of the basis for doing so should be included in the discussion. The discussion should also state briefly why the criteria for supplemental environmental review under CEQA Section 21166 (project changes, changed circumstances and/or new information) have not been triggered.

Impact Analyses

1. Aesthetics

Project Activities with the Potential to Create Impacts:

- Excavation of soil
- Mobilization of heavy equipment
- Placement of pumps and GAC canisters

Setting:

LBNL has an aesthetic that is sometimes described as “buildings in nature” as site structures are, for the most part, scattered amid trees and other vegetation. Although LBNL manages on-site vegetation to reduce the risk of wildland fire, vegetated areas are typically dense enough to visually separate the built environment of the Laboratory from adjacent residential properties and to serve as a transitional element between the Lab and the parklands and open space to the east. Activities associated with the implementation of corrective measures would occur within the central built environment of LBNL (e.g., in parking lots and/or adjacent to buildings).

The visual character of LBNL’s built environment is eclectic. Many buildings display an industrial look and utilitarian quality due to the type of building materials (e.g., poured-in-place concrete, corrugated metal siding) and the visible mechanical equipment (exposed pipes, vents, panels, and tanks) related to the activities occurring in the buildings. Many LBNL buildings are painted in neutral colors (grey, beige) to blend with the natural setting. Some of the site’s newer buildings are painted in livelier colors (light green, powder blue), such as Building 84 in the Life Sciences Cluster near the eastern edge of the hill site. A few LBNL buildings are recognizable landmarks, including Building 50 and the Advanced Light Source, both of which are visible from off-site locations. However, eucalyptus and pine trees along with oak and bay laurel are interspersed throughout the site and adjoining areas; these trees contribute to

screening of many views to the site from the UC Berkeley campus and from adjacent streets and neighborhoods.

Much of the built environment on the hilltop site lacks a strong overall sense of visual hierarchy. Structures were often built on an “as-needed” basis and are generally not related in ways that support interaction or optimal use of the developed areas. Permanent buildings are typically connected directly to parking areas, and many contain little (or no) open space to buffer pedestrian entrances from adjacent surface parking or other temporary structures. Many of the site’s pathways and gathering areas encroach on service areas, loading zones, parking, and utility corridors, which detracts from a cohesive image of the Laboratory site.

Evaluation Criteria:

In addition to the evaluation criteria provided in the Initial Study Checklist (Appendix G of the CEQA Guidelines), the impact of the proposed Project on visual quality would be considered significant if it exceeded the following Standards of Significance, established by the LRDP EIR, as amended:

- Fail to comply with guidelines or goals related to visual quality;
- Significantly alter the existing natural viewsheds, including changes in natural terrain;
- Significantly change the existing visual quality of the region or eliminate visual resources;
- Significantly increase light and glare in the Project vicinity; or
- Significantly reduce sunlight or introduce shadows in areas used extensively by the campus population.

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Impact for which LRDP EIR is Sufficient	Less Than Significant Impact	No Impact
1. AESTHETICS -- Would the Project:					
a) Have a substantial adverse effect on a scenic vista?	_____	_____	_____	_____	_____X_____
b) Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?	_____	_____	_____	_____	_____X_____
c) Substantially degrade the existing visual character or quality of the site and its surroundings?	_____	_____	_____	_____X_____	_____
d) Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?	_____	_____	_____	_____	_____X_____
e) Exceed an applicable LRDP EIR standard of significance?	_____	_____	_____X_____	_____	_____

Discussion:

- a,b) The California Department of Transportation has designated 8.9 miles of Highway 24, from the east portal of the Caldecott Tunnel to the I-680 near Walnut Creek, as a Scenic Highway under the California Scenic Highway Program. The City of Berkeley has designated two scenic view corridors: Cedar Street and Dwight Way. The City of Oakland has designated two scenic corridors: Skyline Boulevard and Shepherd Canyon Road. The Project areas are not located within the viewshed of a state scenic highway or any of these designated scenic roads or vistas. The Project areas range from approximately ½ mile from Cedar Street up to 4 miles away from Shepherd Canyon Road, which means they are too far from these roads and vistas to be visible. No impact would occur as the Project is not within the view shed of these scenic resources.
- c) The components of the corrective measures would be mostly below ground (e.g., wells and extraction trenches), relatively small features at the ground surface (e.g., pumps and GAC canisters) or temporary (e.g., excavations). They would not adversely affect the visual character of the site, which already has an industrial look and institutional quality. This potential impact would be less than significant.
- d) No impact would occur because no lighting or structures containing reflective material would result from the implementation of the corrective measures.
- e) Implementation of the corrective measures would not exceed an LRDP EIR, as amended, standard of significance as it would not result in any structures that would create light or glare, cause shadows, or otherwise create a visual obstruction or adverse view. The largest areas of ground disturbance (i.e., excavations) would occur in areas that are already paved; these areas would be repaved when work is complete. Disturbance of unpaved areas, which is expected to be temporary and minor, would be restored, if needed, in accordance with Mitigation Measures III-D-2a and 2f as proposed in the LRDP EIR, as amended. Thus, the proposed Project would not exceed an applicable Standard of Significance established by the LRDP EIR, as amended.

Cumulative Impacts:

Most Project activities would have no impact on the visual characteristics of the LBNL site. Those that would, such as excavations, would cause only temporary changes in the visual environment and would be visible only to on-site personnel or from a very few vantage points off site. Because excavation sites would be returned to their previous condition (i.e., repaved) and new permanent components such as GAC canisters would be consistent with the current visual character of the site, no cumulative impacts would result from implementation of the corrective measures.

Summary of Impacts and Mitigation Measures:

Potentially significant impacts not mitigated by the LRDP EIR, as amended, mitigation measures: None.

The proposed Project would incorporate LRDP EIR, as amended, Mitigation Measures III-D-2a and 2f. As a result, no significant aesthetic or visual resources impacts would result from the proposed Project.

Mitigation Measure III-D-2a:

Revegetation of disturbed areas, including slope stabilization sites, using native shrubs, trees, and grasses will be included as part of all new projects.

Mitigation Measure III-D-2f:

Periodic monitoring of disturbed areas, fill slopes, and other areas of exposed soil treated under the revegetation program will be conducted and [these areas will be] fixed.

Corrective Measures Project-Specific Mitigation Measures: None.

Sources:

- a,b) California Department of Transportation, 2003. California Scenic Highway Program, <http://www.dot.ca.gov/hq/LandArch/scenic/scpr.htm>. Accessed September 24.
- c,d) LBNL, 2005. *RCRA Corrective Measures Study Report*. February 10, 2005
- e) LBNL, 1987. *Site Development Plan EIR*, August (State Clearinghouse No. [19]85112610)
LBNL, 1992. *Proposed Renewal of the Contract between the United States Department of Energy and The Regents of the University of California for Operation and Management of the Lawrence Berkeley National Laboratory, Supplemental EIR*, September (State Clearinghouse No. [19]91093068)
LBNL, 1997. *Proposed Renewal of the Contract between the United States Department of Energy and The Regents of the University of California for Operation and Management of the Lawrence Berkeley National Laboratory, Supplemental EIR Addendum*, September (State Clearinghouse No. [19]91093068)

2. Agriculture

Project Activities with the Potential to Create Impacts:

- None

Setting and Discussion:

LBNL is not located within an agricultural area or an area that may support future agricultural land uses. No agricultural products are produced from LBNL operations. There are no agricultural operations in the vicinity of the site. No further analysis is necessary because no agricultural resources are present at LBNL.

Evaluation Criteria:

In addition to the evaluation criteria provided in the Initial Study Checklist (Appendix G of the CEQA Guidelines), the impact of the proposed Project on agricultural resources would be considered significant if it exceeded the following Standards of Significance, established by the LRDP EIR, as amended:

- Is located within an area designated as Important Farmland by Soil Conservation Service (U.S. Department of Agriculture).

The LRDP EIR, as amended, did not identify any potential impacts to agricultural resources.

Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Impact for which LRDP EIR is Sufficient	Less Than Significant Impact	No Impact
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2. AGRICULTURE RESOURCES:

_____	_____	_____	_____	<u> X </u>
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Sources:

Department of Conservation, 2003. *Prime Farmland in Alameda County*, map.

3. Air Quality

Project Activities with the Potential to Create Impacts:

- Excavation of soil
- Operation of diesel-powered heavy equipment
- Operation of diesel-powered trucks to transport soil and backfill
- Operation of SVE systems

Setting:

The Project site is located in the cities of Berkeley and Oakland, within the boundaries of the San Francisco Bay Area Air Basin. Berkeley’s proximity to the onshore breezes stimulated by the Pacific Ocean provide for generally very good air quality at LBNL. However, during the ozone smog season (summer and fall), transport studies have shown that emissions generated in Oakland and Berkeley are often transported to other regions of the Bay Area and beyond (e.g., Central Valley) that are more conducive to the formation of ozone smog. In the winter, reduced solar energy and cooler temperatures diminish ozone smog formation, but increase the likelihood of carbon monoxide formation.

The federal Clean Air Act of 1970 established maximum allowable concentration criteria standards for six ambient air pollutants - ozone (smog), carbon monoxide, nitrogen dioxide, sulfur dioxide, particulate matter, and lead. Each of these standards was set to meet specific public health and welfare criteria. Individual states were given the option to adopt more stringent state standards for criteria pollutants and to include other pollutants. California has done so with many pollutants through its own clean air act. The BAAQMD is the regional agency with regulatory authority over stationary sources in the Bay Area, while the California Air Resources Board (CARB) has regulatory authority over mobile sources such as construction equipment, trucks, and automobiles throughout the state. The BAAQMD has the primary responsibility to meet and maintain the state and federal ambient air quality standards in the Bay Area. These regulated ambient air pollutants and their state and federal standards are provided in Table V-1.

Both the state and federal Clean Air Acts require areas to be classified as either attainment or non-attainment for each criteria pollutant, based on whether or not the state and national standards have been achieved. Therefore, areas in California have two sets of attainment/non-attainment designations: one for the federal standards and one for the state standards. The Bay Area Air Basin is currently designated as nonattainment for state ozone standards and the federal 1-hour ozone standard, although ozone levels measured in the Berkeley and Oakland area have not exceeded the standards in the past four years

(BAAQMD's monitoring network last measured an exceedance in 1995). Ozone and ozone precursors such as reactive organic compounds and oxides of nitrogen are the pollutants of greatest concern in the Air Basin. The Air Basin is also designated as nonattainment for the state PM₁₀ standard. Urbanized portions of the Bay Area (specifically known as the San Francisco - Oakland - San Jose federal planning area) are designated "maintenance" with respect to the federal carbon monoxide standard. The "maintenance" designation denotes that the area, now "attainment," had once been designated as "nonattainment." The Air Basin is designated as either attainment or unclassified for all other pollutants.

Tables V-2 and V-3 show ambient levels of ozone and carbon monoxide measured at BAAQMD's monitoring station on Alice Street in Oakland. This site is representative of the air in the vicinity of LBNL. Table V-4 shows PM₁₀ levels measured in Fremont, the nearest monitoring station in Alameda County that measures PM₁₀. Table V-5 shows trends in regional exceedances of the federal and state ozone standards. Because of the exceedances, ozone is the pollutant of greatest concern in the Bay Area. Bay Area counties experience most ozone exceedances during the period from April through October. Construction equipment, building emission sources (such as heaters), and motor vehicles traveling to LBNL would emit the ozone precursors reactive organic gases (ROG) and nitrogen oxides (NO_x). These emissions may photochemically react in the presence of sunlight and warm temperatures, creating ozone smog. Often, because of wind patterns, this transformation occurs some miles distant. Thus, the Project's emissions may not have a local impact and may be very small in terms of quantities, but could contribute to existing violations of state and federal ozone standards.

Table V-1

FEDERAL AND STATE AMBIENT AIR QUALITY STANDARDS

POLLUTANT	AVERAGING TIME	CALIFORNIA STANDARDS	FEDERAL STANDARDS	
		CONCENTRATION	PRIMARY	SECONDARY
Ozone (O ₃)	1 Hour	0.09 ppm (180 µg/m ³)	0.12 ppm (235 µg/m ³)	Same as Primary Standard
	8 Hour	---	0.08 ppm (157 µg/m ³)	
Respirable Particulate Matter (PM ₁₀)	24 Hour	50 µg/m ³	150 µg/m ³	Same as Primary Standard
	Annual Arithmetic Mean	20 µg/m ³	50 µg/m ³	
Fine Particulate Matter (PM _{2.5})	24 Hour	No Separate State Standard	65 µg/m ³	Same as Primary Standard
	Annual Arithmetic Mean	12 µg/m ³	15 µg/m ³	
Carbon Monoxide (CO)	8 Hour	9.0 ppm (10 mg/m ³)	9.0 ppm (10 mg/m ³)	---
	1 Hour	20 ppm (23 mg/m ³)	35 ppm (40 mg/m ³)	
	8 Hour (Lake Tahoe)	6 ppm (7 mg/m ³)	---	
Nitrogen Dioxide (NO ₂)	Annual Arithmetic Mean	---	0.053 ppm(100 µg/m ³)	Same as Primary Standard
	1 Hour	0.25 ppm (470 µg/m ³)	---	
Lead	30 Day Average	1.5 µg/m ³	---	---
	Calendar Quarter	---	1.5 µg/m ³	Same as Primary Standard
Sulfur Dioxide (SO ₂)	Annual Arithmetic Mean	---	0.030 ppm (80 µg/m ³)	---
	24 Hour	0.04 ppm (105 µg/m ³)	0.14 ppm (365 µg/m ³)	---
	3 Hour	---	---	0.5 ppm (1300 µg/m ³)
	1 Hour	0.25 ppm (655 µg/m ³)	---	---

Source: California Air Resources Board, July 2003

ppm=parts per million
 mg/m³=milligrams per cubic meter
 µg/m³=micrograms per cubic meter

Table V-2

HIGHEST 4 DAILY MAXIMUM HOURLY OZONE MEASUREMENTS AND NUMBER OF DAYS ABOVE THE HOURLY STANDARD AT OAKLAND (822 ALICE STREET) IN PARTS PER MILLION (PPM)

	2000		2001		2002		2003	
High	May 21	0.072	Sep 30	0.069	Sep 1	0.053	Jun 26	0.081
2 nd High	Sep 17	0.069	May 30	0.066	Aug 9	0.052	Sep 21	0.081
3 rd High	Apr 2	0.055	May 6	0.059	Oct 6	0.050	Jun 25	0.073
4 th High	Apr 1	0.053	May 7	0.053	Apr 15	0.049	Aug 24	0.062
Days above State Standard of 0.09 ppm		0		0		0		0
Days above National Standard of 0.12 ppm		0		0		0		0

Source California Air Resources Board web site at www.arb.ca.gov November 2004

Table V-3

HIGHEST 4 DAILY MAXIMUM 8-HOUR CARBON MONOXIDE AVERAGES AND NUMBER OF DAYS ABOVE THE 8-HOUR STANDARD AT OAKLAND (822 ALICE STREET) IN PARTS PER MILLION (PPM)

	2000		2001		2002		2003	
High	Dec 31	3.43	Jan 3	3.98	Jan 7	3.34	Jan 7	2.78
2 nd High	Dec 20	3.34	Jan 5	3.88	Nov 3	2.73	Jan 3	2.46
3 rd High	Dec 1	3.03	Feb 4	3.29	Nov 29	2.53	Oct 24	2.21
4 th High	Dec 23	2.93	Jan 4	3.18	Nov 2	2.36	Dec 17	2.14
Days above State Standard of 9.0 ppm		0		0		0		0
Days above National Standard of 9.0 ppm		0		0		0		0

Source California Air Resources Board web site at www.arb.ca.gov November 2004

Table V-4

HIGHEST 4 DAILY MAXIMUM PM¹⁰ MEASUREMENTS AT FREMONT (CHAPEL WAY STATION)
 IN MICROGRAMS PER CUBIC METER ($\mu\text{g}/\text{m}^3$)

	2000		2001		2002		2003	
High	Nov 20	61.1	Jan 7	60.4	Dec 4	54.1	Jun 2	37.2
2 nd High	Jan 7	52.5	Nov 9	57.8	Nov 28	46.1	May 21	32.4
3 rd High	Dec 20	50.1	Jan 1	57.1	Aug 18	42.4	Jan 9	29.1
4 th High	Dec 8	43.5	Jan 19	45.8	Jun 7	42.2	Aug 25	27.9

Source California Air Resources Board web site at www.arb.ca.gov November 2004

Table V-5

SUMMARY OF OZONE DATA SUMMARIES FOR THE SAN FRANCISCO BAY AREA AIR BASIN, 1994-2003^(a)

YEAR	NUMBER OF DAYS STANDARD EXCEEDED			OZONE CONCENTRATIONS (PPM)	
	STATE 1-HR	FEDERAL 1-HR	FEDERAL 8-HR	1 HR (MAX 1-HR)	8 HR (MAX 8-HR)
2003	19	1	7	0.128	0.101
2002	16	2	7	0.160	0.106
2001	15	1	7	0.134	0.102
2000	12	3	4	0.152	0.114
1999	20	3	9	0.156	0.122
1998	29	8	16	0.147	0.111
1997	8	0	0	0.114	0.084
1996	34	8	14	0.138	0.112
1995	28	11	18	0.155	0.115
1994	13	2	4	0.130	0.097

Source California Air Resources Board web site at www.arb.ca.gov November 2004

(a) This table summarizes data from all of the monitoring stations within the Bay Area
 ppm = parts per million

Hazardous and Toxic Air Emissions Sources

There are no known facilities within a ¼-mile of the LBNL site boundary that use acutely hazardous substances in excess of threshold planning quantities (SARA Title III, Community Right to Know). Consequently there is no significant impact in the area from use of acutely hazardous substances by businesses, including LBNL. "Acutely hazardous material" means any material defined pursuant to subdivision (a) of Section 25532, California Health and Safety Code.

