CHAPTER 3
PROJECT DESCRIPTION

This EIR evaluates the potential for environmental impacts from implementation of the proposed RBC 2014 LRDP. The RBC would be a new major research campus at University properties in Richmond, California, more specifically described below. The 2014 LRDP horizon year is 2050.

3.1 OVERVIEW

The University, through LBNL and UC Berkeley, proposes to establish a new major research campus, at properties it owns in Richmond, California, for use by both LBNL and UC Berkeley and synergistic institutional or industry counterparts for research and development focused on energy, environment, and health. The University proposes to rename these properties the RBC. The properties are currently operated by the UC Berkeley campus, and the UC Berkeley campus would continue to have administrative control of the RBC, as described further in the 2014 LRDP. The proposed project consists of development of campus facilities pursuant to the proposed 2014 LRDP, which has been prepared in support of the research and academic goals of the University, as elaborated in the 2014 LRDP. An LRDP is defined by statute (PRC 21080.09) as a "physical development and land use plan to meet the academic and institutional objectives for a particular campus or medical center of public higher education;" in this instance, as elaborated in the 2014 LRDP, the new campus is intended to meet institutional objectives of both UC Berkeley and LBNL.

Development and operational activities pursuant to the proposed 2014 LRDP include construction, development, and demolition projects, and operational, research, and maintenance activities through the planning year 2050. At full implementation, the proposed LRDP provides for up to 5.4 million square feet of new research, development, and support space at the RBC site and an employee population of 10,000. The proposed LRDP addresses land use; access, circulation, and parking; open space and landscape; utilities and infrastructure; sustainability; and safety and preparedness. The proposed project includes construction, expansion, or improvement of utility infrastructure and roadway improvements. Past activities have resulted in the deposition of chemical contaminants affecting both soil and groundwater at the part of the proposed RBC site that includes portions of the University's RFS; this is currently under an investigation and cleanup order issued by DTSC. The proposed project includes management of these contaminants in accordance with a proposed RAW, including a soil management plan, contingent upon DTSC approval, or in accordance with the existing DTSC investigation and cleanup order for the RFS. These actions are described in detail in Section 3.9 and are evaluated in this EIR for their environmental effects in Chapter 5.

Design principles in the proposed LRDP feature preservation of the site's important natural open spaces, including the marsh and coastal grasslands.

This LRDP EIR provides a comprehensive program-level analysis of the RBC 2014 LRDP and its potential impacts on the environment, in accordance with Section 15168 of the CEQA Guidelines. The 2014 LRDP would establish RBC growth parameters through 2050; LRDP amendment(s) or replacement would be required in order to exceed those growth parameters. Subsequent proposals for specific development at the RBC would be reviewed for consistency with the LRDP, its EIR, and any necessary further compliance with CEQA.

UC Berkeley is currently responsible for land use and design process at the University's Richmond properties; UC Berkeley would maintain these responsibilities under the RBC LRDP. RBC implementation would be a cooperative effort of LBNL and UC Berkeley, however. While the entities have a close existing partnership and both are managed under the auspices of The Regents of the University of California, the institutions are distinct administrative entities. Upon determination by The Regents to approve the 2014 LRDP and certify the EIR, LBNL and UC Berkeley expect to establish a joint operating committee to oversee RBC operations. The committee would advise the UC Berkeley Chancellor and the LBNL Director.

3.2 PROJECT LOCATION AND SURROUNDING LAND USES

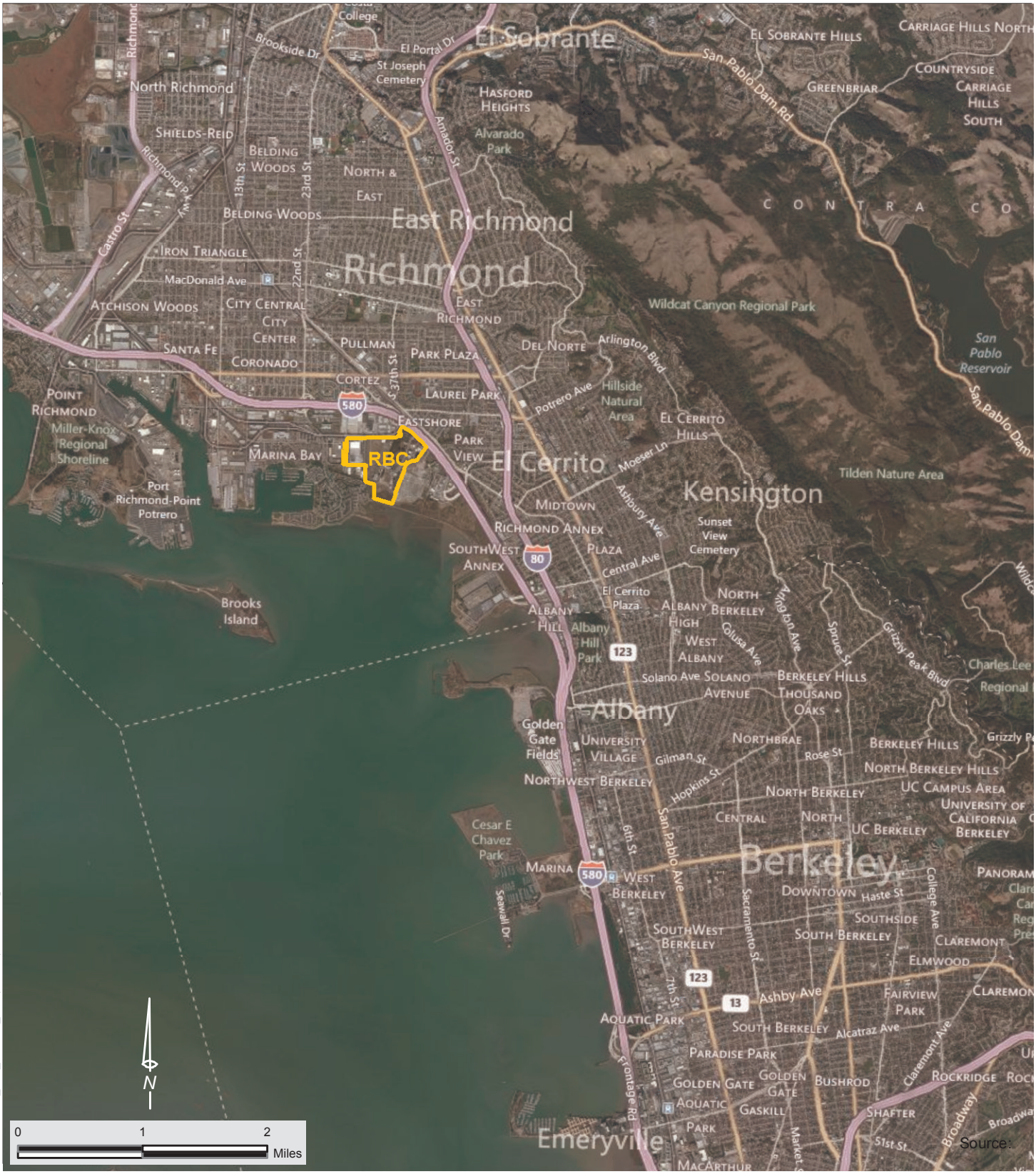
The approximately 134-acre RBC site is located at 1301 South 46th Street in the South Shoreline area of the City of Richmond, approximately 5 miles northwest of the UC Berkeley campus and the LBNL site in Berkeley (Figure 3-1). The RBC site is composed of two University-owned parcels. One parcel is 109.8 acres and is composed of 96.8 acres of uplands at the RFS and 13 acres of the Western Stege Marsh and a transition area at the RFS. The other parcel is a recently acquired 24.0-acre developed property along Regatta Boulevard immediately west of the RFS upland area.[4] The University owns two additional parcels in Richmond that comprise tidal lands and open San Francisco Bay waters. Those two parcels are 46.1 and 15.6 acres and would not be part of the RBC.

The proposed RBC property is bounded on the west by a Pacific Gas and Electric (PG&E) service station, on the north/northwest by Regatta Boulevard, on the northeast by Meade Street, on the east by South 46th Street, and on the south by the San Francisco Bay. I-580 is parallel to Meade Street along the northeastern RBC site boundary.

Land uses surrounding the RBC site include industrial/office uses, a major interstate freeway, and low-/medium-density residential neighborhoods. Regatta Boulevard, along the RBC site northern/northwestern boundary, is adjacent to a railroad spur and a business complex developed with one- to two-story buildings. Bio-Rad Laboratories, a private research equipment manufacturing company, is located immediately west of the RBC site. The adjacent property to the east is the location of former chemical production operations previously owned by several entities, including Stauffer and Zeneca, and is currently owned by Cherokee Simeon Venture I, LLC.

The Marina Bay residential neighborhood, across Meeker Slough, and southwest of the RBC site, consists of a mix of multi- and single-family residences. Low- and medium-density residential uses are also located across I-580, north of the RBC site Meade Street boundary.

[4] The two RBC parcels total about 134 acres; however, the existing 2.7-acre Regatta Boulevard right-of-way between the Regatta and Richmond Field Station parcels is included in the land use map for analytical purposes. The University is working with the City of Richmond to acquire the road right-of-way parcel and to subsequently provide Regatta Boulevard right-of-way on the proposed RBC western boundary. The resulting RBC acreage would remain approximately 134 acres following the proposed realignment of Regatta Boulevard.



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Source:

Regional Location

Richmond, California

TETRA TECH

Figure 3-1

3.3 EXISTING SITE CONDITIONS

3.3.1 Site Conditions

The 134-acre RBC site consists of upland areas developed with buildings that are used for academic and research activities and spaces leased by private and government entities, a north-south oriented eucalyptus tree stand in the site central portion, coastal grasslands, a tidal salt marsh (known as the Western Stege Marsh), and a transition zone between the upland areas and the marsh. About 14 acres of grasslands occur in a number of RBC site meadows. The Bay Trail is south of the site.

The University purchased the original RFS landholdings in 1950. From 1870 to 1950, much of the property belonged to the California Cap Company, which manufactured explosives. The southeast portion of the uplands area was used for explosive manufacturing from the 1870s until 1948. Primarily as a result of historic uses on and around the site, soils, groundwater, and marsh sediments contain levels of contamination that exceed regulatory agency screening criteria. Consequently, several site areas may warrant additional characterization or remedial actions. The main contaminants of concern include metals, volatile organic compounds, and PCBs. The University has been conducting an investigation and remediation of the site in accordance with a DTSC Site Investigation and Remedial Action Order No. I/SE-RAO 06-07-004. On-site contamination and remediation is discussed in many reports completed under the Order, available on the web at rfs-env.berkeley.edu. More information on the actions proposed to address RBC site contamination is presented in Section 3.9 below.

3.3.2 Existing On-Site Land Uses

The RBC site is currently developed with roadways, parking lots, landscaped areas, and 81 one- and two-story buildings, as shown in Table 3-1. The upland RFS area, which has been the location of a variety of industrial enterprises dating back to the mid-19th century, also contains previously disturbed, currently undeveloped open space. Figure 3-2 presents current land uses on the RBC site. The site is currently developed with 1,050,000 gsf of facilities, including more than 500,000 assignable square feet of research space; the NRLF, which serves as an archive for 7.7 million volumes of lesser-used books for the four northern UC campuses; one of the world's largest earthquake shaking tables; test facilities for advanced transportation research; and an EPA regional laboratory. The University purchased the Regatta parcel (former Price Club site) in 2007, which added 24.0 acres to its Richmond properties. The Regatta parcel is developed with a warehouse building and surface parking. The warehouse building currently houses UC Berkeley archives and provides space for other private leased uses.

As of late 2012, the RBC site had a daily population of approximately 300 persons.

3.3.3 Transportation, Circulation, and Parking

The existing RBC site main entrance is at S. 46th Street and the junction of Seaver Avenue and Robin Drive, accessed via the junction of Meade Street and Seaver Avenue. The site is accessible via interstate freeways I-80 and I-580. There are three interchanges on I-580 that provide access to the RBC site—Marina Bay Parkway interchange, Regatta Boulevard interchange, and Bayview Avenue interchange. The Regatta Boulevard and Bayview interchanges are both about 0.35 miles from the main entrance and provide the most direct access between the freeway and the RBC site. The Marina Bay Parkway and Regatta Boulevard interchanges provide the most direct access between the freeway and the Regatta property. Side-street access to the RBC site is provided via overpasses at Bayview Avenue, Regatta Boulevard/Juliga Woods Street, Marina Bay Parkway/S. 23rd Street, Marina Way, Harbor Way, and other streets farther west. Bay Trail access to the

Table 3-1
RBC Site Buildings

Building Number	Year Built	Gross Square Feet	Current Use
100	1950	639	Research
102	1950	6,737	Research
110	1950	1,325	Inactive
111	1987	507	Shop
112	1964	16,949	Office
113	1981	1,800	Storage
114	1950	4,523	Storage
116	1964	967	Shop
117	1950	608	Field Building
118	1950	1,708	Research
120	1967	269	Storage
121	1982	728	Storage
125	1950	1,024	Storage
128	1950	10,287	Storage
149	1982	720	Storage
150	1950	5,410	Research
151	1959	2,629	Research Office
152	1950	4,201	Research
153	1959	3,754	Shop
154	1958	2,731	Research
155	1950	1,896	Office
158	1957	3,343	Research
159	1950	2,366	Research Office
160	1950	1,926	Recreation
161	1950	2,392	Research
162	1976	240	Restroom
163	1950	6,430	Office
164	1950	3,462	Office
165	1996	749	Research
166	2002	5,412	Storage
167	1965	4,092	Shop
175	1950	16,052	Storage
176	1950	672	Research
177	1950	2,969	Research
178	1950	3,950	Office
180	1950	11,008	Office
185	1950	3,165	Storage
190	1950	2,951	Research Office

Table 3-1
RBC Site Buildings

Building Number	Year Built	Gross Square Feet	Current Use
190 TLR	1995	480	Storage
194	1963	1,892	Shop
195	1964	664	Storage
196	1950	2,807	Conference
197	1975	2,419	Vehicle Storage
198	1981	1,800	Storage
275	1956	7,914	Research Lab
276	1958	4,880	Research
277	1966	21,426	Research
280A	1963	13,069	Research Office
280B	1963	15,777	Storage
282	1950	129	Research Lab
300	1992	1,320	Research Office
400	1982	253,660	Library
420	1971	10,635	Storage
421	1970	1,242	Research Lab
445	1968	2,336	Conference
450	1954	6,778	Vehicle Storage
451	1954	7,421	Office
452	1956	7,355	Conference
452 TLR	1995	1,420	Research
453	1956	5,764	Office
454	1963	6,580	Office
460	1968	984	Storage
470	1982	438	Research
471	1988	558	Greenhouse
472	1968	2,633	Research Office
473	1962	3,570	Office
474	1956	342	Storage
475	1993	1,296	Storage
476	1958	997	Storage
478	1958	38,862	Exhibit
479	1954	54	Office
480	1956	7,036	Research
482	1965	1,516	Research
484	1965	14,133	Research Lab
485	1968	429	Research

Table 3-1
RBC Site Buildings

Building Number	Year Built	Gross Square Feet	Current Use
486	1967	8,068	Research Lab
487	1968	543	Inactive
488	1969	175	Storage
491	2002	180	Storage
201	1990	46,000	EPA Building
None	1956	404,098	Regatta Center

RBC for bicyclists and pedestrians is provided via underpasses/overpasses at Central Avenue, Buchanan Street, Gilman Street, University Avenue, the Berkeley bicycle and pedestrian bridge, and others further south. Bay Trail access to the RBC is also provided to bicyclists and pedestrians along the length of the entire South Shoreline Area in the City of Richmond.

The major vehicular circulation routes on the RBC site include east-west oriented Robin Drive and Lark Drive, and north-south oriented Egret Way. The primary vehicular entries into the RBC site are:

- South 46th Street and the junction of Seaver Avenue and Robin Drive,
- South 46th Street at Building 194,
- Regatta Boulevard near South 34th Street, and
- Regatta Boulevard (multiple locations) for the Regatta property.

Parking is accommodated in several surface lots. There are currently 760 on-site parking spaces. UC Berkeley operates a shuttle bus that runs hourly between the UC Berkeley main campus and the RFS.