State environmental law requires that air districts create an inventory of facilities with potential to emit specified Toxic Air Contaminants (TAC), and make this information available to the public upon request. The BAAQMD's 2000 Toxic Air Contaminant Control Program Annual Report calculates that the annual excess cancer risk in the Bay Area is about 167 per million people from stationary sources, and about 450 in a million from diesel exhaust. Thus, diesel emissions create about 70% of toxic and cancer-causing emissions found in ambient air. LBNL updates its operating permits each year and the Air District uses this information to update its TAC inventory.

Evaluation Criteria:

In addition to the evaluation criteria provided in the Initial Study Checklist (Appendix G of the CEQA Guidelines), the impact of the proposed Project on air quality would be considered significant if it exceeded the following Standards of Significance, established by the LRDP EIR, as amended:

- Air pollutant emission levels would violate any ambient air quality standard;
- Contribute substantially to an existing or projected air quality violation for ozone, carbon monoxide or PM₁₀;
- Expose sensitive receptors to substantial pollutant concentrations; or
- Result in a human cancer risk greater than 10 in 1,000,000 or a hazard index greater than one for non-carcinogens.

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Impact for which LRDP EIR is Sufficient	Less Than Significant Impact	No Impact
3. AIR QUALITY -- Would the Project:					
a) Conflict with or obstruct implementation of the applicable air quality plan?	_____	_____	_____	_____X_____	_____
b) Violate any air quality standard or contribute substantially to an existing or projected air quality violation?	_____	_____	_____X_____	_____	_____
c) Result in a cumulatively considerable net increase of any criteria pollutant for which the Project region is non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors)?	_____	_____	_____	_____X_____	_____
d) Expose sensitive receptors to substantial pollutant concentrations?	_____	_____	_____X_____	_____	_____

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Impact for which LRDP EIR is Sufficient	Less Than Significant Impact	No Impact
e) Create objectionable odors affecting a substantial number of people?	_____	_____	_____	_____	<u> X </u>
f) Exceed an applicable LRDP EIR standard of significance?	_____	_____	<u> X </u>	_____	_____

Discussion:

- a) As required by state and federal laws, there are three plans for the Bay Area Air Basin developed in part by BAAQMD to meet federal and state air quality planning requirements. They are:
- *Bay Area 2001 Ozone Attainment Plan for the 1-Hour National Ozone Standard* developed to meet federal ozone air quality planning requirements;
 - *Bay Area 2000 Clean Air Plan*, the most recent triennial update of the *1991 Clean Air Plan* developed to meet planning requirements related to the state ozone standard; and
 - *The 1996 Carbon Monoxide Redesignation Request and Maintenance Plan for Ten Federal Planning Areas*, developed by the air districts with jurisdiction over the ten planning areas including the BAAQMD to ensure continued attainment of the national carbon monoxide standard. In June 1998, the U.S. Environmental Protection Agency (EPA) approved this plan and designated the ten areas to attainment. The maintenance plan was revised in October 1998.

Implementation of the corrective measures would entail dust and VOC emissions during excavation and hauling activities and VOC emissions during ongoing operation of the SVE system for the Building 7 lobe of the Old Town Groundwater Solvent Plume. The SVE system is currently permitted and would continue to be permitted by the BAAQMD. There are no published construction emission thresholds and the BAAQMD has accounted for construction emissions in its Clean Air Plan (CAP). Compliance with the CAP can be found by determining if the Project will induce growth of the area, in terms of increased population or workforce. The corrective measures Project would create a small number of jobs during construction activities, which would have a cumulative duration of a few weeks over the first year of the Project. It is expected that workers used for the Project would be LBNL employees or local contractors and not from outside the region. Once construction is complete, no additional jobs would be created. Therefore, the Project would not be growth inducing. Thus, the Project would not conflict with, or obstruct the timely implementation of the Bay Area 2000 CAP or any subsequent CAP updates. This potential impact would be less than significant.

- b) Construction related emissions are generally of short-term duration, but may still cause adverse air quality impacts. Particulate matter (PM₁₀) is the pollutant of greatest concern with respect to construction activities. PM₁₀ emissions can result from a variety of construction activities, including excavation, grading, vehicle travel on paved and unpaved surfaces, and vehicle and equipment exhaust. Construction related emissions may cause a substantial increase in localized concentrations

of PM₁₀. Particulate emissions from construction activities may also lead to adverse health effects as well as nuisance concerns such as reduced visibility and soiling of exposed surfaces.

Under its CEQA guidelines, the BAAQMD's approach for air quality impacts analysis for construction activities is to emphasize implementation of effective and comprehensive PM₁₀ control measures rather than detailed quantification of emissions. If appropriate control measures identified by the BAAQMD are implemented during Project construction activities, the impacts of Project air pollutant emissions would not be significant. Because excavations would be small, 1,600 square feet (0.04 acres) or less, and located in areas that are paved, the Project only would be required to implement the BAAQMD's "Basic Control Measures," which are part of the Laboratory's normal standard operating procedures for construction sites. The Basic Control Measures that were considered appropriate for the Project were limited to those that would not generate a significant volume of potentially contaminated sludge. With implementation of the following standard operating procedures, potential impacts would be less than significant:

- Sweep daily all paved access roads, parking areas and staging areas at construction sites where soil accumulates.
- Sweep streets daily (with water sweepers) if visible soil material is carried onto adjacent public streets.

In addition, excavated soil will be covered and/or stored and transported in covered bins, which will minimize the potential for spillage and dust generation during transport.

- c) During construction, emissions would be generated by construction worker trips and by construction equipment. The BAAQMD generally does not recommend a detailed air quality analysis for projects generating less than 2,000 vehicle trips per day, unless warranted by the specific nature of the project or project setting. Construction worker trips are estimated at less than 18 daily individual (one-way) trips during peak construction activity periods, with an additional 6 to 8 individual truck trips per day for hauling material into and out of the excavation sites. Therefore the contribution of the Project to any cumulatively considerable impact due to development in the Bay Area would be less than significant.
- d) No sensitive receptors such as schools or hospitals are located within ¼ mile of the Project site. In addition, as noted previously, dust impacts would be controlled and construction-period exhaust emissions would be less than significant because of the small number of vehicle trips required to complete the Project. Because waste soil would be transported off site in covered bins, potential sensitive receptors along truck routes would not be exposed to dust from construction.
- e) The construction process would include no activities or sources capable of creating objectionable odors.
- f) The Project would generate short-term emissions, but would not exceed significance thresholds because it would comply with construction-period BAAQMD requirements. While there would be some long-term emissions associated with the SVE system, these emissions are covered by an existing BAAQMD permit (number S-190) and would continue to be covered by this permit for the duration of the system's operation. The SVE systems use GAC canisters to remove VOCs from the vapor stream. Implementation of the corrective measures would not generate radionuclide emissions or significant levels of toxic air contaminants. Air quality impacts associated with construction would be reduced in accordance with Mitigation Measure III-J-1 as proposed in the LRDP EIR, as amended.

A human health risk assessment was prepared as part of the CMS. The risk assessment concluded that the Project does not present a cancer risk or other health hazard to people who are located off site because there are no pathways by which off-site populations could be exposed to the chemicals in soil and groundwater at LBNL. The risk assessment also concluded that there may be some potential theoretical cancer risk or other health hazards for hypothetical future indoor workers at LBNL in some areas (i.e., near the Building 7 Sump area, the Building 51L Groundwater Plume Source Area, the Building 7 Lobe of the Old Town Groundwater Solvent Plume, and the Building 51/64 Groundwater Solvent Plume). Implementation of the corrective measures would have the beneficial effect of reducing the potential cancer risks and other health hazards by lowering the concentrations of chemicals in soil and groundwater in these areas. Thus, the Project would not exceed an applicable LRDP EIR, as amended, standard of significance.

Cumulative Impacts:

The Corrective Measures Project would not result in any significant cumulative air quality impacts. There would be no individually significant air quality impacts. The Project is consistent with the LBNL LRDP, and would not conflict with or obstruct implementation of the Ozone Attainment Plan, the Clean Air Plan, nor the Carbon Monoxide Maintenance Plan. The Project would not violate any applicable air quality standard or contribute substantially to any existing or projected air quality violations. Implementation of the corrective measures would not result in a cumulatively considerable net increase of any criteria pollutant, including ozone and its precursors, or PM₁₀. No construction emissions of criteria pollutants or toxic air contaminants would be expected to exceed any regional, state, or federal thresholds of significance. There would be some operational emissions, which would be within the allowable levels of the BAAQMD Permit. The Project would implement applicable BAAQMD measures to further reduce construction-period air impacts from excavation activities. The proposed Project would not create or substantially contribute to a significant TAC impact. Emissions of TACs during excavation and operation are expected to be very low in general and negligible based on the distances and directions to the nearest residential areas.

Summary of Impacts and Mitigation Measures:

Potentially significant impacts not mitigated by LRDP EIR, as amended, mitigation measures. None.

The Project would incorporate LRDP EIR, as amended, Mitigation Measure III-J-1. As a result, no significant air quality impacts would result from the proposed Project.

Mitigation Measure III-J-1:

Construction contract specifications would require that during construction exposed surfaces would be wetted twice daily or as needed to reduce dust emissions. In addition, contract specifications would require covering of excavated materials.

Corrective Measures Project-Specific Mitigation Measures: None.

Sources:

- a) BAAQMD, 2001. *Revised San Francisco Bay Area 2001 Ozone Attainment Plan for the 1-Hour National Ozone Standard*. October 24.

BAAQMD, 2000. *Bay Area 2000 Clean Air Plan and Triennial Assessment*, December 20.

California Air Resources Control Board, 1996. *Final Carbon Monoxide Redesignation Request and Maintenance Plan for Ten Federal Planning Areas*. April.

California Air Resources Control Board, 1998. *Revision to the 1996 Carbon Monoxide Maintenance Plan for Ten Federal Planning Areas*. October 6.

California Air Resources Board, 2003. Federal and State Ambient Air Quality Standards.

California Air Resources Board, 2004. web site at www.arb.ca.gov November.

b,c,d) BAAQMD, 1999. *BAAQMD CEQA Guidelines, Assessing Air Quality Impacts of Projects and Plans*. December.

d,e) LBNL, 2005. *RCRA Corrective Measures Study Report*. February 10, 2005

f) LBNL, 1987. *Site Development Plan EIR*, August (State Clearinghouse No. [19]85112610)

LBNL, 1992. *Proposed Renewal of the Contract between the United States Department of Energy and The Regents of the University of California for Operation and Management of the Lawrence Berkeley National Laboratory, Supplemental EIR*, September (State Clearinghouse No. [19]91093068)

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LBNL, 2003b. *Human Health Risk Assessment for the Lawrence Berkeley National Laboratory*, May.

4. Biological Resources

Project Activities with the Potential to Create Impacts:

- Excavation of soil
- Placement of pumps and GAC canisters

Setting:

LBNL is situated on approximately 200 acres on the western slopes of the Oakland-Berkeley Hills, within a mixture of low to moderate density residential neighborhoods and open space of various vegetation types and wildlife habitats. The CMS sites are currently developed with landscaping, walkways, buildings, and other impervious coverage.

The vegetation type on the Project sites is considered “landscaped” with an “Urban” habitat association (Mayer and Laudenslayer, 1988). There are no sensitive vegetation communities on the immediate Project sites. Landscaped areas occur throughout LBNL, primarily adjacent to buildings. Common horticultural species characterize the landscaping. Landscaping installed since the LRDP was written in 1987 consists of native and non-native drought-tolerant species and may provide foraging and nesting habitat for bird species tolerant of human presence and disturbance. Birds commonly found in such areas

include the non-native English sparrow (*Passer domesticus*), house finch (*Carpodacus mexicanus*), dark-eyed junco (*Junco hyemalis*), and Anna's hummingbird (*Calypte anna*). Reptiles using this type of habitat may include garter snake (*Thamnophis* sp.) and western fence lizard (*Sceloporus occidentalis*).

LBNL is located within the Briones Valley and Richmond USGS (United States Geological Survey) 7.5 Minute Quads. Potential species listed by the California Department of Fish and Game Natural Diversity database (CNDDDB), U.S. Fish and Wildlife Service (USFWS), and the California Native Plant Society (CNPS) for these Quads are included in Attachment 1. Because the Quads contain many habitats (from salt marshes to upland oak woodland), only a few of which are present in less disturbed areas at LBNL (e.g., Blackberry Canyon), an evaluation of the potential for these species to occur at LBNL is provided. In areas where corrective measures would be implemented there are no mature trees or water bodies that would provide suitable habitat for wildlife species. Thus, there is no potential for many of the species to occur in the Project area. In addition, the 1987 LRDP EIR, as amended, concludes that the continued operation of LBNL, including implementation of the 1987 LRDP, is not expected to restrict the number or reduce the range of any rare, endangered, or threatened plant or animal species, or to cause existing fish or wildlife populations to drop below self-sustaining levels.

Federal Endangered Species Act

The Federal Endangered Species Act of 1973 (Act) recognized that many species of fish, wildlife, and plants are in danger of or threatened with extinction and established a national policy that all federal agencies should work toward conservation of these species. The Secretary of the Interior and the Secretary of Commerce are designated in the Act as responsible for identifying endangered and threatened species and their critical habitats, carrying out programs for the conservation of these species, and rendering opinions regarding the impact of proposed federal actions on endangered species. The Act also outlines what constitutes unlawful taking, importation, sale, and possession of endangered species and specifies civil and criminal penalties for unlawful activities.

Biological assessments are required under Section 7(c) of the Act if listed species or critical habitat may be present in the area affected by any major construction activity conducted by, or subject to issuance of a permit from, a federal agency as defined in Part 404.02. Under Section 7(a)(3) of the Act every federal agency is required to consult with the USFWS or National Marine Fisheries Service (NMFS) on a proposed action if the agency determines that its proposed action may affect an endangered or threatened species.

Section 9 of the Act prohibits the "take" of any fish or wildlife species listed under the Act as endangered or threatened. Take, as defined by the Act, means "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such action." However, Section 10 allows for the "incidental take" of endangered and threatened species of wildlife by non-Federal entities. Incidental take is defined by the Act as take that is "incidental to, and not the purpose of, the carrying out of an otherwise lawful activity." Section 10(a)(2)(A) requires an applicant for an incidental take permit to submit a "conservation plan" that specifies, among other things, the impacts that are likely to result from the taking and the measures the permit applicant will undertake to minimize and mitigate such impacts. Section 10(a)(2)(B) provides statutory criteria that must be satisfied before an incidental take permit can be issued.

Migratory Bird Treaty Act

The federal Migratory Bird Treaty Act (MBTA) of 1918 (16 USC 703-711) makes it unlawful to take, possess, buy, sell, purchase, or barter any migratory bird listed in 50 CFR Part 10, including feathers or other parts, nests, eggs, or products, except as allowed by implementing regulations (50 CFR 21).

California Endangered Species Act

The California Endangered Species Act (CESA) established a state policy to conserve, protect, restore, and enhance any endangered species or any threatened species and its habitat (Fish and Game Code Sections 2050-2098). The Fish and Game Commission is charged with establishing a list of endangered and threatened species. State agencies must consult with the California Department of Fish and Game (CDFG) to determine if a proposed project is likely to jeopardize the continued existence of any endangered or threatened species.

The California Fish and Game Code defines “take” (Section 86) and generally prohibits “taking” of a species listed as endangered or threatened under CESA (California Fish and Game Code Section 2080) or as fully protected (as defined in California Fish and Game Code Sections 3511, 4700, and 5050). Impacts on individuals of those species are considered significant if they result in the following effects: a) direct mortality; b) permanent or temporary loss of occupied habitat that would result in mortality to or reduced productivity of at least one individual of the species; c) avoidance of biologically important habitat for substantial periods resulting in mortality to or reduced productivity of at least one individual of the species.

Section 2081 of the Fish and Game Code allows the “take” of a species listed as threatened or endangered by CESA in certain circumstances. Take is defined as any act that involves direct mortality or other actions that may result in adverse impacts when attempting to take individuals of a listed species. Under Section 2081, the state Department of Fish and Game may issue a permit to authorize take for scientific, educational or management purposes or take that is incidental to otherwise lawful activities.

Native Plant Protection and Conservation

The legal framework for conserving plants in California is written, in part, in the Native Plant Protection Act (NPPA) of 1977. The NPPA directs the CDFG to carry out the Legislature's intent to "preserve, protect and enhance rare and endangered plants in this State" and is codified in CDFG Code 1900-1913. The NPPA also gave the California Fish and Game Commission the power to designate native plants as "endangered" or "rare" and protected endangered and rare plants from take.

The CDFG requires a CESA Section 2081 (a) permit for take of candidate or listed threatened and endangered plants for scientific, educational, or management purposes, and a CESA Section 2081 (b) permit for incidental take of listed threatened and endangered plants from all activities, except those specifically authorized by the NPPA.

CESA (Fish and Game Code Section 2050-2116) expanded upon the original NPPA and enhanced legal protection for plants, but the NPPA remains part of the Fish and Game Code. To align with federal regulations, CESA created the categories of "threatened" and "endangered" species. It converted all "rare" animals into CESA as threatened species, but did not do so for rare plants. Thus, there are three listing categories for plants in California: rare, threatened, and endangered. Since rare plants are not included in CESA, mitigation measures for impacts to rare plants are specified in a formal agreement between the CDFG and the Project proponent.

The CNPS has prepared its own policy regarding impacts to rare plants (CNPS 1991 [revised 1998]). The CNPS endorses the mitigation concepts of the state through the CDFG Code, NPPA, and CEQA, but states that CEQA guidelines “are not always appropriate to mitigating rare plant impacts.” The principles of CNPS policy are:

- Avoidance through Design and Reconfiguration of the Project
- Reducing Impacts by Moving Projects Away from Sensitive Areas
- Habitat Restoration
- Reduction of Impacts over Time through Fencing or Staking
- Providing Offsite Compensation

California Fish and Game Code Section 1601

The CDFG also regulates activities that may affect streambeds. Division 2, Chapter 6, Section 1601 of the California Fish and Game Code states that "...general plans sufficient to indicate the nature of a project for construction by, or on the behalf of, any government agency, state or local, and any public utility, of any project which will divert, obstruct or change the natural flow or bed, channel, or bank of any river, stream, or lake designated by the Department in which there is at any time an existing fish or wildlife resource or from which these resources derive benefit, or will use material from the streambeds designated by the Department, shall be submitted to the Department."

Evaluation Criteria:

In addition to the evaluation criteria provided in the Initial Study Checklist (Appendix G of the CEQA Guidelines), the impact of the proposed Project on biological resources would be considered significant if it exceeded the following Standards of Significance, established by the LRDP EIR, as amended:

- Substantially reduce the number or restrict the range of a rare, endangered, or threatened plant or animal species;
- Cause fish or wildlife levels to drop below self-sustaining levels; or
- Adversely affect significant riparian lands, wetlands, marshes, or other wildlife habitats.

Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Impact for which LRDP EIR is Sufficient	Less Than Significant Impact	No Impact
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4. BIOLOGICAL RESOURCES --

Would the Project:

a) Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?

_____	_____	_____	_____X_____	_____
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	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Impact for which LRDP EIR is Sufficient	Less Than Significant Impact	No Impact
b) Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations or by the California Department of Fish and Game or US Fish and Wildlife Service?	_____	_____	_____	_____	_____X_____
c) Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?	_____	_____	_____	_____	_____X_____
d) Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?	_____	_____	_____	_____	_____X_____
e) Conflict with any local applicable policies protecting biological resources?	_____	_____	_____	_____X_____	_____
f) Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other applicable habitat conservation plan?	_____	_____	_____	_____	_____X_____
g) Exceed an applicable LRDP EIR standard of significance?	_____	_____	_____	_____X_____	_____

Discussion:

- a) The special status species identified in the CNDDDB, USFWS and CNPS databases as having some potential to occur within the Briones Valley and Richmond USGS 7.5 Minute Quads are listed in Attachment 1. However, appropriate on-site habitat is lacking at LBNL for most of these species because many require wetland or estuarine habitats (the Quads encompass habitat extending from San Francisco Bay to inland valleys), which are not present on site. The Project site is developed, disturbed and experiences a high level of human activity, which discourages wildlife use. No listed plants and no species requiring riparian, woodland, or rural habitat are expected to occur. Because no trees would be removed, no nesting special status or listed species would be affected by the Project.

The LBNL site was thoroughly investigated for the presence of special status species as part of the 1987 LRDP EIR, as amended, and no special status animal or plant species are expected to occur in areas that would be affected by the corrective measures. The 1987 LRDP EIR, as amended, concludes that the continued operation of LBNL is not expected to restrict the number or reduce the range of any rare, endangered, or threatened plant or animal species, or to cause existing fish or wildlife populations to drop below self-sustaining levels. Although there is some potential habitat for special status species within the less developed areas of LBNL, (e.g., Alameda whipsnake) no special status species have been identified in the developed areas that would be affected by the proposed corrective measures. Most corrective actions would occur in areas that are paved and lack any wildlife resources. This impact would be less than significant.

- b) The CMS sites do not contain riparian habitat or support sensitive natural communities. No impact would occur as these resources are not present.
- c) There are no marshes, vernal pools, or wetlands on the site. No impact would occur as these resources are not present.
- d) No migration routes or corridors would be disturbed by the corrective measures. The CMS sites are not considered native wildlife nursery sites. No impact would occur as these resources are not present.
- e) The Project would not conflict with local applicable policies protecting biological resources, including policies contained within the Berkeley Municipal Code and General Plan. Most work, including excavations, would occur in paved or landscaped areas and would not disturb areas subject to local policies protecting biological resources. Nevertheless, in accordance with policies EM-30 and EM-31 of the City of Berkeley General Plan, native species would be used to revegetate any disturbed areas, if needed, and landscaping would be drought resistant and would help reduce erosion. As no trees would be removed during the CMI process, the latter would not conflict with the 1990 City of Berkeley Tree Policy. This impact would be less than significant.
- f) No impact would occur because the CMS sites are not located within the boundaries of a HCP or NCCP area and the Project would not conflict with a HCP or NCCP.
- g) There are no significant wildlife habitats or natural vegetation associations on the CMS sites as they are currently developed; therefore, no impacts to such habitats or wetlands would occur. The Project would not cause wildlife levels to drop below a sustainable level, nor would it reduce the number of special-status species. Although no conflict with the standards of significance as established in the LRDP EIR, as amended, would occur impacts associated with the potential minor loss of some vegetation would be reduced in accordance with Mitigation Measures III-D-2a and 2f as proposed in the LRDP EIR, as amended.

Cumulative Impacts:

Since the Project involves the implementation of corrective measures to protect human health and environment the Project would potentially result in an overall beneficial impact to biological resources. With implementation of the mitigation measures in the LRDP EIR, as amended, no cumulative effects would result from this Project.

Summary of Impacts and Mitigation Measures:

Potentially significant impacts not mitigated by LRDP EIR, as amended, mitigation measures. None.

The Project would incorporate LRDP EIR, as amended, Mitigation Measures III-D-2a and 2f. As a result, no significant biological resources impacts would result from the proposed Project.

Mitigation Measure III-D-2a:

Revegetation of disturbed areas, including slope stabilization sites, using native shrubs, trees, and grasses will be included as a part of all new projects.

Mitigation Measure III-D-2f:

Periodic monitoring of disturbed areas, fill slopes, and other areas of exposed soil treated under the revegetation program will be conducted and [these areas will be] fixed.

Corrective Measures Project-Specific Mitigation Measures: None.

Sources:

a-f) Abrams, L., 1923. *An Illustrated Flora of the Pacific States: Washington, Oregon, and California*, Vol. I. Stanford University Press, Stanford, CA.

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Jennings, M. R., and M. P. Hayes, 1994. *Amphibian and Reptile Species of Special Concern in California*. California Department of Fish and Game, Rancho Cordova, CA.

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Munz, P., 1959. *A California Flora*. University of California Press, Berkeley, CA.

Peterson, R. T., 1990. *A Field Guide to Western Birds*. Houghton Mifflin Company, Boston, MA.

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Williams, D. F., 1986. *Mammalian Species of Special Concern in California*. California Department of Fish and Game, Sacramento, CA. Wildlife management division Administration Report 86-1.

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Zeiner, D. C., W. F. Laudenslayer Jr., K.E. Mayer, and M. White, (eds.), 1990b. *California's Wildlife, Volume 3, Mammals*. California Statewide Wildlife Habitat Relationships System, California Department of Fish and Game, Sacramento, CA.

United States Fish and Wildlife Service, 2003. *Federal Endangered and Threatened Species that may be Affected by Projects in the Briones Valley and Richmond 7.5 Minute Quad*. September.

g) LBNL, 1987. *Site Development Plan EIR*, August (State Clearinghouse No. [19]85112610)

LBNL, 1992. *Proposed Renewal of the Contract between the United States Department of Energy and The Regents of the University of California for Operation and Management of the Lawrence Berkeley National Laboratory, Supplemental EIR*, September (State Clearinghouse No. [19]91093068)

LBNL, 1997. *Proposed Renewal of the Contract between the United States Department of Energy and The Regents of the University of California for Operation and Management of the Lawrence Berkeley National Laboratory, Supplemental EIR Addendum*, September (State Clearinghouse No. [19]91093068)

5. Cultural Resources

Project Activities with the Potential to Create Impacts:

- Excavation of soil
- Injection of HRC[®]
- Injection of chemical oxidants (*in situ* chemical oxidation)
- Placement of pumps and GAC canisters

Setting:

LBNL has occupied its present location since 1939, when the need for higher-energy accelerators resulted in the construction of the 184-Inch Cyclotron on the hill site overlooking the campus and the City of Berkeley. The 1940s were a period of rapid growth of the LBNL site in response to national defense needs. Further development during the 1950s was more carefully planned, with the construction of

permanent concrete and steel-frame structures east and west of the earlier construction (the area referred to as “Old Town”). Several buildings on site date from this early era, which produced Nobel prizes for nine LBNL scientists.

As part of the environmental analysis for the LRDP EIR, as amended, all undeveloped land and proposed building locations were examined for potential historical and archaeological resources. All reasonably accessible parts of the LBNL area were examined. Special attention was given to areas of relatively flat land or rock outcrops. The steep hillsides were not examined intensively, although transects through accessible areas were made. Based on the findings of the historic and archaeological resources survey, no indications of historic or prehistoric archaeological resources were encountered in any location at the project site. Because the site is relatively steep, it appears that LBNL areas that might have been suitable for prehistoric occupation and use have already been utilized by LBNL.

In terms of historic buildings, field surveys and historic research are being conducted at LBNL by a team of licensed cultural resource professionals to evaluate the potential for historically significant buildings or structures. In coordination with LBNL, the Department of Energy, and the Office of Historic Preservation, this team is systematically investigating and reporting on all buildings and structures at the Lab. These reports are then submitted to the State Historic Preservation Officer for concurrence. The results of this ongoing work indicate that no structures analyzed thus far, apart from the Building 51, are considered eligible for listing in the National Register of Historic Places.

Evaluation Criteria:

In addition to the evaluation criteria provided in the Initial Study Checklist (Appendix G of the CEQA Guidelines), the impact of the proposed Project on cultural resources would be considered significant if it exceeded the following Standards of Significance, established by the LRDP EIR, as amended:

- Disrupt or adversely affect a prehistoric or archaeological site, or a property of historic or cultural significance to a community or ethnic or social group, or a paleontological site, except as part of a scientific study; or
- Affect a local landmark of local cultural/historic importance.

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Impact for which LRDP EIR is Sufficient	Less Than Significant Impact	No Impact
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5. CULTURAL RESOURCES --

Would the Project:

a) Cause a substantial adverse change in the significance of a historical resource as defined in §15064.5?	_____	_____	_____	_____	_____X_____
b) Cause a substantial adverse change in the significance of an archaeological resource pursuant to §15064.5?	_____	_____	_____	_____X_____	_____

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Impact for which LRDP EIR is Sufficient	Less Than Significant Impact	No Impact
c) Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?	_____	_____	_____	<u> X </u>	_____
d) Disturb any human remains, including those interred outside of formal cemeteries?	_____	_____	_____	<u> X </u>	_____
e) Exceed an applicable LRDP EIR standard of significance?	_____	_____	_____	<u> X </u>	_____

Discussion:

- a) Corrective measures would not make changes to or remove historical buildings. No impact would occur because no historic resources as defined in Section 15064.5 would be affected by the implementation of the corrective measures. Project activities planned in the Building 51L plume source area would not affect Building 51, which is nearby and being considered for eligibility for listing in the National Register of Historic Places.
- b-d) Since the Project areas are located in areas of cut and fill, paleontological and archaeological resources, as well as human remains, if present, would have already been disturbed in these areas. The potential to encounter such resources, if they exist on the site, is less than significant as the Project would occur within currently disturbed and previously excavated areas. These potential impacts would be less than significant.
- e) As discussed above, the Project would not affect buried resources or remains. In addition, no historically significant structures within the facility would be lost due to activities associated with the corrective measures. Thus, the Project would not exceed an applicable LRDP EIR, as amended, standard of significance and this potential impact would be less than significant.

Cumulative Impacts:

The Project would not remove or otherwise affect any historically significant structures or other resources and thus the Project would not contribute to a significant cumulative impact on cultural resources.

Summary of Impacts and Mitigation Measures:

Potentially significant impacts not mitigated by LRDP EIR, as amended, mitigation measures: None.

Corrective Measures Project-Specific Mitigation Measures: None.

Sources:

- a-d) LBNL, 2005. *RCRA Corrective Measures Study Report*. February 10, 2005

a,e) LBNL, 1987. *Site Development Plan EIR*, August (State Clearinghouse No. [19]85112610)

LBNL, 1992. *Proposed Renewal of the Contract between the United States Department of Energy and The Regents of the University of California for Operation and Management of the Lawrence Berkeley National Laboratory, Supplemental EIR*, September (State Clearinghouse No. [19]91093068)

LBNL, 1997. *Proposed Renewal of the Contract between the United States Department of Energy and The Regents of the University of California for Operation and Management of the Lawrence Berkeley National Laboratory, Supplemental EIR Addendum*, September (State Clearinghouse No. [19]91093068)

6. Geology and Soils

Project Activities with the Potential to Create Impacts:

- Excavation of soil
- Installation of trenches, pumps and GAC canisters

Setting:

The Project is located in the San Francisco Bay Area, which is a region of seismic activity due to the San Andreas Fault System. The USGS estimates a 70 percent likelihood of a Richter magnitude 6.7 or greater earthquake in the Bay Area within the next 30 years. Excessive groundshaking can cause landslides, surface rupture, structural damage, and other ground failures. Within the San Andreas fault system, the Hayward fault, one of the major active faults, extends along the eastern side of the San Francisco Bay and is located less than a mile from the Project site. Ground-shaking intensities from a major seismic event on the Hayward fault could generate ground motion approaching or exceeding a peak ground acceleration of 0.7g. Ground motion of this type would be characterized by the Modified Mercalli Intensity Scale as violent to very violent.

Soils at LBNL are typically less than 2 feet thick. The native soil at LBNL has been classified as the Xerorthents-Millshohm complex. The Xerorthents consist of loam and silt loam, containing fragment of shale and sandstone. The root zone is more than 20-inches deep. The Millshohm soil consists of silt loam that extends to a depth of 20 inches. The complex has moderate permeability and a low shrink-swell potential. In addition, colluvial deposits, generally less than 20 feet thick have developed along the bases of slopes and in hillside concavities. At least one major and several minor landslide masses are present at LBNL. Grading activities have significantly altered the original topography, with cuts up to 40 feet deep and fills up to 70 feet thick. Natural rock outcrops are few, although there are many rock exposures in cut slopes.

Evaluation Criteria:

In addition to the evaluation criteria provided in the Initial Study Checklist (Appendix G of the CEQA Guidelines), the impact of the proposed Project on geology and soils would be considered significant if, as identified by the LRDP EIR, as amended, it would result in development in the following areas:

- Which are located within an Alquist-Priolo Special Studies Zone, or within a known active fault zone, or an area characterized by surface rupture that might be related to a fault;

- Where the substrate consists of material that is subject to liquefaction or other secondary seismic hazards in the event of groundshaking;
- Where there is evidence of seismic hazards, such as landsliding or excessively steep slopes, that could result in slope failure;
- Which are in the vicinity of soil that is likely to collapse, as might be the case with karst topography, old mining properties, or areas of subsidence caused by groundwater drawdown;
- Where soils are characterized by shrink/swell potential that might result in deformation of foundations or damage to structures; and
- Which are located next to a water body that might be subject to tsunamis or seiche waves.

Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Impact for which LRDP EIR is Sufficient	Less Than Significant Impact	No Impact
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6. GEOLOGY AND SOILS --

Would the Project:

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

i) Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? Refer to Division of Mines and Geology Special Publication 42.

			X	
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ii) Strong seismic ground shaking?

			X	
--	--	--	---	--

iii) Seismic-related ground failure, including liquefaction?

			X	
--	--	--	---	--

iv) Landslides?

		X		
--	--	---	--	--

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

		X		
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c) Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the Project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse?

			X	
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	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Impact for which LRDP EIR is Sufficient	Less Than Significant Impact	No Impact
d) Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial risks to life or property?	_____	_____	_____X_____	_____	_____
e) Have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems where sewers are not available for the disposal of wastewater?	_____	_____	_____	_____	_____X_____
f) Exceed an applicable LRDP standard of significance?	_____	_____	_____X_____	_____	_____

Discussion:

- a) Although LBNL is located in a seismically active area with the potential for large, damaging events, implementation of the corrective measures would not expose people or structures to substantial hazards associated with seismic events. There are no Alquist-Priolo Earthquake Fault Zones within the Project site. Excavations would be temporary and properly shored, in accordance with LRDP EIR, as amended, Mitigation Measures III-B-2a and III-B-2c. Access to work sites would be limited to construction or operations personnel, which would reduce or eliminate the risk to other LBNL workers and visitors during a seismic event. Remediation components would be below ground (e.g., wells, trenches, piping) or relatively small (e.g., pumps, GAC canisters, drums) and would be located in out-of-the-way areas with limited access. This potential impact would be less than significant.
- b) Areas to be excavated are currently paved and would be repaved when excavation is complete. Other activities (e.g., HRC[®] injections) would have minor or no impacts on topsoil. Any exposed soil would be handled in accordance with LRDP EIR, as amended, Mitigation Measures III-B-2a and III-B-2d. This potential impact would be less than significant.
- c) None of the remediation components would be located in unstable areas, i.e., landslide areas. This potential impact would be less than significant.
- d) The Project soils are fill or native soil with a low shrink/swell potential. In addition, no structures would be constructed as part of the proposed Project that would have foundations subject to deformation or damage by shrink/swell soils. Temporary excavations into unstable soils would be conducted in accordance with LRDP EIR, as amended, Mitigation Measures III-B-2a and 2c to ensure stability of the area during implementation of the corrective measures. This impact would be less than significant.
- e) No impact would occur because septic systems would not be needed. Existing wastewater disposal systems would remain intact.

- f) The Project is not within an Alquist-Priolo Special Studies Zone nor located in areas that are subject to liquefaction, tsunamis, or seiche waves. With the inclusion of LRDP EIR, as amended, Mitigation Measures III-B-1 and III-B-2a, 2c and 2d the proposed Project would not exceed any of the standards of significance as established in the LRDP EIR, as amended. This potential impact would be less than significant.

Cumulative Impacts:

The ground surface would be restored after excavation and the remediation components would be small, creating relatively little disturbance of soils, thus, the Project would not contribute to a cumulative adverse impact to geology and soils.