3.3.4 Utilities and Infrastructure

The RBC site is connected to local utility companies for electrical power, natural gas, water, and telecommunications services and to the City of Richmond wastewater system. PG&E provides electricity to the site through multiple overhead 12-kilovolt electrical lines, with both aerial and underground power lines composing the site's electrical service infrastructure. PG&E also provides natural gas service through multiple high-pressure gas mains, with underground gas lines serving the larger site facilities. East Bay Municipal Utility District (EBMUD) provides potable and fire suppression water via multiple high-pressure water mains, with underground potable and firefighting water lines distributed throughout the site. AT&T provides the site with communications service. Site sanitary sewer discharge flows to the City of Richmond publicly-owned treatment works, located approximately 3 miles to the west on Canal Boulevard.

Existing Land Use

Richmond, California

TETRA TECH

Figure 3-2

3.4 RELATIONSHIP OF THE RICHMOND BAY CAMPUS TO THE US DEPARTMENT OF ENERGY

LBNL[5] is located at 1 Cyclotron Road in Berkeley and is a federal facility managed and operated by the University under a DOE/University contract. The research, public service, and training work conducted at LBNL is within the University's mission and the land is owned by The Regents of the University of California. The federal government leases land at LBNL from The Regents and constructs federally owned buildings on the leased lands. The University has also constructed, and is in the process of constructing, buildings at LBNL to house federal research programs. The University is the LBNL Management and Operating (M&O) contractor, as defined under DOE Acquisition Regulations. As LBNL's M&O Contractor, the University is responsible for providing the intellectual leadership and management expertise necessary and appropriate to manage, operate, and staff LBNL; accomplish the missions and activities funded and assigned to LBNL by DOE; administer the DOE/University contract; and provide University oversight of LBNL's contract compliance and performance.

The RBC site would continue to be owned by the University, but some of the facilities developed on the RBC site would be used by the University, as the operating contractor at LBNL, to accomplish the missions and activities assigned and funded by DOE. Because the RBC would be a joint use campus, some of the existing buildings as well as new buildings on the RBC site would be occupied by UC Berkeley teaching and research programs. As a result, the laws, regulations, and policies that would apply to design and construction of an individual facility would depend on its funding source. The laws, regulations, and policies that would apply to the operation of an individual facility would depend on the organization occupying the facility. The proposed joint operating committee would work to sensibly streamline operations that can be handled cooperatively, such as recycling programs, transportation demand management programs, utility operations, maintenance, health and safety, emergency response, when appropriate.

3.5 PROJECT PURPOSE, NEED, AND OBJECTIVES

3.5.1 Project Need

The LBNL main site is located in the Berkeley hills on approximately 202 acres of UC land. The main site comprises approximately 1.6 million gsf in permanent and temporary facilities (LBNL 2012 Annual Lab Plan). Main LBNL site structures are at full occupancy. LBNL currently leases commercial property totaling approximately 371,100 gsf in eight off-site locations and occupies an additional 47,333 gsf of space on the UC Berkeley campus for research and administrative purposes (LBNL 2012 Annual Lab Plan). The University has determined that an additional campus site is needed to accommodate future growth of existing or new LBNL programs, particularly for program activities not requiring routine use of the LBNL national user facilities, (e.g. Advanced Light Source) at the LBNL main site.[6]

LBNL and UC Berkeley have also determined that co-location of UC Berkeley with LBNL at the RBC site would benefit both institutions. The histories of UC Berkeley and LBNL have been

[5] "LBNL" refers to the national federally funded research and development center named the Lawrence Berkeley National Laboratory. "University" refers to the University of California, the statewide entity that is the agency affiliation of both the University of California, Berkeley and LBNL. The University is the management and operating contractor of the Lawrence Berkeley National Laboratory.

[6] LBNL national user facilities provide researchers with the most advanced tools of modern science including accelerators, colliders, supercomputers, light sources and neutron sources, and facilities for studying the nanoworld, the environment, and the atmosphere.

intertwined since the founding of the Laboratory by Ernest Orlando Lawrence in 1931, and both have richly benefited from co-location and synergies at their existing sites in Berkeley. Hundreds of UC Berkeley faculty members hold joint appointments at LBNL; many UC Berkeley undergraduate and graduate students conduct research at LBNL as part of their degree programs. The partnership helps both institutions recruit and retain top students and scientists from around the world. The RBC would further build that synergistic relationship for the benefit of both LBNL and UC Berkeley and create resiliency through research partnerships and engagement beyond traditional university bounds.

Past activities have resulted in the deposition of chemical contaminants affecting both soil and groundwater at the part of the proposed RBC site that includes portions of UC Berkeley's RFS. The project would be conducted in accordance with a proposed RAW, including a soil management plan, contingent upon DTSC approval, or in accordance with the existing DTSC investigation and cleanup order for the RFS.

The proposed 2014 LRDP provides land use designations and identifies developable area to support new research and educational initiatives. The 2014 LRDP creates a framework to support program expansion through the year 2050.

The University's vision for the RBC is that it would be "A state-of-the-art, inspirational, sustainable place to produce world-class collaborative science for healthy living and sustainable communities."

3.5.2 Project Purpose

The purpose of the new campus and the associated LRDP is to support existing or new LBNL and UC Berkeley program growth; to address constraints on locating new research activities at the LBNL main site; to achieve the UC Berkeley's 2002 working paper goal for creating a premiere research facility supporting and complementing UC Berkeley teaching, research, and public service programs at the Richmond property; to reduce UC Berkeley and LBNL fiscal and programmatic costs related to leasing space and dispersed programs; and to allow for successful facilities development for LBNL, UC Berkeley, and other public and private entities in a manner that supports LBNL and UC missions in a time of funding constraints and that continues their history of successful scientific collaboration.

3.5.3 Project Objectives

To accomplish the purpose and need, the University has these project objectives. The project should:

- Be within an approximately 20- to 25-minute commute from the existing LBNL main entrance at Blackberry Gate on Hearst Avenue; or an approximately 20 minute commute from UC Berkeley's main entrance at Oxford and University Avenue.
- Have development capacity for approximately 5.4 million gsf of laboratory, office, and support facilities and related utility and transportation infrastructure to support the University's research, teaching, and public service mission.
- Be in a safe and welcoming community with a positive civic expression of interest in development of the site.
- Be readily accessible to a variety of modes of public transportation, inclusive of local buses, mass transit (BART, Amtrak, and AC Transit), and shuttle services, and allow safe bicyclist access from designated bicycle routes.
- Allow for electrical, natural gas, and water utilities for the lowest possible cost.

- Allow for establishment of a design framework for development of a state-of-the-art research campus that will be the location of choice for internationally recognized researchers.
- Foster synergy and collaboration between UC Berkeley and LBNL in and across disciplines and institutions in both the public and private sectors.
- Provide sustainable land use and circulation patterns that maximize density to reduce overall building footprints and conserve open space, and maximize bicycle, pedestrian and shuttle services and allow for placement and massing of buildings to maximize shared views.
- Facilitate efficient constructability of facilities (buildings, parking structures, bridges, etc.), infrastructure development (roads, underground utilities, pedestrian walkways, etc.), and open space.
- Foster connectivity with the surrounding community.
- Leverage capital investment for environmental stewardship.

3.6 2014 LONG RANGE DEVELOPMENT PLAN

The proposed 2014 LRDP is incorporated by reference into this project description.

3.6.1 Highlights of the RBC 2014 LRDP

The proposed 2014 LRDP addresses land use; access, circulation, and parking; open space and landscape; utilities and infrastructure; sustainability; and safety and preparedness. The LRDP further provides a policy and design framework to guide the development of up to 5.4 million gsf of new research, development, and support space at the site and for an employee population of up to 10,000. Proposed LRDP design principles feature preservation of the site's important natural open spaces, including marsh and coastal grasslands. The site plan organizes development into distinctive groupings to promote a sense of community within the site, particularly during initial campus growth phases. The proposed LRDP includes policies to guide building design and configuration to maximize opportunities for informal interaction.