Summary of Impacts and Mitigation Measures:

Potentially significant impacts not mitigated by LRDP EIR, as amended, mitigation measures: None.

The proposed Project would incorporate LRDP EIR, as amended, Mitigation Measures III-B-1, III-B-2a, III-B-2c, and III-B-2d.

Mitigation Measure III-B-1:

Geologic and soils studies will be undertaken during the design phase of each LBNL building project. Recommendations contained in those studies would be followed to ensure that the effects of landsliding, lurching, and liquefaction potential will not represent a significant adverse impact during a seismic event.

Mitigation Measure III-B-2a:

Excavation and earth moving will be designed for stability, and accomplished during the dry season when feasible. Drainage will be arranged to minimize silting, erosion, and landsliding. Upon completion, all land will be restored, covering exposed earth with planting.

Mitigation Measure III-B-2c:

Excavations will be shored as required by law to preclude minor short-term landslides during construction.

Mitigation Measure III-B-2d:

Revegetation of disturbed areas, including slope stabilization sites, using native shrubs, trees, and grasses will be included as part of all new projects.

Corrective Measures Project-Specific Mitigation Measures: None.

Sources:

- a,c) Association of Bay Area Governments (ABAG), *Earthquake Hazards Maps for Berkeley*, 2002.

California Geological Survey (formerly the Division of Mines and Geology), 1999. *Seismic Shaking Hazard Maps of California*.

- b,e) LBNL, 2005. *RCRA Corrective Measures Study Report*. February 10, 2005

d) USDA Soil Conservation Service. 1981. *Soil Survey of Alameda County, California, Western Part*. March 1981.

f) LBNL, 1987. *Site Development Plan EIR*, August (State Clearinghouse No. [19]85112610)

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7. Hazards and Hazardous Materials

Project Activities with the Potential to Create Impacts:

- Excavation and management of soil that may contain residual contamination
- Management of extracted groundwater

Setting:

Hazardous wastes generated at LBNL are managed by the Environment, Health and Safety Division's Waste Management Group or contractors operating with the Waste Management Group's oversight. The Waste Management Group is responsible for ensuring compliance with hazardous waste regulations and for determining the LBNL Hazardous Waste Handling Facility's storage and labeling requirements, selecting a disposal site, as well as manifesting and maintaining disposal records. Any hazardous wastes, including residual soil or groundwater contamination that is encountered during implementation of the corrective measures, would be managed in accordance with applicable DOE and LBNL policies, and state and federal regulations regarding hazardous waste handling, storage, and disposal.

Evaluation Criteria:

In addition to the evaluation criteria provided in the Initial Study Checklist (Appendix G of the CEQA Guidelines), the impact of the proposed Project with respect to hazards and hazardous materials would be considered significant if it would exceed the following Standards of Significance, identified by the LRDP EIR, as amended:

- Create a potential public health hazard or involve the use, production, or disposal of materials that pose a hazard to people or to animal or plant populations;
- Interfere with emergency response plans or emergency evacuation plans;
- Result in unsafe conditions for employees or surrounding neighborhoods;
- Expose building occupants to work situations that exceed health standards or present an undue potential risk of health-related accidents; or
- Conflict with any federal, state, or local regulations or contractual DOE Order for the handling, packaging, storage, transport, or disposal of hazardous and radioactive materials and/or wastes.

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Impact for which LRDP EIR is Sufficient	Less Than Significant Impact	No Impact
7. HAZARDS AND HAZARDOUS MATERIALS - Would the Project:					
a) Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?	_____	_____	_____	<u> X </u>	_____
b) Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?	_____	_____	_____	<u> X </u>	_____
c) Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?	_____	_____	_____	<u> X </u>	_____
d) Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?	_____	_____	_____	<u> X </u>	_____
e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the Project result in a safety hazard for people residing or working in the Project area?	_____	_____	_____	_____	<u> X </u>
f) For a project within the vicinity of a private airstrip, would the Project result in a safety hazard for people residing or working in the Project area?	_____	_____	_____	_____	<u> X </u>
g) Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?	_____	_____	_____	<u> X </u>	_____

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Impact for which LRDP EIR is Sufficient	Less Than Significant Impact	No Impact
h) Expose people or structures to a significant risk of loss, injury or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands?	_____	_____	_____	<u> X </u>	_____
i) Exceed an applicable LRDP EIR standard of significance?	_____	_____	<u> X </u>	_____	_____

Discussion:

a,b) The corrective measures would not require bulk storage of flammable or combustible liquids or gases, corrosive, caustic, or otherwise reactive or toxic chemical substances. The Project would comply with all LBNL hazardous materials policies and programs, in addition to all applicable DOE Program and Project Management Practices. LBNL has a hazardous materials program, which includes personnel training and management, handling, and storage policies for hazardous materials. Given the types and quantities of chemicals expected and LBNL safety practices, hazardous materials used during corrective measures implementation would not create a hazard to the public or the environment.

Excavated soil would be shipped off site in covered bins to an appropriately licensed landfill. Extracted groundwater would be treated and recycled for soil flushing, or discharged to the sanitary sewer in accordance with conditions in the existing EBMUD permit. Spent GAC and contaminated soil and groundwater encountered during excavations would be handled in accordance with applicable and appropriate storage, transport, and disposal requirements, including state and federal laws and regulations, and LBNL and DOE orders, policies and programs. Compliance with these requirements would reduce potential hazardous materials and hazardous waste impacts to a less than significant level.

c) The Project is about ½ mile north of the UC Berkeley campus and 600 feet or more south of the UC Lawrence Hall of Science. However, no existing or proposed kindergarten-through-12th grade schools are located within one-quarter mile of the Project. Potential impacts would be less than significant.

d) The California Hazardous Waste and Substances List, compiled in accordance with Government Code Section 65962.5 and more commonly known as the Cortese List, includes six locations within LBNL (Buildings 7E, 50, 62, 69, 74, and 76). These sites are included as underground fuel storage tank sites where leaks had occurred and are not associated with the Project. Building 50 was a former underground residual photographic solution storage tank that should not be included on the fuel tank list. LBNL has received case closure from the City of Berkeley or No Further Action approval from the DTSC for all six of these underground tank sites.

e,f) The Project is not located within two miles of a public or private airstrip. Therefore, there are no impacts associated with safety hazards related to air traffic.

- g) The Project would not be constructed in areas (e.g., roadways that serve as evacuation routes) that would impair implementation or physically interfere with the emergency response or evacuation plan at LBNL. Potential impacts would be less than significant.
- h) LBNL has on-site fire and emergency medical services, along with hazardous response personnel, which would minimize risks associated with fires and hazardous material spills. These on-site services are sufficiently staffed to accommodate this Project. This potential impact would be less than significant.
- i) The Project would not create a public health hazard, interfere with emergency response or evacuation plans, create unsafe conditions, or conflict with federal, state or local regulations regarding the handling, packaging, storage, transport, or disposal of hazardous materials or waste. Handling of hazardous wastes would be in accordance with Mitigation Measures IV-K-2a and 3 as proposed in the LRDP EIR, as amended. Thus, the proposed Project would not exceed an applicable Standard of Significance established by the LRDP EIR, as amended.

Summary of Impacts and Mitigation Measures:

Potentially significant impacts not mitigated by LRDP EIR, as amended, mitigation measures: None.

The Project would incorporate LRDP EIR, as amended, Mitigation Measures IV-K-2a and IV-K-3.

Mitigation Measure IV-K-2a:

Prior to shipping any hazardous materials to any hazardous waste treatment, storage or disposal facility, LBNL will confirm that the facility is licensed to receive the type of waste LBNL is proposing to ship to that facility.

Mitigation Measure IV-K-3:

LBNL will require hazardous waste haulers to provide evidence that they are appropriately licensed to transport the type of wastes being shipped from LBNL.

Corrective Measures Project-Specific Mitigation Measures: None.

Sources:

- a-h) LBNL, 2005. *RCRA Corrective Measures Study Report*. February 10, 2005
- d) California Environmental Protection Agency, 2004. Hazardous Waste and Substances Sites List (Cortese List)
- g,h) LBNL, 1999. *LBNL Master Emergency Plan, Pub-533 Rev.1*, April 1, 1999.
- i) LBNL, 1987. *Site Development Plan EIR*, August 1987 (State Clearinghouse No. [19]85112610)
- LBNL, 1992. *Proposed Renewal of the Contract between the United States Department of Energy and The Regents of the University of California for Operation and Management of the Lawrence Berkeley National Laboratory, Supplemental EIR*, September (State Clearinghouse No. [19]91093068)

LBNL, 1997. *Proposed Renewal of the Contract between the United States Department of Energy and The Regents of the University of California for Operation and Management of the Lawrence Berkeley National Laboratory, Supplemental EIR Addendum*, September (State Clearinghouse No. [19]91093068)

8. Hydrology and Water Quality

Project Activities with the Potential to Create Impacts:

- Excavation of soil
- Injection of HRC[®]
- Extraction and management of groundwater
- Well abandonment

Setting:

LBNL is situated within the Strawberry Creek watershed, in the ridges and drainage areas of Blackberry and Strawberry Canyons in the East Bay Hills. The area is characterized by steep slopes underlain by bedrock with a shallow soil surface. Groundwater flow through bedrock is typically characterized by fracture flow that has slow recharge and low yield, while groundwater flow in the drainages is unconfined flow and fluctuates with seasonal precipitation. This area is not underlain by an easily accessible, high-yield, aquifer system; however, groundwater may be a source of some minor recharge for the alluvial aquifer underlying the East Bay Plain may occur. LBNL and surrounding communities receive their water from EBMUD.

Because the purpose of this Project is to implement corrective measures that would remove contaminants from soil and groundwater, one of the expected outcomes of the Project is that groundwater quality at LBNL would improve. The proposed corrective measures would remove chlorinated VOCs by soil washing, SVE, soil excavation and natural attenuation. Groundwater quality will be monitored to determine the effectiveness of the proposed corrective measures.

Storm water generated within the LBNL facility is currently managed in accordance with LBNL's National Pollutant Discharge Elimination System (NPDES) General Permit for Storm Water Discharges Associated with Industrial Activity, as required by the Clean Water Act and the State Water Resources Control Board. The San Francisco Bay Regional Water Quality Control Board and the City of Berkeley provide oversight and enforcement of this permit. Implementation of the permit requirements is detailed in LBNL's Storm Water Pollution Prevention Plan (SWPPP) and Storm Water Monitoring Plan (SWMP).

Evaluation Criteria:

In addition to the evaluation criteria provided in the Initial Study Checklist (Appendix G of the CEQA Guidelines), the impact of the proposed Project on hydrology and water quality would be considered significant, as established by the LRDP EIR, as amended, if it:

- Would be located in flood-prone areas;
- Would increase off-site flood hazard, erosion, or sedimentation;
- Would substantially degrade or deplete groundwater resources;
- Would interfere substantially with groundwater recharge; and

- Would substantially degrade surface or groundwater quality.

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Impact for which LRDP EIR is Sufficient	Less Than Significant Impact	No Impact
8. HYDROLOGY AND WATER QUALITY - Would the Project:					
a) Violate any water quality standards or waste discharge requirements?	_____	_____	_____	<u> X </u>	_____
b) Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted)?	_____	_____	_____	<u> X </u>	_____
c) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation on- or off-site?	_____	_____	_____	<u> X </u>	_____
d) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site?	_____	_____	_____	<u> X </u>	_____
e) Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff?	_____	_____	_____	<u> X </u>	_____
f) Otherwise substantially degrade water quality?	_____	_____	_____	<u> X </u>	_____

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Impact for which LRDP EIR is Sufficient	Less Than Significant Impact	No Impact
g) Place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map?	_____	_____	_____	_____	_____X_____
h) Place within a 100-year flood hazard area structures which would impede or redirect flood flows?	_____	_____	_____	_____	_____X_____
i) Expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam?	_____	_____	_____	_____	_____X_____
j) Inundation by seiche, tsunami, or mudflow?	_____	_____	_____	_____	_____X_____
k) Exceed an applicable LRDP EIR standard of significance?	_____	_____	_____	_____X_____	_____

Discussion:

- a) The proposed corrective measures would remove contaminants from soil and groundwater, which is expected to improve water quality. No discharges of contaminated groundwater to surface water would occur. Water from the soil washing system would be treated and reinjected or would be discharged to the sanitary sewer in accordance with a permit issued to LBNL by EBMUD. The use of HRC[®] could lower pH and cause an increase in the concentrations of dissolved metals, particularly iron, in the groundwater. However, this effect is expected to be localized and temporary and thus would not substantially degrade groundwater quality. This potential impact would be less than significant.
- b) Some of the proposed corrective measures would extract groundwater and treat it with GAC to remove VOCs. Most of this groundwater would be reinjected as part of the soil washing system. Thus its extraction would be temporary and would not deplete groundwater. There are no nearby production wells that would be affected by the corrective measures. This potential impact would be less than significant.
- c) No streams or rivers would be altered. No new impervious surfaces would be created. Local drainage patterns may be temporarily altered in areas where soil would be excavated but any diverted flows would not increase erosion or siltation because the areas around the excavations are paved. This potential impact would be less than significant.
- d) No streams or rivers would be altered. No new impervious surfaces would be created. Existing stormwater drainages would not be removed. Local drainage patterns may be temporarily altered in areas where soil would be excavated but this would not increase the rate or amount of runoff because

the areas around the excavations are paved. Therefore, no flooding would occur on or off site as a result of the proposed Project. This potential impact would be less than significant.

- e) No new impervious surfaces or sources of polluted runoff would be created and thus, stormwater volumes and quality would not be affected by the Project. Contaminated soil that is removed from excavations would be placed in bins, which would prevent potential runoff of contaminants. This potential impact would be less than significant.
- f) As discussed above under item a, the proposed corrective measures would remove contaminants from soil and groundwater, which would improve water quality. No discharges of contaminated groundwater to surface water would occur. This potential impact would be less than significant.
- g) No impact would occur because no housing would be constructed.
- h) No impact would occur because the proposed corrective measures are not within a flood hazard area.
- i) No impact would occur because the location and topography of the site would preclude flooding.
- j) No impact would occur because the locations of the proposed corrective measures are not subject to inundation by seiche, tsunami or mudflow.
- k) No conflict with the standards of significance established in the LRDP EIR, as amended, would result from this Project. LBNL is not located in a flood prone area, nor would it deplete groundwater supplies or inhibit groundwater recharge. The Project would not increase erosion or sedimentation and would not adversely affect groundwater or surface water quality. The proposed Project would have the beneficial effect of improving groundwater quality by removing contaminants.

Summary of Impacts and Mitigation Measures:

Potentially significant impacts not mitigated by LRDP EIR, as amended, mitigation measures. None.

Corrective Measures Project-Specific Mitigation Measures: None.

Sources:

- a-g) LBNL, 2005. *RCRA Corrective Measures Study Report*. February 10, 2005
- h) FEMA Hazard Mapping by ESRI Website: <http://www.esri.com/hazards>. Accessed September 2003.
- i,j) USGS. 7.5 minute Series Quadrangle, Richmond and Briones Valley, photo revised 1980.
- k) LBNL, 1987. *Site Development Plan EIR*, August (State Clearinghouse No. [19]85112610)

LBNL, 1992. *Proposed Renewal of the Contract between the United States Department of Energy and The Regents of the University of California for Operation and Management of the Lawrence Berkeley National Laboratory, Supplemental EIR*, September (State Clearinghouse No. [19]91093068)

LBNL, 1997. *Proposed Renewal of the Contract between the United States Department of Energy and The Regents of the University of California for Operation and Management of the Lawrence Berkeley National Laboratory, Supplemental EIR Addendum*, September (State Clearinghouse No. [19]91093068)

9. Land Use and Planning

Project Activities with the Potential to Create Impacts:

- Excavation of soil

Setting:

The Project area located within the LBNL site, which consists of approximately 200 acres owned by the University of California, most of which is leased to DOE. This land and a larger surrounding area belonging to the University are within the boundaries of the cities of Berkeley and Oakland. Adjacent land use includes residential areas to the north, UC Berkeley athletic fields and recreational facilities to the south, residential areas and UC Berkeley student housing, amphitheater, and classrooms to the west, and the UC Berkeley Lawrence Hall of Science Museum to the east.

LBNL is a federal facility conducting work within the University of California's mission, and as such is generally exempted from compliance with local land use regulations, including general plans and zoning. However, LBNL cooperates with local jurisdictions to reduce any physical consequences of potential land use conflicts to the extent feasible. The proposed corrective measures are consistent with land use designations, goals, and objectives set forth under the LRDP and considered and approved by The UC Regents. The City of Berkeley's Zoning Code designates the entire LBNL Hill site as High Density Residential. As the purpose of LBNL is research rather than residential use, this designation does not accurately reflect the existing land uses on the site. However, other policies within the Municipal Code may be followed to maintain cooperation with the City and the General Plan designates the area as Institutional, which correctly reflects the existing uses on the site. Areas adjacent are designated as open space.

The Land Use and Transportation Element of the Oakland General Plan designates land use at LBNL as Institutional, which is "intended to create, maintain, and enhance areas appropriate for educational facilities, cultural and institutional uses, health services and medical uses as well as other uses of similar character." A portion of LBNL is also designated as a Resource Conservation Area, where future buildings are not permitted except as required to facilitate the maintenance of conservation areas.

Evaluation Criteria:

In addition to the evaluation criteria provided in the Initial Study Checklist (Appendix G of the CEQA Guidelines), the impact of the proposed Project on land use and planning would be considered significant if it exceeded the following Standards of Significance, established by the LRDP EIR, as amended:

- Propose land uses that would conflict with existing or proposed land uses at the periphery of the site or with local land use plans;
- Result in the conversion of open space into urban- or suburban-scale uses;
- Conflict with local general plans, zoning, or locally adopted environmental plans and goals; and
- Result in nuisance impacts as a result of incompatible land uses.