Building heights across the RBC are expected to vary, with lower buildings at the Bay-facing edge and taller buildings behind them. Four- and five-story buildings are expected to be a common building module, with heights of 100 feet providing for a five-story building with tall floor-to-floor heights that allow building systems to be easily altered as laboratory uses change over time. Neighborhoods within the campus may also feature iconic buildings that help establish a sense of place. An example would be Sather Tower (the Campanile) at UC Berkeley, which measures 303 feet to the top.

The proposed 2014 LRDP demonstrates commitment to sustainability through site, building, and infrastructure planning principles. As the site is developed, the campus itself would be open to the community, providing community resources such as auditorium, exhibit, and event space for educational programs. The proposed 2014 LRDP describes and highlights the multiple connections to the RBC site by road, bicycle, and pedestrian path, and incorporates a robust transportation demand management system to facilitate site access.

The RBC would be surrounded by the South Shoreline Area of the City of Richmond, envisioned as a revitalized hub of innovation. The proposed RBC 2014 LRDP emphasizes connectivity beyond the site and the importance of the campus as a catalyst for its vicinity.

The following subsections and Section 3.7, Illustrative Development Scenario, provide additional information about the proposed 2014 LRDP.

3.6.2 Anticipated Research Programs

In the near term, existing programs at the site in sustainable transportation and earthquake engineering, among others, will continue; the site will also continue to house important collections of the University library and UC Berkeley museums. New programs under consideration may establish the campus as a hub of joint research in advanced manufacturing and energy storage. In addition, the programs at the RBC will maintain a close connection to the research conducted on the main campuses of LBNL and UC Berkeley. The RBC will strengthen opportunities for partnerships with private industry. In the longer term, the RBC research would be likely to span energy and environmental sciences and technology, computing sciences, nuclear and particle physics, engineering and materials sciences, chemical sciences, accelerator sciences, climate sciences, and other disciplines. The scale and scope of this research would be appropriate for the size and scope of buildings described in Section 3.7, Illustrative Development Scenario. UC Berkeley expects that student research and teaching programs would also take place at the site, as part of the educational mission of the campus.

3.6.3 Campus Population Projections

The University of California projects that the campus population would increase incrementally with development over the 2014 LRDP's approximately 40-year planning horizon, from approximately 300 persons in 2012 to approximately 10,000 persons by 2050.

3.6.4 Occupiable Building Space Projections

Table 3-2 summarizes the existing and projected RBC occupiable building space at the 2014 LRDP horizon year. Total RBC occupiable building space is projected to increase from approximately 1,050,000 gsf at the present time to 5,400,000 gsf at the 2050 horizon year.

Table 3-2
LRDP Occupiable Building Space Projections

LRDP Use	Existing (2012)	Proposed (2050)	Change
Research, Education, and Support			
Existing Space	1,050,000 gsf	300,000 gsf	-750,000 gsf
New NRLF Space	--	350,000 gsf	350,000 gsf
New Research, Education, & Support Space	--	4,750,000 gsf	4,750,000 gsf
Total	**1,050,000 gsf**	**5,400,000 gsf**	**4,350,000 gsf**

Of the site's existing 1,050,000 gsf, about 750,000 gsf would be demolished and about 300,000 gsf would be retained. The retained space includes the EPA building (46,000 gsf) and NRLF (254,000 gsf). The new building space that would be added to the site includes about 350,000 gsf for the expansion of the NRLF and about 4,750,000 gsf of research, education, and support facilities for occupancy by LBNL, UC Berkeley, and partner institutions. LBNL and UC Berkeley would accommodate existing programs housed in space to be demolished, most likely in new RBC facilities.

3.6.5 Sustainability

The University envisions that the RBC would be a showcase of sustainable design and operations to motivate and inspire its staff, the community, the nation, and the world. The RBC would assert

and enhance the University's reputation as a hub of energy efficiency research and best practice. The facilities would demonstrate building efficiency technology innovations developed by the University and its industry partners in a fully functional laboratory environment.

In August 2011, the University updated its UC Sustainable Practices Policy,[7] which set environmental practices goals for both construction and operation in eight areas: green building, clean energy, transportation, climate protection, sustainable operations, waste reduction and recycling, environmentally preferable purchasing, and sustainable food service. All RBC projects would meet or exceed the goals defined in this, or any successor, UC sustainability policy.

In May 2011, DOE approved DOE Order 436.1, which defines requirements and responsibilities for managing sustainability within DOE facilities. In additional to satisfying the UC sustainability policy, all DOE-funded projects at the RBC also would meet or exceed the goals defined in this DOE Order.

Energy

RBC physical development would incorporate energy efficiency principles in all construction and demolition projects, renovation projects, operations, and maintenance within budgetary constraints. In cases where certain facility types, such as a laboratories or data centers, are not required to meet energy consumption code requirements, the projects would be designed to meet specific energy and carbon performance metrics such as those defined by the "Labs21" (DOE and EPA), "Smart Labs" (UC Irvine), or similar applicable programs.

Water

In order to practicably minimize water use, the RBC would implement such measures as installing water-efficient landscaping and drip or other efficient irrigation systems, using water-efficient fixtures, and capturing rainwater and stormwater for irrigation use.

Municipal Solid Waste

The RBC would comply with the UC Sustainable Practices Policy for zero municipal solid waste by 2020 by creating a robust on-site recycling program for diverting municipal solid waste from landfills. In additional to satisfying the UC sustainability policy, all DOE-funded projects at the RBC also would meet or exceed the goals defined in DOE sustainability Orders.

Materials

Building materials would be selected to reduce embodied energy, maximize building lifespan, and be recyclable or reusable. Material use overall would be minimized, whether in buildings or in other site operations (e.g., paper), and recycled wherever practicable. Materials would be locally sourced and from renewable sources to the degree feasible, including demolition materials re-use and recycling.

Transportation

In addition to improving shuttle access, the RBC would implement a TDM program that would include alternate mode use incentives such as discounted transit passes, parking cash-out, Guaranteed Ride Home, and flexible car share programs.

[7] http://www.universityofcalifornia.edu/sustainability/policy.html

Landscape

The RBC would support bio-diversity and habitat conservation by using native plants wherever possible. In addition, the RBC would use low-impact development design techniques and Bay-Friendly landscape design (see www.stopwaste.org) and make stormwater management a site feature. As described below, natural open spaces would also be maintained.