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Impact for which LRDP EIR is Sufficient	Less Than Significant Impact	No Impact
9. LAND USE AND PLANNING --					
Would the Project:					
a) Physically divide an established community?	_____	_____	_____	_____	<u> X </u>
b) Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the Project (including, but not limited to the LRDP, general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect?	_____	_____	_____	<u> X </u>	_____
c) Conflict with any applicable habitat conservation plan or natural community conservation plan?	_____	_____	_____	_____	<u> X </u>
d) Exceed an applicable LRDP EIR standard of significance?	_____	_____	_____	<u> X </u>	_____

Discussion:

- a) The proposed corrective measures would be implemented within the developed portion of LBNL near existing buildings and paved lots. The Project requires excavations and the installation of trenches, pumps, and piping below the ground surface. Most activities would occur near Buildings 51, 51L, 64, 69A, and 71B, and in the “Old Town Area” near Buildings 7, 25A, and 52. The Project site is primarily located within the City of Berkeley portion of the LBNL area, with one small area located in Oakland. Only MNA, which requires no construction, is proposed for the area within Oakland. The proposed corrective measures would occur only within the LBNL site, and would not extend into adjacent properties. No impact would occur because the proposed Project would not divide an established community.
- b) Construction and implementation of the proposed corrective measures would not result in any significant land use impacts because the measures do not conflict with existing or proposed land uses at the periphery of LBNL or with local land use plans; do not result in the conversion of open space into urban or suburban scale uses; do not conflict with local general plans, zoning, or locally adopted environmental plans and goals; and do not result in nuisance impacts as a result of incompatible land uses. The use of the Project area would remain institutional.

With the exception of Landscaping and Visual Enhancement, the Design Guidelines from the 1987 LRDP do not apply to the Project, as no new construction of buildings would occur. Regarding landscaping, the Design Guidelines, which have been incorporated as part of the Project, require

existing landscaping to be preserved to the extent possible. Because excavations would occur in areas that are paved, landscaping would not be affected and thus replacement of plantings would not be needed. Other components of the proposed Project would be relatively small, located at the ground surface (e.g., wellheads) and/or placed adjacent to buildings (e.g., GAC canisters); these would have minor impacts on landscaping, if any. This potential impact would be less than significant.

- c) There would be no impact because construction and implementation of the proposed corrective measures would not occur in areas subject to an HCP or NCCP.
- d) The proposed corrective measures are consistent with land use designations, goals, and objectives set forth under the LRDP and considered and approved by The UC Regents. Thus, the Project would not conflict with the standards of significance established in the LRDP EIR, as amended.

Cumulative Impacts:

Construction and implementation of the proposed corrective measures would not add to the amount of development occurring in the area. The Project would not cause land use conflicts with any other proposed projects.

As previously noted the multi-step process for investigating and addressing all historical releases of hazardous waste and chemicals that may have occurred at the LBNL will continue consistent with the Corrective Measures Study Report and as a condition of the Hazardous Waste Facility Permit issued in 1993. Although activities such as the demolition of Building 51/51A and the Bevatron surround the remediation measures planned in accordance with the Corrective Measures Study Report, it is not anticipated that these separate activities will result in a cumulative impact to the public health or the environment.

Summary of Impacts and Mitigation Measures:

Potentially significant impacts not mitigated by the LRDP EIR, as amended, mitigation measures: None.

Corrective Measures Project-Specific Mitigation Measures: None.

Sources:

a) LBNL, 2005. *RCRA Corrective Measures Study Report*. February 10, 2005

b,c,d) LBNL, 1987. *Long Range Development Plan*, PUB-5184, August.

LBNL, 1992. *Proposed Renewal of the Contract between the United States Department of Energy and The Regents of the University of California for Operation and Management of the Lawrence Berkeley National Laboratory, Supplemental EIR*, September (State Clearinghouse No. [19]91093068)

LBNL, 1997. *Proposed Renewal of the Contract between the United States Department of Energy and The Regents of the University of California for Operation and Management of the Lawrence Berkeley National Laboratory, Supplemental EIR Addendum*, September (State Clearinghouse No. [19]91093068)

10. Mineral Resources

Project Activities with the Potential to Create Impacts:

- None

Setting and Discussion:

LBNL is not located in a Mineral Resource Zone as defined by the California Department of Mines and Geology, nor are any mineral extraction operations conducted on the site. No further analysis is necessary because no mineral resources are present at LBNL.

Evaluation Criteria:

In addition to the evaluation criteria provided in the Initial Study Checklist (Appendix G of the CEQA Guidelines), the impact of the proposed Project on mineral resources would be considered significant if it resulted in the operation of facilities in development areas:

- Which are located in a Mineral Resource Zone identified by the California Department of Mines and Geology.

Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Impact for which LRDP EIR is Sufficient	Less Than Significant Impact	No Impact
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10. MINERAL RESOURCES:

_____	_____	_____	_____	<u> X </u>
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Sources:

City of Oakland, 1998. *General Plan, Land Use and Transportation Element*, March.

LBNL, 1987. *Long Range Development Plan*, PUB-5184, August.

LBNL, 1987. *Site Development Plan EIR*, August (State Clearinghouse No. [19]85112610)

11. Noise

Project Activities with the Potential to Create Impacts:

- Operation of heavy equipment during excavation
- Operation of pumps

Setting:

Propagation of noise from Project activities to nearby sensitive receptors is dependent on factors such as distance, terrain features, atmospheric conditions, and whether or not a direct line-of-sight exists between the sensitive receptors and the noise source. The topography in the Project area is hilly, which has a substantial effect on the propagation of noise. Noise-sensitive land uses exist to the north, east, and west of the Project area. There are no sensitive land uses in the southerly direction that are close enough to be potentially impacted by excavation or drilling noise. The nearest noise sensitive land use areas are shown on Figure V-1. A description of each area follows.

Area 1 – This area to the west consists of the Nyingma Institute (Buddhist facility) and single- and multi-family residences. There is no direct line-of-sight between any of the residences or Buddhist facility and the Project area, due to intervening hillside terrain and building structures. The average background sound levels in this area were measured at 44 to 54 dBA (LBNL 2003c).

Area 2 – This area to the north consists of single-family residences along Campus Drive, Olympus Avenue, and Summit Road. A partial line-of-sight exists between some of these residences and part of the Project area, although none have a completely unobstructed view due to the intervening terrain and buildings. Average background sound levels in this area were measured at 52 to 54 dBA.

Area 3 – To the east is the UC Berkeley Lawrence Hall of Science Museum. No line-of-sight exists between the Project area and the Museum itself due to the Museum's offset from the edge of the hillside. However, if a person stands directly in front of the 3.5-foot tall boundary wall at the edge of the hillside where the Museum property faces LBNL, a partial line-of-sight does occur. This wall is at the boundary of the Museum's outdoor area where children often play on the Museum's outdoor fixtures. The fixtures themselves do not have a line-of-sight to the Project area. Average background sound levels at the Museum site were measured at 53 to 54 dBA.

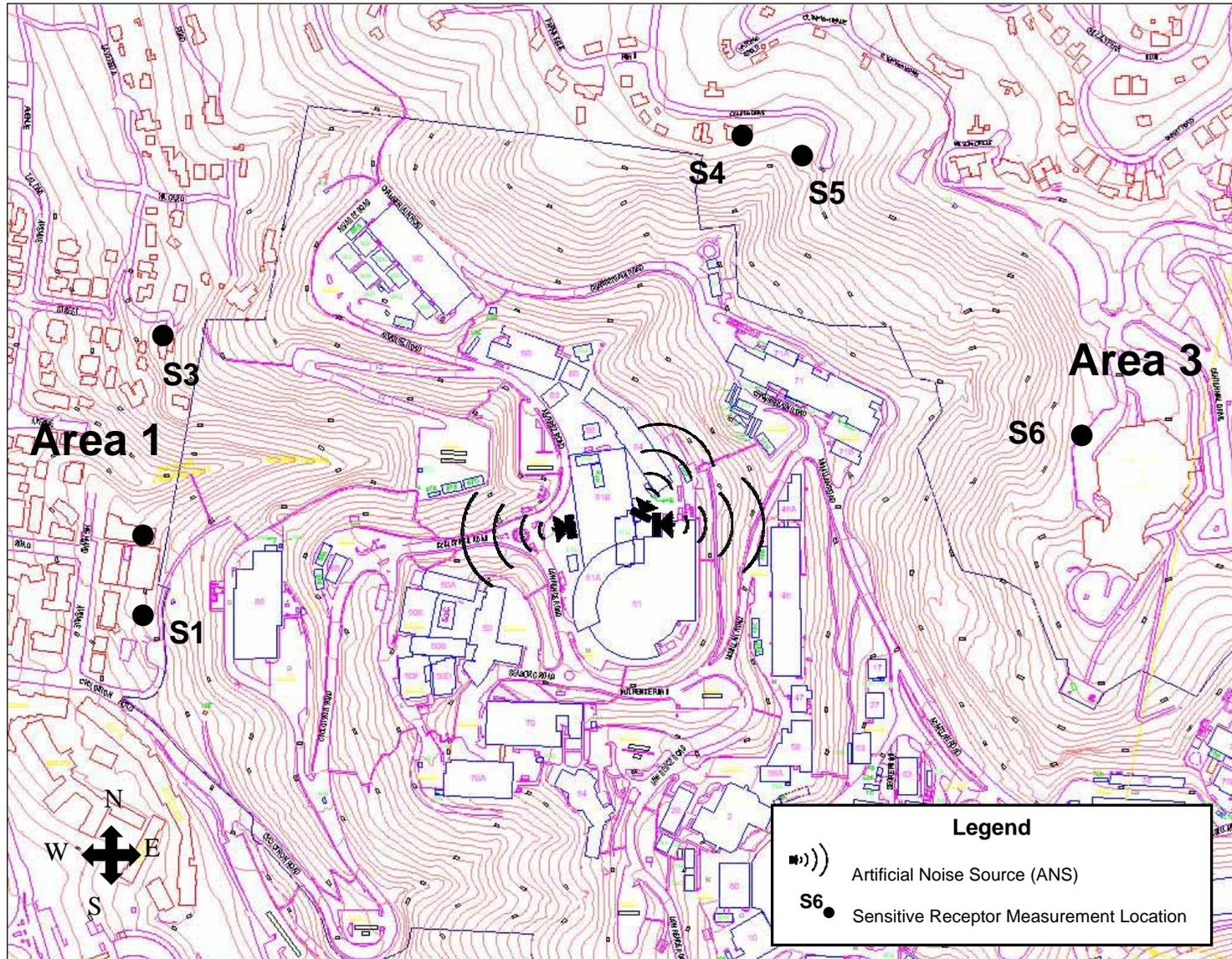
Evaluation Criteria:

In addition to the evaluation criteria provided in the Initial Study Checklist (Appendix G of the CEQA Guidelines), the impact of the proposed Project on noise would be considered significant if it exceeded the following Standards of Significance, established by the LRDP EIR, as amended:

- Generate noise that would conflict with local noise ordinances and standards, including State of California and local guidelines for long-term exposures, acceptable interior noise levels, and 24-hour average noise levels;
- Propose land uses that substantially increase noise levels in areas of sensitive receptors; and
- Propose land uses not compatible with the baseline noise levels.

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Impact for which LRDP EIR is Sufficient	Less Than Significant Impact	No Impact
11. NOISE - Would the Project result in:					
a) Exposure of persons to or generation of noise levels in excess of standards established in any applicable plan or noise ordinance, or applicable standards of other agencies?	_____	_____	<u> X </u>	_____	_____
b) Exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels?	_____	_____	_____	<u> X </u>	_____
c) A substantial permanent increase in ambient noise levels in the Project vicinity above levels existing without the Project?	_____	_____	_____	_____	<u> X </u>
d) A substantial temporary or periodic increase in ambient noise levels in the Project vicinity above levels existing without the Project?	_____	_____	_____	<u> X </u>	_____
e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the Project expose people residing or working in the Project area to excessive noise levels?	_____	_____	_____	_____	<u> X </u>
f) For a project within the vicinity of a private airstrip, would the Project expose people residing or working in the Project area to excessive noise levels?	_____	_____	_____	_____	<u> X </u>
g) Exceed an applicable LRDP EIR standard of significance?	_____	_____	_____	<u> X </u>	_____

Figure V-1. Artificial Noise Source (ANS) Arrangement and Sensitive Receptor Measurement Locations



Discussion:

- a) Implementation of the corrective measures would involve the use of various noise-producing pieces of equipment, and may result in a temporary increase of ambient noise levels in the surrounding areas during excavation and drilling activities. However, the proposed Project would not result in exposure of persons at off-site locations to noise levels in excess of applicable standards.

Most construction equipment used to implement the corrective measures would produce noise levels of about 75 dBA or less at 50 feet (Table V-6). Some equipment (i.e., drill rigs and jackhammers) could produce temporary noise at a maximum noise level of about 85 to 90 dBA. Recent measurements of a representative artificial noise source producing a noise level of 95 dBA at 50 feet showed that noise in the vicinity of Building 51L, a Project area, would not be audible at most adjacent off site sensitive receptor locations (see Table V-7). Thus, excavation and drilling noise would be inaudible or barely audible at adjacent sensitive receptor locations. Mitigation Measure III-K-2 of the LRDP EIR, as amended, would be implemented, as needed, to reduce noise for on-site receptors. The Project would comply with the City of Berkeley’s municipal code Noise Ordinance (Berkeley, 2003), which specifies restrictions for construction activities. The Noise Ordinance (Section 13.40.070 of the Municipal Code) generally prohibits operating construction/demolition tools and equipment between 7:00 p.m. and 7:00 a.m. on weekdays, or 8:00 p.m. and 9:00 a.m. on weekends or holidays, such that the sound creates a noise disturbance across a residential or commercial real property line. There would be no noise impacts on residential property in Oakland from the Project. This potential impact would be less than significant.

Table V-6

NOISE LEVELS OF TYPICAL EXCAVATION EQUIPMENT¹

Equipment Type	Measured Noise Level, dBA at 50 Feet
Drill Rig ²	90
Jackhammer ³	86
Front End Loader	74
Back Hoe	75
Grader	75
Compaction Roller	74
Haul Truck	74
Artificial Noise Source (ANS)	95

1. Measurements conducted by Parsons on recent rail, highway, and pipeline construction and demolition projects (Alameda Corridor, 2000; Denver TREX, 2003; Los Angeles ECIS/NEIS, 2003).
2. Auger drill rig drilling pile holes. This equipment is similar to that which may be used to dig excavations at LBNL.
3. Jackhammer breaking concrete.

Table V-7

MEASURED NOISE LEVELS AT SENSITIVE RECEPTOR LOCATIONS

Measurement Location (See Figure V-1)	Average Background Noise Level, dBA	Artificial Noise Source Level, dBA ⁽¹⁾
Site 1	54.2	not audible ⁽²⁾
Site 2	46.2	not audible ⁽²⁾
Site 3	43.7	not audible ⁽²⁾
Site 4	53.9	53.5
Site 5	52.0	47.0
Site 6 (at wall)	53.5	57.4
Site 6 (15 ft. from wall)	53.0	not audible ⁽²⁾

1. Measured level was adjusted to exclude background noise.
2. Artificial source could not be measured or heard.

- b) This potential impact would be less than significant because the proposed Project would not result in exposure of persons at off-site locations to excessive vibration levels. Construction equipment that would be used for the Project is not expected to generate substantial vibration.
- c) No impact would occur because the proposed Project would not result in permanent increases in noise levels in the Project vicinity. Extraction pumps would be installed within the well casings below ground level. They would be inaudible or only barely audible in the immediate vicinity of the well. Once excavation and drilling are complete there would be no further noise generated.
- d) The proposed Project would not result in a substantial increase (temporary or periodic) in ambient noise levels in the Project vicinity. This potential impact would be less than significant.
- e) No impact would occur because the proposed Project is not located within 2 miles of a public airport or public use airport.
- f) No impact would occur because the proposed Project is not located within 2 miles of a private airstrip.
- g) The Project would not generate any incompatible land uses, nor would it cause long-term increases in the baseline noise levels of the Project area, because noise generation would end at the completion of excavation and drilling activities associated with the proposed Project. Thus, the proposed Project would not exceed applicable LRDP EIR, as amended, standards of significance.

Cumulative Impacts:

Because noise levels from excavation and drilling would be inaudible or barely audible at nearby sensitive receptors, no short-term cumulative impacts are anticipated during implementation of the corrective measures. The Project would generate no long-term noise impacts, so there would be no permanent cumulative impacts.

Summary of Impacts and Mitigation Measures:

Potentially significant impacts not mitigated by LRDP EIR, as amended, mitigation measures. None.

The Project would incorporate LRDP EIR, as amended, Mitigation Measure III-K-2.

Mitigation Measure III-K-2:

Noise-generating construction equipment will be located as far as possible from existing buildings. If necessary, windows of laboratories or offices will be temporarily covered to reduce interior noise levels on-site.

Corrective Measures Project-Specific Mitigation Measures: None.

Sources:

a) Alameda Corridor, 2000. Alameda Corridor Rail Construction Project, Noise and Vibration Control Monitoring for Construction and Demolition Operations, Conducted by Parsons, 1998-2000.

Berkeley, 2003. City of Berkeley Municipal Code, Title 13, Chapter 13.40, "Community Noise"

Denver TREX, 2003. Southeast Corridor Multi-Modal Transportation Design-Build Project, Noise and Vibration Control Monitoring for Construction and Demolition Operations, Conducted by Parsons, 2001-2003.

ECIS/NEIS, 2003. East Central Interceptor Sewer and Northeast Interceptor Sewer Construction Projects, Noise and Vibration Control Monitoring for Construction Operations, Conducted by Parsons, 2001-2003.

LBNL, 2003c. *Noise Study for the Demolition of Building 51*. October.