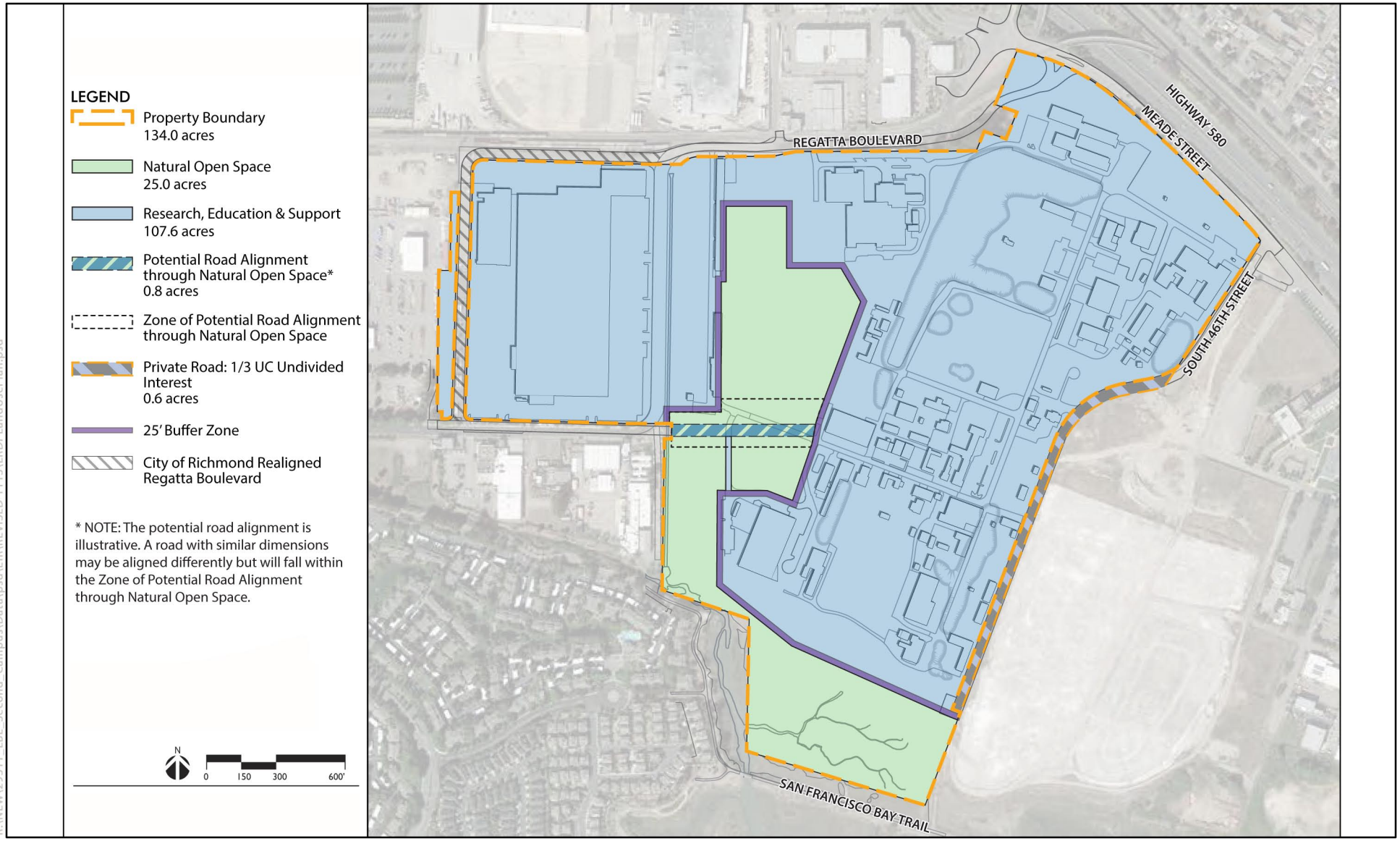
3.6.6 Land Use Plan

The proposed 2014 LRDP identifies two land use designations to inform the pattern of development at the RBC: (1) Research, Education, and Support, and (2) Natural Open Space. Definitions for each land use designation are provided below. Figure 3-3 shows the proposed 2014 LRDP land uses. A possible layout of the site, including realignment of Regatta Boulevard, is shown in Figure 3-4.

Research, Education, and Support

The Research, Education, and Support land use designation applies to RBC site areas that would be developed with new facilities or that would retain existing facilities in their current or expanded form. This land use would include 107.6 acres, which is sufficient to meet projected program needs. The types of facilities that would be allowed in designated Research, Education, and Support areas include:

- Laboratory, classroom, office, and administration buildings for researchers, faculty, postdocs, students, and non-University public and private entities.
- Product and process development space for private sector startups, small businesses, and industry counterparts that are synergistic with UC Berkeley and LBNL research.
- Support infrastructure and facilities for operations, transportation, utilities, renewable power generation, firefighting, security, safety, hazardous materials management, and corporation yard uses, including vehicle and materials shops and storage. Support facilities for specialized research programs such as plant and animal research facilities, greenhouses, and clinical spaces.
- Community outreach and education resources, including exhibit, lecture, and event spaces as well as conference facilities and meeting rooms focused on public education.
- Amenities such as dining, short-term accommodation facilities (for visiting researchers), retail, and recreation facilities.
- Transportation-related facilities including parking lots and structures, bus and shuttle stops, and roads and pathways. Parking structures may house parking administration offices, bicycle support facilities, and utility structures.
- Developed, usable open spaces ranging from courtyards, terraces, and quad-like spaces, to walkways, tree groves, and recreational fields. Existing landscaping in these areas, including non-native eucalyptus trees, may be removed and replaced. Open spaces in this zone may be paved or landscaped, with or without seating or other site furnishings. They would range in scale from expansive areas for large, outdoor gatherings to more intimate spaces better suited to small groups and individuals. Stormwater would be managed within these zones in swales, permeable landscaping, and storm drainage systems. Small structures such as pavilions or overlook platforms may be located in these areas.



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LRDP Land Use Plan

Richmond, California

TETRA TECH

Figure 3-3

LRDP Conceptual Layout

Richmond, California

TETRA TECH

Figure 3-4

- Transition zones that would buffer the Natural Open Space areas from site buildings, allowing for maintenance access and minimizing the transference of non-native species or noise or light intrusions. These buffer zones would disallow permanent structures within 25 feet of the Natural Open Space areas. Paving would be pervious wherever practicable and any planting would consist of native or non-invasive species.
- Throughout the RBC, paving would be pervious wherever practicable, stormwater would be carefully managed to protect natural areas, and any planting would consist of native or non-invasive species.

Natural Open Space

The Natural Open Space land use designation applies to natural areas such as the Western Stege Marsh and coastal grasslands, as shown in Figure 3-2. Human encroachment on these spaces would be limited; the LRDP expresses intent to protect, restore, and maintain these resources in their natural condition. Operational activities in these spaces would be limited to interpretation, education, maintenance, and research. Improvements in this zone would be limited to minor access roads for maintenance vehicles and limited boardwalks or pathways, consistent with conservation goals. The LRDP designates 25.2 acres of natural areas as Natural Open Space to protect them from development and maintain their natural condition.

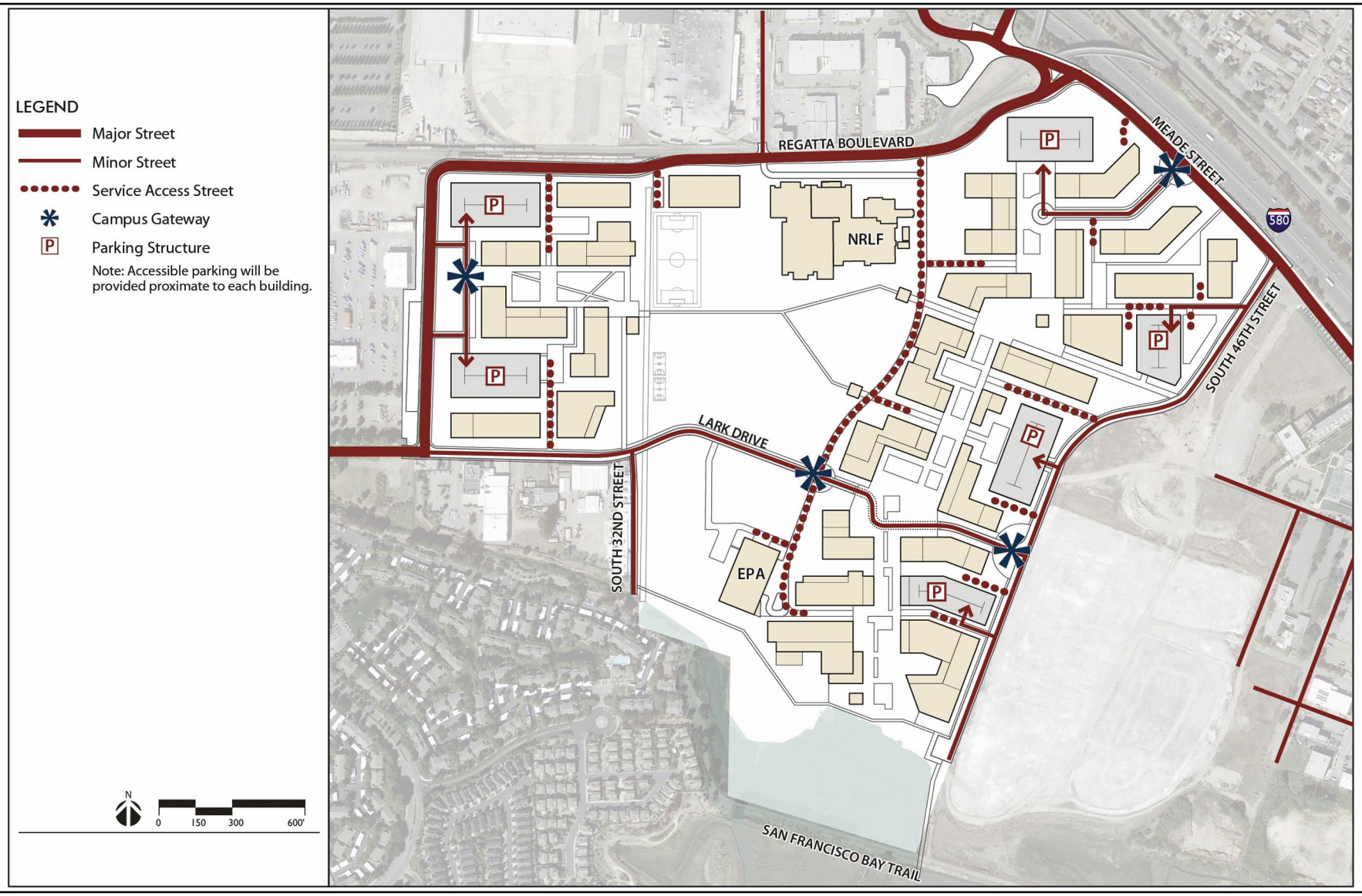
3.6.7 Circulation and Parking

The RBC would model sustainability, including in transportation modes. Prioritizing site access by alternative modes is a key objective for site circulation planning and operation. Transit shuttle facilities and bicycle connectivity improvements would be part of all development phases. A TDM program would promote alternatives to single-occupant commuter vehicles, and an existing on-site hydrogen fueling station could be used to support sustainable transit infrastructure, if vehicles serving the site can one day be hydrogen fueled. Nonetheless, for purposes of the 2014 LRDP environmental impact report, conservative assumptions about mode split and vehicle travel will be made to inform the impact analysis, as outlined below.

Vehicle Access and Circulation

Access to the RBC site is illustrated in Figure 3-5. Vehicle access would continue to be provided from the existing exits off of I-580. The existing entry points to the site would likely remain as primary or service access points. Additional points of entry would be provided from South 46th Street to the east, from Meade Street to the north, and from multiple Regatta Boulevard locations to the west.

RBC internal roadways would provide calm, mixed-use streets for internal circulation. They would serve as vehicle, pedestrian, bicycle, and utility pathways and would provide direct access to buildings. Regatta Boulevard would be rerouted to the west to allow connectivity between the eastern and western portions of the site. Lark Drive would be extended to connect with Regatta Boulevard.



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LRDP Circulation Plan

Richmond, California

TETRA TECH

Figure 3-5

Bicycle Circulation

RBC site bicycle access would be via existing overpasses at Bayview Avenue, Regatta Boulevard/Juliga Woods Street, Marina Bay Parkway/S. 23rd Street, Marina Way, Harbor Way, and others further west. Extended Lark Drive would provide bicycle connectivity to downtown Richmond and neighborhoods west of the RBC. Additional RBC site bicycle access would be provided by the Bay Trail; more distant urban connections to the Bay Trail for RBC bicycle commuters would be via existing underpasses/overpasses at Central Avenue, Buchanan Street, Gilman Street, University Avenue, the Berkeley bicycle and pedestrian bridge, and others further south. Bicycle lanes would be provided on all new RBC site roads. A bike sharing system may also be implemented both for internal site circulation and for travel to retail and other points nearby.

Parking

Approximately 690 of the existing 760 vehicle parking spaces located in RBC site surface parking lots would be removed and, as needed over time, replaced in strategic locations. Surface parking would continue to be provided as a short term measure to serve the first few facilities. Later, parking structures would be constructed to provide for the majority of the approximately 6,000 vehicle parking spaces projected for the long term RBC development. The projected change in RBC site parking is shown in Table 3-3. Parking structures would be located in a manner to support a more pedestrian-friendly, vehicle-free district with similarities to a traditional higher education campus. Small surface parking lots would be located adjacent to all new facilities as necessary for disabled access, shipping/receiving, and short-term visitor parking. All parking areas would be provided with an appropriate drainage system designed to treat stormwater runoff from parking areas in conformance with applicable Clean Water Act permits.

Table 3-3
LRDP Parking Projections

Existing Parking Spaces	760
Parking Spaces to be Removed	690
New Parking Spaces	5,930
Total	**6,000**

Bicycle parking would be provided at a rate of at least 20 percent of the RBC population at any given time period, in accordance with Leadership in Energy and Environmental Design (LEED) requirements; this would amount to approximately 2,000 spaces at full LRDP implementation.

New buildings would have indoor secure bicycle parking, showers, and clothes lockers, as well as outdoor bicycle racks, some of which may be secure or covered.

Transit

Two RBC shuttle lines are proposed. The LBNL-UC Berkeley-RBC Shuttle would provide a no-transfer 20-minute ride from LBNL to the RBC with a single intermittent stop at the main UC Berkeley campus. The BART-RBC Shuttle would run routinely between the El Cerrito Del Norte and El Cerrito Plaza BART stations and the RBC, providing a nonstop nine-minute ride from BART to the RBC. The BART stations would also serve as connection points to AC Transit and other bus systems.

3.6.8 Public Services

Increases in campus population and building space would potentially increase demand for public services.

Fire Protection Services

The RBC site is in the jurisdiction of the City of Richmond Fire Department. The closest station is on Bayview Avenue approximately half a mile and four minutes away. It is expected that LBNL and UC Berkeley would continue to use the City of Richmond fire station-based emergency services until required fire safety and emergency assessments and plans indicate the need for additional services. Over the long-term, it may become desirable or necessary to house emergency service equipment and personnel on the campus. The Research, Education, and Support land area includes space for an on-site fire station.

Police Services

The UC Police Department (UCPD) performs all patrol, investigation, crime prevention education, emergency preparedness, and related law enforcement duties for the RBC site. UCPD coordinates closely with the City of Richmond Police Department, operating joint patrol programs in the South Shoreline Area, and coordinating efforts at all levels to ensure the effective provision of police services. The results of required emergency and security assessments and plans may indicate the need for additional services. Over time, these additional services and the associated number of UCPD staff on-site may necessitate expanding or replacing the existing police station. LBNL would retain ultimate responsibility for all security, fire protection, and emergency service requirements for all DOE-funded facilities, assets, and personnel.

3.6.9 Utilities and Infrastructure

The proposed LRDP provides that RBC utility infrastructure would be sustainably designed and implemented and that it would grow over time in carefully planned increments. Nonetheless, for purposes of this EIR, conservative utilities demand assumptions have been made to inform the impact analysis, as outlined below.

The site is currently serviced by a full range of traditional utilities including water, wastewater, natural gas, electricity, and telecommunications utilities providers. The site currently houses a hydrogen fueling station.

The discussion below describes the projected increase in RBC utilities demand under the proposed 2014 LRDP and the types of new facilities or expansions that would likely be required to meet this demand. Table 3-4 presents the current RBC utility demand at the proposed RBC site and the estimated future demands at full 2014 LRDP campus development.

Potable and Firefighting Water

EBMUD provides water to the RBC site for potable, firefighting, central plant, and irrigation uses. Under existing conditions, water consumption is approximately 11 million gallons each year, with an estimated maximum flow rate of 50 gallons per minute (gpm). Following full 2014 LRDP development, the estimated annual water consumption would be about 340 million gallons and the maximum flow rate would be 2,230 gpm. Demand for firefighting water would increase the maximum flow rate by up to 3,000 gpm for a time period of up to 4 hours. The site is currently served by three 8-inch laterals, each connected to 12-inch EBMUD water mains located at South 46th Street, Regatta Boulevard and South 32nd Street, and Regatta Boulevard and South 34th Street. These 8-inch laterals would be upgraded to 12-inch laterals for future potable water delivery. That system would be supplemented and cross-connected by a 12-inch RBC fire water distribution system for future fire water delivery. The underground distribution system would include piping, sectionalizing valves, back-flow preventers, and pressure reducers located generally within 2014 LRDP defined utility corridors. Each new RBC building would feature a water supply isolation valve and meter at its service entry point.