Ver, 1992. *Noise and Vibration Control Engineering, Principals and Applications*, by Istvan L. Ver and Leo Beranek, Published by John Wiley & Sons, Inc., pp. 134-138.

12. Population and Housing

Project Activities with the Potential to Create Impacts:

- None

Setting and Discussion:

Growth at the LBNL site is controlled by the 1987 LRDP. The LRDP anticipates that total population growth could increase from approximately 2,850 in 1987 to approximately 4,750 at buildout. The current population at LBNL is approximately 4,375 employees. Employees live in various portions of the Bay Area and commute to LBNL as no housing is located on site. The proposed Project would have no impact on population and housing because it would not create new homes, employment, or infrastructure, would not demolish existing housing structures or require employees to relocate. It is expected that workers used for the Project would be LBNL employees or local contractors and not from outside the

The Berkeley Unified School District operates 20 schools, including four early childhood education locations, 11 elementary schools, three middle schools, one high school, and one adult school. Total enrollment for elementary and secondary schools for the 2002-2003 academic year was 9,060 students. In addition there are 20 private elementary and secondary schools in the City. The UC Berkeley campus is adjacent to LBNL. The Oakland Unified School District administers 59 elementary schools, 15 middle schools, and six high schools. It is also responsible for three adult schools, six alternative schools, four special education schools, and 39 child care centers. Total school enrollment for elementary and secondary students for the 2002-2003 academic year was 52,501.

LBNL open space is not accessible to the public. There are 52 parks in the City of Berkeley providing traditional activities such as athletic fields, swimming pools, tennis and basketball courts, as well as numerous play areas, community gardens, rock climbing, and a variety of water sports at the Berkeley Marina. An estimated 3,073 acres of total parklands are available within Oakland's city limits. Oakland's parks are categorized by size and intended service area. The park categories include region-serving parks that are 25 acres or larger, community parks, and neighborhood parks. Oakland also has several classifications of miniparks, which are generally less than one-acre in size.

Near LBNL, regional open space resources include the 2,077-acre Tilden Park and the 205-acre Claremont Canyon Preserve, which border the eastern Berkeley City limits and are used extensively by Berkeley residents. These parks provide open space and recreation facilities, including picnic areas, bicycle trails, swim areas, and environmental education centers. Also bordering the city's eastern limits is University of California property, including the central campus, Strawberry Canyon and the Ecological Study Area that serve as popular open space resources.

The proposed Project would not affect the demand for fire or police protection, schools, parks, or other public facilities. No increase in LBNL or employee population would occur; therefore, no increase in demand for schools or parks would occur. There would be no change in demand for other public facilities. Although these services would continue to be used on site and by persons employed on site, no increase in demand would occur that would require additional services or the construction of additional public service facilities. Thus, the Project would have no impact on public services and no further analysis is necessary.

Evaluation Criteria:

In addition to the evaluation criteria provided in the Initial Study Checklist (Appendix G of the CEQA Guidelines), the impact of the proposed Project on public services would be considered significant if it exceeded the following Standards of Significance, established by the LRDP EIR, as amended:

- Require additional police and/or sheriff staff and equipment to maintain acceptable service ratios;
- Require additional fire protection staff or equipment to maintain an acceptable level of service (i.e., response time, equipment);
- Require expansion or realignment of the existing school system; and
- Affect or require the designation of substantial additional parkland to remain in conformance with locally acceptable or adopted park standards.

Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Impact for which LRDP EIR is Sufficient	Less Than Significant Impact	No Impact
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13. PUBLIC SERVICES:

_____	_____	_____	_____	_____X
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Sources:

LBNL, 1997. *Proposed Renewal of the Contract between the United States Department of Energy and The Regents of the University of California for Operation and Management of the Lawrence Berkeley National Laboratory, Supplemental EIR Addendum*, September (State Clearinghouse No. [19]91093068)

14. Recreation

Project Activities with the Potential to Create Impacts:

- None

Setting and Discussion:

Although there are no recreational facilities within the Project area, there are recreational areas near the site including open space and developed recreational facilities. Recreational open space, which can be used for walking, hiking, and passive recreation, includes the 205-acre Claremont Canyon and the 2,077-acre Tilden Park. Tilden Park contains a lake, nature area, botanical garden, and other opportunities. UC Berkeley provides both passive and developed recreational opportunities through open space and developed sports facilities.

The proposed Project would not increase or change the existing level of use of neighborhood parks and regional facilities nor require the construction of new facilities because no population increase would occur as a result of the Project. Since the use of recreation facilities would not increase, deterioration of recreational opportunities would not be accelerated. The same levels of use and wear that are currently experienced would continue under this Project. Thus, the Project would have no impact on recreation and no further analysis is necessary.

Evaluation Criteria:

The LRDP EIR, as amended, does not specifically analyze the impact of anticipated development on existing neighborhood or regional parks or other recreational facilities. The evaluation criteria provided in the Initial Study Checklist (Appendix G of the CEQA Guidelines) were considered.

Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Impact for which LRDP EIR is Sufficient	Less Than Significant Impact	No Impact
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14. RECREATION:

_____	_____	_____	_____	<u> X </u>
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Sources:

City of Berkeley, 2003. Index of Parks and Recreation Facilities. www.ci.berkeley.ca.us/parks/
 Accessed September.

15. Transportation/Traffic

Project Activities with the Potential to Create Impacts:

- Transport of soil and backfill materials for excavations
- Vehicle trips by workers

Setting:

Regional Description

Roadways

The roadways that are anticipated to be used by trucks traveling to and from the Project site include Cyclotron Road, McMillan Road, Lawrence Road, Hearst Avenue, Shattuck Avenue, University Avenue, and Interstate-80. A description of these roadways is given in the following paragraphs. Operating characteristics of intersections and roadway segments are described by the concept of level of service (LOS). LOS is a qualitative description of an intersection and roadway’s operation based on delay and the volume to capacity ratio (v/c ratio). Typically, and generally accepted, LOS ‘A’ through ‘D’ are considered excellent to satisfactory service levels, LOS ‘E’ is undesirable, and LOS ‘F’ is unsatisfactory. The LRDP EIR, as amended, considers LOS of D or better to be acceptable.

Cyclotron Road, McMillan Road, and Lawrence Road are located within the boundaries of LBNL. These roadways are two lane facilities, on which on-street parking is generally prohibited.

Hearst Avenue is an east-west street that extends from West Berkeley to the Northwest corner of the UC Berkeley Core Campus near the entrance to LBNL. Hearst Avenue is generally a two-lane street with on-street parking. During peak commute hours, parking restrictions on the south side of the street in the morning and the north side of the street in the evening provide an additional travel lane. These restrictions occur between Gayley Road and Oxford Street. Hearst Avenue is not a designated truck route within the City of Berkeley. The intersections of Hearst Avenue with Shattuck Avenue, Oxford Street, Euclid Avenue, Gayley Road, Spruce Street, Arch Street, Scenic Avenue, and Le Roy Avenue are operating at acceptable levels of traffic service (LOS C or better) during both the A.M. peak hours (7:00-9:00 a.m.) and P.M. peak hours (4:00-6:00 p.m.).

Shattuck Avenue is a north-south roadway, classified as a Principal Arterial in the Metropolitan Transportation System (MTS) and the Congestion Management Program (CMP). Shattuck Avenue is a

four-lane roadway in the vicinity of the Project site, with a center raised median, left-turn pockets, and on street parking. Shattuck Avenue extends from North Berkeley to Downtown Oakland and is the most heavily used north-south roadway in the Berkeley area. Shattuck Avenue is a designated truck route between Adeline Street and Shattuck Place. The intersections of Shattuck Avenue with Hearst Avenue and University Avenue are operating at acceptable levels of traffic service (LOS C or better) during both the A.M. and P.M. peak hours.

University Avenue is a four lane east-west street, classified as a Principal Arterial in the MTS and CMP. The roadway provides parking, is divided, and has left-turn pockets at major intersections. Left turns from University Avenue onto cross streets generally are not served by a separate left turn signal phase. University Avenue extends from the west edge of the UC Berkeley campus to Interstate-80 and the Berkeley Marina. University Avenue is a designated truck route between I-80 and Oxford Street. The intersections of University Avenue with Martin Luther King (MLK) Way, Milvia Street, Shattuck Avenue (East), Shattuck Avenue (West), and Oxford Street are operating at acceptable levels of traffic service (LOS C or better) during both the A.M. and P.M. peak hours; however, the intersections of University Avenue with Sixth Street and San Pablo Avenue are operating at unacceptable levels of traffic service (LOS F) during both the A.M. and P.M. peak hours.

Interstate-80 connects the San Francisco Bay Area with the Sacramento region and continues east. Within Berkeley, Interstate-80 is oriented in a north-south direction and borders the western edge of the city. Five lanes of travel are provided in both directions in the Berkeley area. Access from Interstate-80 to the city of Berkeley is provided at the Ashby Avenue, University Avenue, and Gilman Street interchanges. Interstate-80 and the nearby Interstate-80/580 interchange operate at capacity during peak commute hours. I-80 is a designated truck route. I-80 operates at unacceptable levels of traffic service (LOS F) during both the A.M. and P.M. peak hours westbound between University Avenue and the I-80/580 split and eastbound from the Emeryville city limits to the Albany city limits.

Public Transportation

Three transit options serve Berkeley, the UC Berkeley Central Campus and LBNL. These transit systems include Bay Area Rapid Transit (BART), Alameda-Contra Costa Transit (AC Transit) bus routes, and a University run shuttle service, which includes service to LBNL.

The BART station closest to the Project site is the Downtown Berkeley station at Center Street/Shattuck Avenue, where it is heavily used by commuters and UC students. Currently, BART trains operate from 4:00 AM to midnight Monday through Friday, 6:00 AM to midnight on Saturdays, and 8:00 AM to midnight on Sundays.

AC Transit provides relatively direct travel to and from neighboring cities such as Oakland, Richmond, El Cerrito, San Francisco, and local Berkeley neighborhoods.

The shuttle service operated by UC Berkeley provides service within the Central Campus area and the surrounding neighborhoods, including Downtown Berkeley and the BART station. A LBNL shuttle bus operates between the Downtown Berkeley BART station and the Laboratory from about 6:20 AM until 7:15 PM. Another shuttle bus operates between the Laboratory and the Rockridge BART station during morning and evening commute hours. On-site shuttle bus service is provided from 6:40 AM until 6:30 PM. Buses are spaced at 10-minute intervals throughout the day.

Bicycle and pedestrian routes can be found on or along most roadways within and surrounding the Berkeley campus.

Current Conditions

Roadway Segment Levels of Service

Existing condition LOS at study area intersections were taken from the University of California, Berkeley Long Range Development Plan Administrative Draft EIR (ADEIR) Transportation Chapter. The following intersections are operating at unacceptable (LOS F) levels of traffic service during both the A.M. and P.M. peak hours:

- University Avenue and Sixth Street
- University Avenue and San Pablo Avenue

Existing LOS for segments of I-80 were taken from the UCB LRDP ADEIR Transportation Chapter. The following roadway segments are operating at unacceptable (LOS F) levels of traffic service during both the A.M. and P.M. peak hours:

- I-80 westbound between University Avenue and the I-80/580 split
- I-80 eastbound from the Emeryville city limits to the Albany city limits

Evaluation Criteria:

In addition to the evaluation criteria provided in the Initial Study Checklist (Appendix G of the CEQA Guidelines), the impact of the proposed Project on transportation and traffic would be considered significant if it exceeded the following Standards of Significance, established by the LRDP EIR, as amended:

- Cause intersection levels of service (LOS) to fall below LOS D or cause a significant incremental decline in service at an intersection currently operating at LOS E or below;
- Have inadequate parking and internal circulation to accommodate projected traffic so that off-campus areas are adversely affected; and,
- Fail to include provisions for pedestrian and bicycle circulation, and bicycle and motorcycle parking and security.

Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Impact for which LRDP EIR is Sufficient	Less Than Significant Impact	No Impact
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15. TRANSPORTATION/TRAFFIC --

Would the Project:

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

_____	_____	_____	_____X_____	_____
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	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Impact for which LRDP EIR is Sufficient	Less Than Significant Impact	No Impact
b) Exceed, either individually or cumulatively, a level of service standard established by the county congestion management agency for designated roads or highways?	_____	_____	_____	_____X_____	_____
c) Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks?	_____	_____	_____	_____	_____X_____
d) Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?	_____	_____	_____	_____X_____	_____
e) Result in inadequate emergency access?	_____	_____	_____	_____	_____X_____
f) Result in inadequate parking capacity?	_____	_____	_____	_____X_____	_____
g) Conflict with applicable policies, plans, or programs supporting alternative transportation (e.g., bus turnouts, bicycle racks)?	_____	_____	_____	_____	_____X_____
h) Exceed an applicable LRDP EIR standard of significance?	_____	_____	_____	_____X_____	_____

Discussion:

a) While the project is scheduled to last from 2005 through 2011, construction and excavation activities are anticipated to be completed by Summer 2006. The highest level of truck travel would occur during excavation of the Building 51L Plume Source Area, anticipated to occur in Spring 2006. During the excavation and drilling period (peak activity), approximately six workers are estimated for purposes of this analysis to commute to the Project site on a typical weekday. An estimate of the number of trips by workers is based upon a conservative assumption that 100 percent of the workers would be driving alone (i.e., no carpooling assumed) to and from the site during the peak hour, even though public transportation is available to the Project area. In addition, it was assumed that half of the workers would travel off site during the lunch period due to the presence of a cafeteria on site. The number of trips generated by workers would therefore be six inbound trips in the morning, six mid-day trips (three inbound, three outbound), and six outbound afternoon trips for a total of approximately 18 daily trips during the peak construction activity periods. Some of these trips would travel along I-80 (eastbound and westbound) and through the intersections of University Avenue with Sixth Street and San Pablo Avenue, which are currently operating at an unacceptable LOS during

both the A.M. and P.M. peak hours. Some of the added trips would coincide with peak-hour traffic at these locations and could increase intersection and roadway segment delay during the peak hours.

The Project would generate truck traffic to remove waste and to import backfill to the Project site. The Project is expected to generate 136 outbound loads of excavated soil and 136 inbound loads delivering clean backfill and other fill materials (e.g., concrete trucks). The total number of truck trips expected to be generated during excavation activities associated with the Project is 544 (includes inbound trips of empty trucks to be loaded and outbound trips of trucks delivering clean backfill). It is estimated that the maximum number of round-trips per day, for truck traffic, would be less than 10. A small number of truck trips would be generated to periodically remove spent GAC canisters. The non-hazardous materials would be hauled to an off-site landfill via Cyclotron Road, Hearst Avenue and University Avenue, to Interstate-80.

Construction-generated traffic would be temporary and therefore would not result in long-term degradation in operating conditions on roadways or at intersections. The Project includes a requirement that contractors implement standard Best Management Practices in order to minimize short-term construction-related transportation impacts. Generally, these practices include implementation of a traffic control plan, such as measures (e.g., advance warning signs, flaggers to direct traffic, and advance notification of interested parties about the location, timing, and duration of construction activity) to maintain safe and efficient traffic flow during the construction period. To avoid a temporary reduction of roadway capacities during peak-hour traffic due to slower movements of trucks as compared to passenger vehicles, the Project includes a requirement limiting truck traffic to off-peak hours and prohibiting hauling between the hours of 7:00 to 9:00 a.m. and 4:00 to 6:00 p.m. With inclusion of these measures as part of the Project, the potential impact would be less than significant.

- b) Shattuck Avenue, University Avenue, and Interstate 80 are classified as Principal Arterials in the County's Congestion Management Program (CMP). Currently, CMP standards are not exceeded on these roads; however, University Avenue and Interstate 80 are already operating at unacceptable levels (LOS F) during the AM and PM commute hours. The travel demand measure that would be included as part of the Project would require that both worker and truck traffic avoid peak travel periods. With this measure, potential effects on traffic would be less than significant.
- c) The proposed Project would have no effect on air traffic patterns.
- d) The proposed Project would not result in any changes to roadway design features, and would thus not increase any hazards due to roadway design.

Soil containing VOCs would be generated by the Project. Such waste would be disposed of at appropriate certified waste-handling facilities. The transportation and handling of hazardous materials associated with the Project could increase roadway hazard potential. Any wastes containing hazardous materials generated by the remediation process would be managed by the Environment, Health and Safety Division's Waste Management Group. This group is responsible for ensuring compliance with hazardous waste regulations and for determining the LBNL Hazardous Waste Handling Facility's storage and labeling requirements, selecting a disposal site, as well as manifesting and maintaining disposal records. Any hazardous soil or groundwater contamination that is encountered would be managed in accordance with applicable DOE and LBNL policies, and state and federal regulations regarding hazardous waste transport. Contaminated soil would be shipped in covered bins, which would reduce the potential for a spill. This potential impact would be less than significant.

Orlando Lawrence Berkeley National Laboratory, Berkeley, California, SCH No. 2002122051 (April 2003).

Because of the Best Management Practices outlined earlier, including the limitation of construction traffic to off-peak hours, and because of the low level of Project-related traffic (less than 10 truck round trips per day, as well as small and temporary numbers of additional worker commute trips), the Project would not result in cumulatively significant impacts to local intersections or roadway segments. In addition, prior to the beginning of Corrective Measure-related traffic, most Molecular Foundry construction traffic impacts will have already occurred, and construction of the Molecular Foundry should be complete prior to Spring 2006, the period of maximum Corrective Measure Project traffic activity.

Summary of Impacts and Mitigation Measures:

Potentially significant impact not mitigated by LRDP EIR, as amended, mitigation measures: None.

Corrective Measures Project-Specific Mitigation Measures: None.

Sources:

a-g) LBNL, 2005. *RCRA Corrective Measures Study Report*. February 10, 2005

California Department of Transportation (Caltrans), 1996, *Manual of Traffic Controls for Construction and Maintenance of Work Zones*

California Department of Transportation (Caltrans), 2002, *2001 Traffic Volumes on California State Highways*, March

City of Berkeley, 2001, Transportation Element, Berkeley Draft General Plan EIR, February

State of California, Streets and Highways Code

State of California, California Vehicle Code

UC Berkeley, 2001. Northeast Quadrant Science and Safety Projects and 1990 Long Range Development Plan Amendment, Draft EIR, June

h) LBNL, 1987. *Site Development Plan EIR*, August (State Clearinghouse No. [19]85112610)

LBNL, 1992. *Proposed Renewal of the Contract between the United States Department of Energy and The Regents of the University of California for Operation and Management of the Lawrence Berkeley National Laboratory, Supplemental EIR*, September (State Clearinghouse No. [19]91093068)

LBNL, 1997. *Proposed Renewal of the Contract between the United States Department of Energy and The Regents of the University of California for Operation and Management of the Lawrence Berkeley National Laboratory, Supplemental EIR Addendum*, September (State Clearinghouse No. [19]91093068)

16. Utilities and Service Systems

Project Activities with the Potential to Create Impacts:

- Handling and disposal of groundwater from the extraction systems
- Disposal of soil at a landfill

Setting:

EBMUD provides water to LBNL through a 12-inch meter in Campus Drive and a 6-inch meter in Summit Road, and has a storage capacity of 3.1 million gallons. In addition to the water supplied by EBMUD, LBNL operates and maintains three 200,000-gallon storage tanks on site for emergency supplies. Water is used for both daily laboratory work and facility operations as well as for fire protection. Wastewater services are also provided by EBMUD through a gravity line. Wastewater is carried by a gravity flow system through two monitoring stations at Hearst Avenue and Centennial Drive, which connect to the UC and City of Berkeley sewer systems (basin number 17), ending at the EBMUD intercepting sewer. LBNL also has a storm drainage system that empties into the North Fork of Strawberry Creek and Strawberry Creek.

Waste disposal is provided by the Richmond Sanitary Service, where non-hazardous solid waste is disposed at the West Contra Costa Landfill in Richmond. The landfill is projected to close in January 2006, at which time solid waste would be disposed at the Livermore Landfill. LBNL also has a recycling program to reduce the amount of materials in the waste stream.

Electricity is provided by Pacific Gas and Electric Company through existing on-site infrastructure and the Grizzly Peak substation. Many facilities within LBNL also have emergency generators for emergency back-up and on-site utility plants.

Evaluation Criteria:

In addition to the evaluation criteria provided in the Initial Study Checklist (Appendix G of the CEQA Guidelines), the impact of the proposed Project on utilities and service systems would be considered significant if it exceeded the following Standards of Significance, established by the LRDP EIR, as amended:

- Water: Propose a significant increase in the consumption of potable water, or require a substantial expansion of water supply treatment or distribution facilities;
- Wastewater Treatment: Require substantial expansion of wastewater treatment and distribution capacity; and
- Solid Waste: Utilize a landfill which does not have sufficient available capacity to accommodate the proposed Project.

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Impact for which LRDP EIR is Sufficient	Less Than Significant Impact	No Impact
16. UTILITIES AND SERVICE SYSTEMS - Would the Project:					
a) Exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board?	_____	_____	_____	<u> X </u>	_____
b) Require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?	_____	_____	_____	<u> X </u>	_____
c) Require or result in the construction of new storm water drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?	_____	_____	_____	_____	<u> X </u>
d) Have sufficient water supplies available to serve the Project from existing entitlements and resources, or are new or expanded entitlements needed?	_____	_____	_____	_____	<u> X </u>
e) Result in a determination by the wastewater treatment provider which serves or may serve the Project that it has adequate capacity to serve the Project's projected demand in addition to the provider's existing commitments?	_____	_____	_____	<u> X </u>	_____
f) Be served by a landfill with sufficient permitted capacity to accommodate the Project's solid waste disposal needs?	_____	_____	_____	<u> X </u>	_____
g) Comply with applicable federal, state, and local statutes and regulations related to solid waste?	_____	_____	_____	<u> X </u>	_____
h) Exceed an applicable LRDP EIR standard of significance?	_____	_____	_____	<u> X </u>	_____

Discussion:

- a,b) Soil flushing is the primary method recommended for the cleanup of contaminated groundwater. The extracted groundwater would be treated on site using GAC, and then reinjected to flush contaminants from the subsurface. If not needed for soil flushing, the water would be discharged to the sanitary sewer in accordance with provisions of LBNL's EBMUD Wastewater Discharge Permit. Over the past year about 8,000 gallons per day of treated groundwater were discharged to the sewer. It is anticipated that a similar amount would be discharged during the CMI. Reuse options for extracted and treated groundwater will be evaluated in the future, if the water is no longer needed for recirculation. Therefore, potential impacts to water and wastewater would be less than significant.
- c) No impact would occur because no new impervious surface coverage would result from construction and implementation of the corrective measures. The existing storm water drainage system would remain intact. The construction or expansion of storm water drainage facilities is not required.
- d) No impact would occur since the Project would not result in an increase in water supply demand. Existing demand levels would remain the same as before implementation of the corrective measures.
- e) The Project would have a projected demand for wastewater treatment services as described in a), above. However, the corrective measures are included in the LBNL's Wastewater Discharge Permit, and any treated groundwater that is not needed for soil flushing would be disposed of into the sanitary sewer system under a permit issued by EBMUD. Therefore, potential impacts to wastewater treatment services would be less than significant.
- f) Approximately 1,355 cubic yards of excavated soil would be disposed of with implementation of the corrective measures. Excavated soil would be stored in covered bins on site, until shipped off site for disposal in accordance with state and federal laws and regulations. The used carbon from soil flushing activity and the SVE system would be shipped off site for regeneration and not for disposal.

Local landfills that would likely be disposal sites for the waste soil have adequate capacity for the relatively small amount of soil that would be generated by the Project. The Richmond landfill and the Vasco Road landfill in Livermore accept non-hazardous soil. Although the Richmond landfill is scheduled to close in 2006, the Vasco Road landfill is not scheduled for closure until 2015, at which time the implementation and operation of the corrective measures should be complete (Integrated Waste Management Board, SWIS, 2003). The Altamont landfill would be used if a Class II disposal facility were needed. The Vasco Road and Altamont landfills have about 10 million cubic yards each of remaining capacity, which would be adequate to accommodate the 1,355 cubic yards of soil generated from this Project. Therefore, potential impacts to solid waste disposal capacity would be less than significant.

- g) The corrective measures would comply with solid waste statutes and regulations in that materials would be disposed of at the appropriate certified location. The excavated soils would be sent to a local landfill as non-hazardous waste, as described above or if hazardous shipped off site for disposal in accordance with applicable local, state, and federal laws and regulations. This potential impact would be less than significant.
- h) The proposed Project would not increase the consumption of potable water, increase the need for wastewater treatment and distribution, or utilize a landfill that lacks sufficient capacity to accommodate the Project. Thus, the Project would not exceed an applicable Standard of Significance established by the LRDP EIR, as amended.

Cumulative Impacts:

The Project would not increase water use and would not contribute to a cumulative impact. In addition, use of energy resources would not significantly increase during implementation and operation of corrective measures and use of any electricity would cease following completion of remediation.

The corrective measures would discharge about the same volume of treated groundwater (about 8,000 gallons per day) to the wastewater stream as is currently discharged from LBNL. This would contribute to the general amount of material entering the sanitary sewer system. However, the amount to be discharged would be regulated by LBNL's Waste Discharge Permit in accordance with the requirements of EBMUD.

The corrective measures would add 1,355 cubic yards of excavated soils to the solid waste stream. This would contribute to the general amount of material entering the sanitary landfill. Since adequate capacity is available to accept solid wastes without affecting the landfill's ability to continue collections from other customers, a significant adverse impact would not occur.

Summary of Impacts and Mitigation Measures:

Potentially significant impacts not mitigated by the LRDP EIR, as amended, mitigation measures: None.

Corrective Measures Project-Specific Mitigation Measures: None.

Sources:

a-e,h) LBNL, 2005. *RCRA Corrective Measures Study Report*. February 10, 2005

f) California Integrated Waste Management Board. 2003. Solid Waste Facility Information (SWIS) (Richmond and Livermore). <http://www.ciwmb.ca.gov/SWIS/>. Site accessed September 22.

g) Lawrence Berkeley National Laboratory, 1987. *Long Range Development Plan*, PUB-5187, August.

h) LBNL, 1987. *Site Development Plan EIR*, August (State Clearinghouse No. [19]85112610)

LBNL, 1992. *Proposed Renewal of the Contract between the United States Department of Energy and The Regents of the University of California for Operation and Management of the Lawrence Berkeley National Laboratory, Supplemental EIR*, September (State Clearinghouse No. [19]91093068)

LBNL, 1997. *Proposed Renewal of the Contract between the United States Department of Energy and The Regents of the University of California for Operation and Management of the Lawrence Berkeley National Laboratory, Supplemental EIR Addendum*, September (State Clearinghouse No. [19]91093068)

17. Mandatory Findings of Significance

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Impact for which LRDP EIR is Sufficient	Less Than Significant Impact	No Impact
17. MANDATORY FINDINGS OF SIGNIFICANCE					
a) Does the Project have the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory?	_____	_____	_____X_____	_____	_____
b) Does the Project have impacts that are individually limited, but cumulatively considerable? (“Cumulatively considerable” means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects)?	_____	_____	_____X_____	_____	_____
c) Does the Project have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly?	_____	_____	_____X_____	_____	_____

Discussion:

- a) The proposed Project would have a beneficial effect on the quality of the environment by removing contaminants from soil and groundwater at LBNL. There could be temporary impacts associated with the construction phase of the Project but these would be mitigated by measures incorporated as part of the Project or by implementing the mitigation measures established in the LRDP EIR, as amended. As noted in the preceding discussion, the proposed Project would not substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory. Thus, with the measures integrated into the Project Description, potential impacts would be less than significant.

- b) Since the Project incorporates the mitigation measures from the LRDP EIR, as amended, and incorporates other features that reduce impacts as part of the project (e.g., traffic management measures). The Project would not contribute to cumulative impacts. Although individual impacts have the potential to occur during implementation of the corrective measures, mitigation measures have been established and incorporated to reduce the magnitude of the potential impact to a less than significant level. Since these potential impacts would be reduced, they would not contribute to a cumulative effect. The proposed Project would only create impacts during the implementation process, and would not affect or be affected by past and future projects.
- c) The proposed Project would reduce the potential for humans to be exposed to contaminants in soil and groundwater by removing contaminants from soil and groundwater at LBNL. There could be temporary impacts to human health during the construction phase of the proposed Project but these would be mitigated by measures incorporated as part of the Project or by implementing the mitigation measures established in the LRDP EIR, as amended. Therefore, the Project would not have direct or indirect environmental effects that would cause adverse impacts on humans.

18. Finding of De Minimis Impact to Fish, Wildlife and Habitat

The proposed Project would have no adverse effect on the following resources:

- a) Riparian land, rivers, streams, watercourses, and wetlands under state and federal jurisdiction;
- b) Native and non-native plant life and the soil required to sustain habitat for fish and wildlife;
- c) Rare and unique plant life and ecological community's dependent on plant life;
- d) Listed threatened and endangered plant and animals and the habitat in which they are believed to reside;
- e) All species of plant or animals as listed as protected or identified for special management in the Fish and Game Code, the Public Resources Code, the Water Code, or regulation adopted there under;
- f) All marine and terrestrial species subject to the jurisdiction of the Department of Fish and Game and the ecological communities in which they reside;
- g) All air and water resources the degradation of which will individually or cumulatively result in a loss of biological diversity among the plants and animals residing in that air and water.

Based on the information presented in the preceding sections, DTSC finds that the proposed Project will have no potential for adverse effect either individually or cumulatively on fish and wildlife, or the habitats on which they depend, as defined by Section 711.2 of the Fish and Game Code. The presumption of adverse effect set forth in 14 CCR 753.5 (d) has been rebutted by substantial evidence.

Sources:

- a-g) Section 4-Biological Resources and Section 8-Hydrology and Water Quality of this Initial Study and references therein.

ATTACHMENT 1
REGIONAL LIST OF SPECIAL STATUS
PLANT AND ANIMAL SPECIES

Regional List of Special Status Plant and Animal Species

SPECIES	LISTING STATUS	GENERAL HABITAT	POTENTIAL FOR OCCURRENCE
INVERTEBRATES			
Vernal pool fairy shrimp <i>Branchinecta lynchi</i>	Federal Threatened	Inhabits small, clear-water sandstone depression pools and grassy swales, earth slumps, or basalt-flow depression pools. Endemic to the grasslands of the Central Valley, Central Coast Mountains, and South Coast Mountains.	None
Monarch butterfly <i>Danaus plexippus</i>	--	Winters in eucalyptus groves. Winter roosting sites protected by State.	Moderate- Low
Bridges coast range shoulderband (snail) <i>Helminthoglypta nickliniana bridgesi</i>	Federal Species of Concern	Inhabits open hillsides of Alameda and Contra Costa Counties	Low
Ricksecker's water scavenger beetle <i>Hydrochara rickseckeri</i>	Federal Species of Concern	Specific habitat requirements are unknown; requires calm, shallow water of ponds and streams.	None
California linderiella fairy shrimp <i>Linderiella occidentalis</i>	Federal Species of Concern	Inhabits seasonal pools in unplowed grasslands with old alluvial soils underlain by hardpan or in sandstone depressions.	None
San Francisco lacewing <i>Nothochrysa californica</i>	Federal Species of Concern	Inhabits a wide variety of habitats (coastal sage scrub to riparian and oak woodlands), habitats tend to be wooded or heavily vegetated areas where moisture and humidity levels are higher; historically ranged from Mendocino to Los Angeles Counties.	Low
FISH			
Green sturgeon <i>Acipenser medirostris</i>	Federal Candidate State Species of Concern	Primarily marine, this species seldom migrates inland beyond the estuaries of large rivers.	None
Sacramento perch <i>Archoplites interruptus</i>	Federal Species of Concern	Historically found in sloughs, slow moving rivers, and lakes of the Central Valley.	None
Tidewater goby <i>Eucyclogobius newberryi</i>	Federal Endangered	Prefers semi-closed estuaries or lagoons of coastal streams that are low in salinity.	None
Delta smelt <i>Hypomesus transpacificus</i>	Federal Threatened State Threatened	This species inhabits the Sacramento-San Joaquin Delta and seasonally inhabits the Suisun Bay, Carquinez Strait, and San Pablo Bay. This species is seldom found at salinities above 10 PPT, and is most often found at salinities below 2 PPT. Spawning appears to occur in side channels and sloughs in the middle reaches of the Delta.	None

Regional List of Special Status Plant and Animal Species

SPECIES	LISTING STATUS	GENERAL HABITAT	POTENTIAL FOR OCCURRENCE
Central California coast coho salmon <i>Oncorhynchus kisutch</i>	Federal Threatened State Endangered	Found in many of the short, coastal drainages from the Oregon border south to Monterey Bay. In the larger coastal drainages, it is found primarily in the lower sections. The Federal listing is limited to naturally spawning populations in streams between Punta Gorda, Humboldt County and the San Lorenzo River, Santa Cruz County. The state listing is limited to Coho south of San Francisco Bay.	None
Central Valley steelhead <i>Oncorhynchus mykiss</i>	Federal Threatened State Species of Concern	Critical habitat was designated to include all river reaches accessible to listed steelhead in the Sacramento and San Joaquin Rivers and tributaries in California. The river reaches and estuarine areas of the Sacramento-San Joaquin delta are also included.	None
Central Valley fall/late fall-run chinook salmon <i>Oncorhynchus tshawytscha</i>	Federal Candidate State Species of Concern	Breeding runs occur in the Sacramento River and its tributaries, river reaches and estuarine areas of the Sacramento-San Joaquin Delta are also utilized.	None
Central Valley spring-run chinook salmon <i>Oncorhynchus tshawytscha</i>	Federal Threatened State Threatened	Critical habitat for this ESU includes the Sacramento River and its tributaries, river reaches and estuarine areas of the Sacramento-San Joaquin Delta, waters from Chipps Island westward to Carquinez Bridge, and waters of the San Francisco Bay (North of the San Francisco/Oakland Bay Bridge) from San Pablo Bay to the Golden Gate Bridge. Adult numbers depend on pool depth and volume, amount of cover, and proximity to gravel.	None
Winter-run chinook salmon <i>Oncorhynchus tshawytscha</i>	Federal Endangered State Endangered	Unblocked Bay Area and coastal rivers and streams.	None
Sacramento splittail <i>Pogonichthys macrolepidotus</i>	Federal Threatened State Species of Concern	Inhabits slow moving river sections and dead end sloughs. Requires flooded vegetation for spawning and foraging for young. Endemic to lakes and rivers of the Central Valley, but Now confined to the Delta, Suisun Bay, and associated marshes.	None
Longfin smelt <i>Spirinchus thaleichthys</i>	Federal Species of Concern State Species of Concern	This species prefers moderately saline water and may be found in major bays and estuaries from San Francisco Bay Northward. It lives in the bay waters throughout the summer, moving into the lower reaches of the rivers that flow into these bays in the fall to spawn.	None