Table 3-4
RBC Utility Demand

Utility	Existing Demand	Projected Demand (2050)
Potable Water	11 million gallons/year (peak demand – 50 gpm)	340 million gallons/year (peak demand – 2,230 gpm)
Firefighting Water	(peak demand – 3,000 gpm)	(peak demand – 6,000 gpm)
Wastewater	9.3 million gallons/year (peak demand – 55 gpm)	273 million gallons/year (peak demand – 2,140 gpm)
Chilled Water	3,513 tons of cooling installed	12,600 tons of cooling installed
Heating Hot Water	281.7 kBTU/h	218,400 kBTU/h
Electrical energy	3,700 megawatt hours/year (peak demand – 500 kW)	142,400 megawatt hours/year (peak demand – 24.7 MW)
Standby Power	peak demand – 400 kW (installed capacity – 3.9 MW)	peak demand –16 MW (installed capacity –20 MW)
Natural Gas	73,600 therms/year (peak demand – 2,700 kBTU/h)	6,600,000 therms/year (peak demand – 240,300 kBTU/h)
Telecommunications	48 strands of fiber optic cable and 300 pairs of copper wire	1,000 strands of fiber optic cable and 3,600 pairs of copper wire

Notes:

gpm gallons per minute
kBTU/h Kilo-British thermal unit hour
kW Kilowatt
MW Megawatt

Wastewater

The Richmond Municipal Sewer District provides wastewater services to the site. The site is currently served by a 15-inch City of Richmond sanitary sewer main line, which connects to several locations at the south end of the developed uplands area. Currently, 9.3 million gallons per year of RBC site wastewater is treated at the City's wastewater treatment plant (WWTP) through the City's sewer system. This would increase to an estimated 273 million gallons per year at full 2014 LRDP implementation. The current peak RBC site sanitary sewer flow rate, which includes some stormwater inflow, is estimated at 55 gpm; this peak flow rate would increase to 2,140 gpm with full 2014 LRDP implementation. The new underground system would include piping and cleanouts located generally within LRDP-identified RBC utility corridors.

Stormwater

The existing site upland area consists of approximately 28 percent impervious and 72 percent pervious surfaces. On-site stormwater currently flows north to south by way of open swales, culverts, underground pipes, and sheet flow into drainages. Runoff from the buildings and other impervious surfaces is directed into storm drains. Currently, there are two main on-site storm drain lines. Stormwater in the western uplands drains overland through open swales or through underground pipes into Meeker Slough and into the transition area north of the Western Stege Marsh. Stormwater in the eastern uplands drains overland through open swales and through underground pipes into the transition area north of the Western Stege Marsh.

The Regatta property is 100 percent impervious surfaces. Runoff from the buildings and other impervious surfaces is directed into storm drains. The eastern portion of the Regatta property drains to the trapezoidal storm drain channel along Regatta Boulevard. The western portion of the Regatta property drains to Meeker Tidal Creek. This trapezoidal drain channel runs north-

south along the western uplands edge; in addition to RBC stormwater, it also carries stormwater collected from portions of the City of Richmond north of the RBC site.

The existing uplands area and Regatta properties combined consist of approximately 42 percent impervious and 58 percent pervious surfaces. With full 2014 LRDP implementation, it is anticipated that the RBC would comprise 43 percent impervious and 57 percent pervious surfaces. The increase in impervious surfaces would be small (about 3 acres). Furthermore, reductions in stormwater runoff would be achieved at the RBC through the incorporation of low-impact development (LID) design techniques that are consistent with NPDES requirements, the UC Sustainable Practices Policy, and LRDP goals that the site model sustainability. Therefore, RBC site stormwater runoff is not expected to increase over existing conditions and is in fact expected to decrease due to the LID and the sustainable design of the new campus.

All construction projects requiring coverage under the State Water Resources Control Board NPDES General Permit for Construction Activities would incorporate stormwater runoff standards. The RBC would also incorporate new open swales, including runoff treatment features and best management practices (BMPs) commensurate with RWQCB requirements to treat stormwater before it is discharged into Western Stege Marsh. In addition, buildings that are constructed using federal funds would also be required to comply with Energy Independence and Security Act (EISA) Section 438 requirements.

Cooling Water

The existing site facilities at the site house water cooling equipment with a combined total capacity of approximately 3,513 tons. The water cooling demand projected for full 2014 LRDP implementation is approximately 12,600 tons. The campus would include individual building heating and cooling systems.

Heating Water

The existing facilities at the site currently house heating equipment with a combined total capacity of approximately 282 kilo-British thermal unit hours (kBtu/h). The heating demand projected for full 2014 LRDP implementation is approximately 218,400 kBtu/h. The campus would include individual building heating and cooling systems.

Electrical Energy

PG&E provides electricity to the site through multiple overhead 12-kilovolt (kv) electrical lines, with both aerial and underground power lines comprising the site's electrical service infrastructure. Under existing conditions, the site has a peak power demand of about 500 kW and consumes approximately 3,700,000 kilowatt hours (kWh) annually. With full 2014 LRDP implementation, RBC peak power demand would be about 25 MW and would consume approximately 142,400 megawatt hours (MWh) annually. The RBC site would continue to be served at 12kv until increased demand made it economical to construct 115kv lines and a 115:12kv substation on the site with a 12kv distribution system. The new substation would include transformers, switchgear, metering, and safety equipment. The Research, Education, and Support land area includes space for a substation prospectively near the junction of Regatta Boulevard and 34th Street. The underground distribution system would include ductbanks, manholes, sectionalizing switches, and additional safety equipment located generally within the utility corridors defined in the 2014 LRDP. Each new major RBC facility would include, as appropriate, adequately sized transformers, switchgear, and standby electrical generators. Whenever possible, generators with the cleanest available technology would be selected.

Natural Gas

PG&E provides the project site with natural gas service through multiple high-pressure gas mains, with underground gas lines serving the larger site facilities. Under existing conditions, site peak demand is about 2,700 kBtu/h and annual consumption is approximately 73,600 therms. With full 2014 LRDP implementation, the RBC would consume approximately 6,600,000 therms of natural gas annually and have a peak demand of about 240,300 kBtu/h. To provide increased natural gas to the proposed project, a new 8-inch gas pipeline would be installed on the RBC eastern portion with three 5- or 6-inch laterals branching off to serve distinct facility clusters. In addition, a new 6-inch gas pipeline would be installed for the western RBC site area. The points of connection to PG&E would include new pressure reducers, meters, vaults, and safety equipment. The underground distribution system would include piping, sectionalizing valves, and additional safety equipment located generally within the 2014 LRDP-defined utility corridors. Each new facility would include a pressure reducer, seismic valve, and meter as required to meet specific operational needs and code requirements.

Telecommunications

AT&T provides project site communications service through telecommunications infrastructure comprising underground and aerial lines. The site is currently served by 48 strands of fiber optic cable and 300 pairs of copper wire. With full 2014 LRDP implementation, the RBC would require approximately 1,000 strands of fiber optic cable and 3,600 pairs of copper wire. The points of connection to AT&T would be located on Meade Avenue and Regatta Boulevard. Each distinct facility cluster would be served by a centralized Main Distribution Frame and a telecommunications distribution system for each individual building. The Research, Education, and Support land area includes space for the Main Distribution Frames. The underground main service and distribution systems would include vaults, conduits, and manholes located generally within the 2014 LRDP-defined utility corridors. Each new RBC facility would include a Building Distribution Frame at its service entry point.

3.6.10 Waste and Recycling

The RBC is intended to model sustainability, and both UC Berkeley and LBNL are working to implement zero waste plans for their respective facilities. The RBC would comply with the UC Sustainable Practices Policy for zero municipal solid waste by 2020. In this EIR analysis, conservative assumptions about waste generation and recycling are used and appear below. In additional to satisfying the UC sustainability policy, all DOE-funded RBC projects also would meet or exceed the goals defined in DOE Orders on sustainability.

Hazardous Waste

Hazardous chemical waste, mixed waste, combined waste, and radioactive waste would be packaged, labeled, and categorized for transport to appropriate permitted and licensed or authorized off-site facilities. Biohazardous waste and universal waste would also be generated and managed at the RBC site. RBC waste collection areas equipped with all required safety features would accommodate collection and management (i.e., consolidation) of hazardous waste and radioactive waste (including mixed waste and combined waste). Hazardous waste and radioactive waste storage areas would be physically separate. The RBC site would also have designated management and storage areas for biohazardous waste (including medical waste) and universal waste.

The storage, handling, use, and disposal of all hazardous materials, hazardous wastes, and other scientific materials within the buildings operated by LBNL would be subject to LBNL Environmental Health and Safety (EH&S) programs. These activities within the UC Berkeley operated buildings would be subject to UC Berkeley EH&S programs.