Regional List of Special Status Plant and Animal Species

SPECIES	LISTING STATUS	GENERAL HABITAT	POTENTIAL FOR OCCURRENCE
AMPHIBIANS			
California tiger salamander <i>Ambystoma californiense</i>	Federal Proposed Threatened State Species of Concern	Wintering sites occur in grasslands occupied by burrowing mammals. Breeds in ponds and vernal pools.	None
California red-legged frog <i>Rana aurora draytonii</i>	Federal Threatened	Lowlands and foothills in or near permanent sources of deep water with dense shrubby or emergent riparian vegetation.	None
Foothill yellow-legged frog <i>Rana boylei</i>	Federal Species of Concern State Species of Concern	Streams with permanent water and quiet pools absent of predatory fish	None
Western spadefoot toad <i>Spea hammondi</i>	Federal Species of Concern State Species of Concern	Grasslands or valley foothill hardwood woodlands with shallow temporary ponds for breeding.	None
REPTILES			
Silvery legless lizard <i>Anniella pulchra pulchra</i>	Federal Species of Concern State Species of Concern	Typically occurs in sandy or loose loamy soils under sparse vegetation. Soil moisture is essential, with the species showing a preference towards soils with high moisture content.	Low
Western pond turtle <i>Clemmys marmorata</i>	CDFG Species of Concern	A thoroughly aquatic turtle of ponds, marshes, rivers, streams, and irrigation ditches with aquatic vegetation.	None
Alameda whipsnake <i>Masticophis lateralis euryxanthus</i>	Federal and State Threatened	Restricted to valley-foothill hardwood habitat of the coast ranges between the vicinity of Monterey and North San Francisco Bay.	Low
California horned lizard <i>Phrynosoma coronatum frontale</i>	Federal Species of Concern State Species of Concern	Patchy open areas with sandy soil.	Low
BIRDS			
Tricolored blackbird <i>Agelaius tricolor</i>	Federal Species of Concern State Species of Concern	Inhabits dense cattail marshes, marshy meadows and rangeland. A highly colonial species, it is most numerous in the Central Valley and vicinity of California.	None
Bell's sage sparrow <i>Amphispiza belli belli</i>	Federal Species of Concern State Species of Concern	Inhabits dense chaparral (often dominated by chamise), coastal sagebrush, and dry foothills.	Low
Western burrowing owl <i>Athene cunicularia hypugaea</i>	Federal Species of Concern State Species of Concern	Burrow sites occur in open, dry annual or perennial grasslands, deserts, and scrublands characterized by low-growing vegetation. A subterranean nester, dependent upon burrowing mammals, most notably, the California ground squirrel.	None

Regional List of Special Status Plant and Animal Species

SPECIES	LISTING STATUS	GENERAL HABITAT	POTENTIAL FOR OCCURRENCE
Aleutian Canada goose <i>Branta Canadensis leucopareia</i>	Federal Delisted	The Central Valley appears to be the main wintering ground of this subspecies. Typically forages in fields near their roosting areas (lakes and ponds).	None
Ferruginous hawk <i>Buteo regalis</i>	Federal Species of Concern State Species of Concern	A winter migrant that commonly inhabits grasslands, prairies, and brushy open country.	Low
Red knot <i>Calidris canutus</i>	Federal Species of Concern	Mud flats, estuaries, and open areas in salt marshes.	None
Costa's hummingbird <i>Calypte costae</i>	Federal Species of Concern	Commonly associated with arid environments, including coastal scrub, desert scrub, chaparral, edges of desert riparian and valley foothill riparian, and desert wash.	None
Lawrence's goldfinch <i>Carduelis lawrencei</i>	Federal Species of Concern	Uncommon in foothills surrounding the Central Valley. Breeds in open oak or other arid woodland and chaparral, near water. Typical habitats include valley foothill hardwood, and valley foothill hardwood-conifer.	None
Vaux's swift <i>Chaetura vauxi</i>	Federal Species of Concern State Species of Concern	Prefers redwood and Douglas-fir communities; nests are typically placed in large hollow trees and snags. Forages high in the air over most communities; however, shows an apparent preference for foraging above rivers and lakes.	Low
Western snowy plover <i>Charadrius alexandrinus nivosus</i>	Federal Threatened State Species of Concern	Sandy beaches on marine and estuarine shores. May also utilize salt pond levees and the shores of large alkali lakes. Requires sandy, gravelly, or friable soil substrate for nesting.	None
Black swift <i>Cypseloides niger</i>	Federal Species of Concern State Species of Concern	Breeds in small colonies on cliffs behind or adjacent to waterfalls in deep canyons and on sea-bluffs above the surf.	None
Snowy egret <i>Egretta thula</i>	Federal Species of Concern	Inhabits fresh and saline emergent wetlands, coastal estuaries, ponds, slow-moving rivers, irrigation ditches, and wet fields.	None
White-tailed kite <i>Elanus leucurus</i>	Federal Species of Concern	Low rolling foothills/valley margins with scattered oaks and river bottomlands or marshes adjacent to deciduous woodland. Open grasslands, meadows, or marshes are utilized for foraging. Isolated, dense-topped trees in close proximity to foraging areas are used for nesting and perching.	Low

Regional List of Special Status Plant and Animal Species

SPECIES	LISTING STATUS	GENERAL HABITAT	POTENTIAL FOR OCCURRENCE
Little willow flycatcher <i>Empidonax traillii brewsteri</i>	State Endangered	A spring and fall migrant at lower elevations, primarily in riparian habitats from central/coastal California north. Previously bred throughout much of the lowland and montane portions of its range. Breeding is now primarily limited to the Sierra Nevada and Cascade Ranges.	None
American peregrine falcon <i>Falco peregrinus anatum</i>	Federal Delisted State Endangered	Inhabits open country, breeding near rivers, wetlands, lakes, or other aquatic features, nests on cliffs, banks, dunes, mounds, and human-made structures.	Low
Saltmarsh common yellowthroat <i>Geothlypis trichas sinuosa</i>	Federal Species of Concern State Species of Concern	Resident of the San Francisco Bay region, inhabiting fresh and salt water marshes. Utilizes tall grasses, tule patches, and willows for nesting.	None
Bald eagle <i>Haliaeetus leucocephalus</i>	Federal Threatened State Endangered	Nests and forages on inland lakes, reservoirs, and rivers; winter foraging at lakes and along major rivers.	None
Loggerhead shrike <i>Lanius ludovicianus</i>	Federal Species of Concern State Species of Concern	Inhabits open areas with sparse shrubs, trees, and other perches.	Low
California black rail <i>Laterallus jamaicensis coturiculus</i>	Federal Species of Concern State Threatened	Mainly inhabits salt marshes bordering larger bays. Occurs in tidal salt marsh with dense pickleweed; Also in freshwater and brackish marshes.	None
Marbled godwit <i>Limosa fedoa</i>	Federal Species of Concern	Prairie grasslands and meadows around lakes, coastal wetlands, beaches in winter.	None
Lewis' woodpecker <i>Melanerpes lewis</i>	Federal Species of Concern	An uncommon, local winter resident, inhabiting oak savannas, and open deciduous and conifer environments. Breeds locally along the eastern slopes of the Coast Ranges.	Low
Suisun song sparrow <i>Melospiza melodia maxillaris</i>	Federal Species of Concern State Species of Concern	Resident of brackish-water marshes surrounding Suisun Bay. Inhabits cattails, tules and other sedges.	None
Alameda (South Bay) song sparrow <i>Melospiza melodia pusillula</i>	Federal Species of Concern State Species of Concern	Resident of the South Bay, inhabiting salt and brackish marshes with cordgrass, pickleweed, and gumplant.	None
San Pablo song sparrow <i>Melospiza melodia samuelis</i>	Federal Species of Concern State Species of Concern	Prefers saline emergent wetlands or tidally influenced marsh.	None

Regional List of Special Status Plant and Animal Species

SPECIES	LISTING STATUS	GENERAL HABITAT	POTENTIAL FOR OCCURRENCE
Long-billed curlew <i>Numenius americanus</i>	Federal Species of Concern State Species of Concern	Uncommon to locally very common as a winter visitant from early July to early April along most of the California coast, and in the Central and Imperial valleys. Preferred winter habitats include large coastal estuaries, upland herbaceous areas, and croplands.	None
California brown pelican <i>Pelecanus occidentalis californicus</i>	Federal Endangered State Endangered	Colonial nester on coastal cliffs and offshore islands and along lake margins in the interior of the state.	None
California clapper rail <i>Rallus longirostris obsoletus</i>	Federal Endangered State Endangered	Salt water and brackish marshes traversed by tidal sloughs in the vicinity of the San Francisco Bay. Typically associated with abundant growths of pickleweed and cordgrass.	None
Bank swallow <i>Riparia riparia</i>	State Threatened	A colonial nesting species, nests primarily in riparian and other lowland habitats. Vertical banks/cliffs composed of fine textured/sandy soils near streams, rivers, lakes, or the ocean are required to excavate nesting hole.	None
Black skimmer <i>Rynchops niger</i>	Federal Species of Concern	Colonial. Found in estuaries, open beaches, salt marshes, and inland dredge spoil.	None
Rufous hummingbird <i>Selasphorus rufus</i>	Federal Species of Concern	Found in a wide variety of habitats with nectar producing flowers. Uses valley foothill hardwood, valley foothill hardwood-coniferous, riparian, and various chaparral habitats.	Low
Allen's hummingbird <i>Selasphorus sasin</i>	Federal Species of Concern	A common summer resident and migrant along most of the California coast. Breeders are most common in coastal scrub, valley foothill hardwood, and valley foothill riparian habitats.	Low
California least tern <i>Sterna antillarum browni</i>	Federal Endangered State Endangered	Inhabits beaches bordering shallow water in estuaries. Breeding within California appears to be limited to the San Francisco Bay and isolated locations along the coast of southern California.	None
MAMMALS			
Pacific western big-eared bat <i>Corynorhinus townsendii townsendii</i>	Federal Species of Concern State Species of Concern	Occupies the humid, coastal regions of northern and central California, in a wide variety of habitats. Roosts in caves, buildings, and mine tunnels. This species is highly sensitive to human disturbance at roosting, maternity, and hibernacula sites.	Low
Berkeley kangaroo rat	Federal Species of Concern	Open grassy hilltops and open spaces in chaparral and blue	Low

Regional List of Special Status Plant and Animal Species

SPECIES	LISTING STATUS	GENERAL HABITAT	POTENTIAL FOR OCCURRENCE
<i>Eipodomys heermanni berkeleyensis</i>		oak/digger pine woodlands.	
Greater western mastiff-bat <i>Eumops perotis californicus</i>	Federal Species of Concern State Species of Concern	This species utilizes a wide range of open habitats including coastal scrub, annual grasslands, and conifer woodlands. Roosts in or on buildings, crevices in cliffs, trees, and in tunnels.	Low
San Pablo vole <i>Microtus californicus sanpabloensis</i>	CDFG Species of Concern	Marshy ground, wet meadows, dry grassy hillsides.	Low
Small-footed myotis bat <i>Myotis ciliolabrum</i>	Federal Species of Concern	Inhabits relatively arid wooded and brushy uplands in close proximity to water, from sea level to about 8,900 feet. Maternity colonies may occur in buildings, caves, and mines.	Low
Long-eared myotis bat <i>Myotis evotis</i>	Federal Species of Concern	May be found in a variety of brush, woodland, and forest communities, from sea level to about 9,000 feet; shows a preference toward coniferous woodlands and forests. Nursery colonies located in buildings, crevices, spaces under bark, snags; night roosting in caves.	Low
Fringed myotis bat <i>Myotis thysanodes</i>	Federal Species of Concern	May be found in a variety of environments; valley and foothill hardwood, hardwood-conifer and pinyon-juniper woodland provide optimal habitat. Maternity colonies and roosts located in caves, mines, buildings, and crevices.	Low
Long-legged myotis bat <i>Myotis volans</i>	Federal Species of Concern	This species is most commonly associated with woodland and forest communities above 4,000 feet. However, may also forage in chaparral, coastal scrub, Great Basin shrub habitats, and in early successional stages of woodlands and forests. Occurrence records ranges from sea level to 11,400 feet. Roosts in rock crevices, buildings, under tree bark, in snags, mines, and caves.	Low
Yuma myotis bat <i>Myotis yumanensis</i>	Federal Species of Concern State Species of Concern	Optimal environments include open forests and woodlands in proximity to bodies of water used for foraging; maternity colonies in caves, mines, crevices, and buildings.	Low
San Francisco dusky-footed woodrat <i>Neotoma fuscipes annectens</i>	Federal Species of Concern State Species of Concern	Oak and riparian woodlands with moderate canopy and dense understory; chaparral.	Low
San Joaquin Valley woodrat	Federal Endangered	Deciduous valley oaks, most numerous where scrub cover is	Low

Regional List of Special Status Plant and Animal Species

SPECIES	LISTING STATUS	GENERAL HABITAT	POTENTIAL FOR OCCURRENCE
<i>Neotoma fuscipes riparia</i>	State Species of Concern	dense. Prefers willow thickets with an oak overstory.	
San Joaquin pocket mouse <i>Perognathis inornatus</i>	Federal Species of Concern	Typically found in grasslands and Blue oak savannahs with friable soils.	Low
Salt marsh harvest mouse <i>Reithrodontomys raviventris</i>	Federal Endangered State Endangered	Only in the saline emergent wetlands of San Francisco Bay and its tributaries. Pickleweed is primary habitat. Requires higher areas in order to escape floods.	None
Salt marsh vagrant shrew <i>Sorex vagrans halicoetes</i>	Federal Species of Concern State Species of Concern	Salt marshes of the south arm of the San Francisco Bay where abundant driftwood is scattered among pickleweed.	None
PLANTS			
Bent-flowered fiddleneck <i>Amsinckia lunaris</i>	Federal Species of Concern CNPS 1B	Cismontane woodland, valley and foothill grassland.	None
Pallid manzanita <i>Arctostaphylos pallida</i>	Federal Threatened State Endangered CNPS 1B	Broadleafed upland forest, closed-cone coniferous forest, chaparral, cismontane woodland, coastal scrub, only in Alameda and Contra Costa Counties	None
Alkali milk-vetch <i>Astragalus tener var. tener</i>	Federal Species of Concern CNPS 1B	Playas, valley and foothill grassland, vernal pools, alkaline.	None
Mount Diablo fairy-lantern <i>Calochortus pulchellus</i>	CNPS 1B	Chaparral, cismontane woodland, riparian woodland, valley and foothill grassland. Primarily from the Mount Diablo area.	None
Coastal bluff morning glory <i>Calystegia purpurata ssp saxicola</i>	Federal Species of Concern CNPS 1B	Coastal dunes and scrub.	None
Salt marsh owl's clover <i>Castilleja ambigua ssp ambigua</i>	Federal Species of Local Concern CNPS 1B	Marshes and swamps, coastal salt.	None
Franciscan thistle <i>Cirsium andrewsii</i>	Federal Species of Concern CNPS 1B	Broadleafed upland forest, coastal bluff scrub, coastal prairie, coastal scrub/mesic, sometimes serpentinite.	None

Regional List of Special Status Plant and Animal Species

SPECIES	LISTING STATUS	GENERAL HABITAT	POTENTIAL FOR OCCURRENCE
Point Reyes bird's beak <i>Cordylanthus maritimus ssp. palustris</i>	Federal Species of Concern CNPS 1B	Coastal salt marshes and swamps.	None
Western leatherwood <i>Dirca occidentalis</i>	CNPS 1B	Broadleafed upland forest, closed-cone coniferous forest, chaparral, cismontane woodland, north coast coniferous forest, riparian forest and riparian woodland.	None
Tiburon buckwheat <i>Eriogonum caninum</i>	Federal Species of Local Concern CNPS 3	Chaparral, coastal prairie, and valley-foothill grasslands, on serpentinite.	None
Fragrant fritillary <i>Fritillaria liliacea</i>	Federal Species of Concern CNPS 1B	Coastal Scrub, valley and foothill grassland, coastal prairie.	None
Diablo helianthella <i>Helianthella castanea</i>	Federal Species of Concern CNPS 1B	Broadleaved upland forest, chaparral, cismontane woodland, coastal scrub, riparian woodland, valley and foothill grassland.	None
Santa Cruz tarplant <i>Holocarpha macradenia</i>	Federal Threatened State Endangered CNPS 1B	Coastal prairie, valley and foothill grassland.	None
Delta tule pea <i>Lathyrus jepsonii var. jepsonii</i>	Federal Species of Concern CNPS 1B	Freshwater and brackish marshes and swamps.	None
Oregon meconella <i>Meconella oregana</i>	Federal Species of Concern CNPS 1B	Coastal prairie and coastal scrub.	None
Mount Diablo cottonweed <i>Micropus amphibolus</i>	CNPS 3	Broadleafed upland forest, chaparral, cismontane woodland, valley and foothill grassland, rocky.	None
San Antonio Hills monardella <i>Monardella antonina ssp. antonina</i>	CNPS 3	Chaparral, cismontane woodland.	None
Robust monardella <i>Monardella villosa ssp. globosa</i>	Federal Species of Concern CNPS 1B	Broadleafed upland forest, chaparral, cismontane woodland, valley and foothill grassland.	None
Pacific cordgrass <i>Spartina foliosa</i>	Federal Species of Local Concern CNPS 4	Meadows and seeps, marshes and swamps.	None

Regional List of Special Status Plant and Animal Species

SPECIES	LISTING STATUS	GENERAL HABITAT	POTENTIAL FOR OCCURRENCE
Most beautiful jewel-flower <i>Streptanthus albidus ssp. peramoenus</i>	Federal Species of Concern CNPS 1B	Chaparral, cismontane woodland, valley and foothill grassland, serpentine.	None
California seablite <i>Suaeda californica</i>	Federal Endangered CNPS 1B	Marshes and swamps.	None
Oval-leaved viburnum <i>Viburnum ellipticum</i>	CNPS 2	Chaparral, cismontane woodland, lower montane coniferous forest.	None

California Native Plant Society Listing Categories (CNPS 2002)

- 1B Plant species that are rare, threatened, or endangered in California and elsewhere
- 2 Plant species that are rare, threatened, or endangered in California, but are more common elsewhere
- 3 Plant species that lack the necessary information to assign them to a listing status
- 4 Plant species that have a limited distribution or that are infrequent throughout a broader area in California

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CDFG 2002	Rising 1996	Zeiner et al. 1990a	Abrams 1944	CNPS 2002	

ATTACHMENT 2

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