Municipal Solid Waste and Recycling

All solid waste generated at the RBC would be separated into appropriate waste streams. The non-recyclable and nonhazardous solid wastes from the site would be disposed at a licensed landfill. The recyclable solid wastes from the site would be off-hauled by a licensed contractor.

3.7 ILLUSTRATIVE DEVELOPMENT SCENARIO

To achieve a more detailed understanding of potential project impacts and to allow a more thorough communication of project implications to the public, and also to provide a basis for some of the quantified modeling that has been prepared for the proposed 2014 LRDP and EIR, the University developed an Illustrative Development Scenario that is shown in Figure 3-4.

This Illustrative Development Scenario is a conceptual portrayal of potential development under the LRDP that would be consistent with the proposed 2014 LRDP goals and objectives, the proposed 2014 LRDP Land Use Diagram, and the LRDP's proposed development uses and square footages. The Illustrative Development Scenario is intended to provide a conservative basis for the analysis of environmental impacts.

The actual locations of buildings, configurations, and uses may vary as specific projects are considered for approval in the future. The University's needs and opportunities may change over time at any particular site and the Illustrative Development Scenario is not intended to be a precise representation of the actual development program that would take place over the 40-year planning horizon of the 2014 LRDP.[8]

The EIR uses the Illustrative Development Scenario in the following ways:

1. To illustrate potential development pursuant to the 2014 LRDP based upon a conceptual portrayal of such potential development, and therefore give the reviewer an illustrative sense of the scope and scale of potential development at any particular building site pursuant to the LRDP.
2. To provide a basis for the EIR's project impacts analysis consistent with the *State CEQA Guidelines* provisions for program EIRs, and to provide a similar analytical basis for considering and evaluating future RBC actions after the program EIR has been certified; and
3. To provide a basis for quantified or modeled studies such as the human health risk assessment.

The Illustrative Development Scenario depicts possible siting and dimensions of new buildings, parking garages, and roadway changes, and demolition of existing buildings. Further detail and discussion of these project elements follow in this chapter. Consistent with the proposed 2014 LRDP Land Use Diagram, the Illustrative Development Scenario indicates that development of major new buildings would take place within the Research, Education, and Support zone of the RBC. Parking structures would be sited to support a pedestrian-friendly, vehicle-free environment.

While actual RBC development under the 2014 LRDP would likely not precisely follow the Illustrative Development Scenario layout, the University would consider how each individual

[8] It is not possible to forecast accurately the complex series of development opportunities and decisions, including future building locations, sizes, configurations, uses, construction schedules, etc., that would comprise full implementation of the LRDP program.

project conforms to the assumptions and impact analyses presented in the 2014 LRDP EIR to determine what, if any, further CEQA documentation is necessary at that time. If specific project differences require significant changes to the 2014 LRDP EIR such that the project is not within the scope of the LRDP EIR or the specific impact statements and mitigation measures do not cover the individual project pursuant to CEQA Guidelines Sections 15168(c)(2) and 15168(c)(5), then appropriate, project-specific CEQA analysis would be tiered from this 2014 LRDP EIR in accordance with CEQA Guidelines Sections 15168(d)(1-3). This use of the Illustrative Development Scenario in connection with further approvals is subject to the overall limitations on subsequent review that have been stated elsewhere in this EIR. In particular, any development in excess of a net total of 5,400,000 gsf of occupiable (Research, Education, and Support) space would require an amendment of the LRDP and accompanying CEQA review.

If adopted, the provisions of the 2014 LRDP would become binding land use designations and policies for the University, and later projects carried out by the University would be required to be consistent with the 2014 LRDP (unless the LRDP is amended). In contrast, the descriptions contained in the Illustrative Development Scenario are not binding or governing policies, but the Illustrative Development Scenario would be part of the information that is considered in determining the appropriate form of CEQA review for later approvals of specific projects pursuant to the 2014 LRDP. Thus the scenario is illustrative, and it is provided in this EIR for the purpose of evaluating the development impacts that may occur pursuant to the proposed LRDP. Under the CEQA Guidelines, for later approvals based on a program EIR, the Illustrative Development Scenario may be considered (along with other information, and along with the overall limitations on subsequent review that have been stated elsewhere in this EIR) in determining whether the proposed later approval is within the scope of this EIR's analysis, or whether some level of further analysis is required under CEQA.

The Illustrative Development Scenario assumes ongoing demolition and construction activities over the course of the approximately 40-year planning period. Areas of soil and groundwater contamination at the RBC site would be addressed as part of the proposed project activities; this is further discussed in Section 3.9.

3.7.1 Demolition

In addition to showing new building space, the Illustrative Development Scenario depicts which existing buildings would be potentially demolished and removed; up to 750,000 gsf of outdated or underused facilities are not carried forward in the Illustrative Development Scenario. Demolition is considered for buildings and structures that are not cost-effective to upgrade, no longer suitable for modern science, costly to maintain, and not an efficient use of the site's buildable space. Most of the existing buildings are more than 40 years old, beyond the effective age of a typical laboratory building, and are relatively small, averaging about 9,600 gsf.

Active demolition project phases would generally proceed as follows: (1) determine any special site or building conditions due to historic contamination; (2) evaluate as necessary soil management, construction activities, and adherence to existing decision documents; (3) characterize building contents; (4) abate building materials hazards, including asbestos-containing materials, lead-based paint, and radioactive contamination, if any are present; (5) identify and remove reusable and recyclable materials; (6) demolish and remove the structure; (7) address hazards, if any, in soils in accordance with established protocols and regulatory oversight; (8) demolish and remove foundation and utilities; and (9) fill any holes, grade the site as necessary, and landscape the site or redevelop it with a new building. Existing concrete may be reduced to rubble and re-used on site to support sustainable redevelopment.

Demolition equipment would include large vehicles, stationary equipment, and hand-held equipment typical of that used in demolition and construction.

Table 3-5 identifies anticipated demolition activity levels under the 2014 LRDP. The table compares anticipated average and peak annual average levels of demolition activity, broken out into principal demolition parameters for analysis. The annual average is derived by dividing the total demolition gsf by a 40-year planning period. The anticipated peak demolition activity is assumed to be demolition of the majority of the existing Regatta property within a 12-month period. The calculation of truck trips assumes 10-ton haul trucks.

Table 3-5
Demolition Activity Levels

	Anticipated Average Demolition Project (12-month peak activity)	Anticipated Site-wide Average Annual Demolition Activity	Anticipated Peak Demolition Activity (12-month period)
Facilities Demolition	9,600 gsf	18,750 gsf	250,000 gsf
Weight (125 lbs/gsf)	600 tons	1,172 tons	15,625 tons
Truck Trips	60 truckloads	117 truckloads	1,563 truckloads

Notes:

gsf gross square feet
lbs pounds

3.7.2 Construction

Large project construction planning includes consideration of each project's environmental and regulatory elements. Construction activities usually include the need for adjacent lay-down areas for equipment, supplies, and fabrication activities, as well as construction-worker parking, typically on or near a job site. Under the 2014 LRDP, it is expected that large construction projects would not often occur simultaneously, although such projects may have some degree of overlap in schedules.

Construction would typically begin with demolition of existing facilities at a site, if necessary, followed by site clearing, soil investigation and management, and excavation work. At the RBC, preliminary steps include determination of any special site or building conditions due to historic contamination that should inform site work. Excavated soil would be adequately characterized and profiled so that it may be shipped off site during this phase, unless the project is a balanced cut-fill excavation. Soil must be evaluated for contamination prior to on-site reuse or off-site disposal. Reuse or disposal of soil would be in accordance with soil management plan requirements in a proposed RAW, if approved by DTSC, or subject to DTSC approval. Foundation work, building frame erection, and building finishing are the three major phases to follow. Under optimal conditions, site work for large RBC projects would typically be scheduled to occur between the months of April through September for optimal weather conditions, although it may occur in any month of the year, and the remaining phases may also take place at any time during any season.

Construction equipment would typically include large vehicles, stationary equipment, and hand-held equipment used on the building site and at nearby staging areas, and would be powered by diesel or gasoline engines or electricity. Such equipment would include cranes, scraper/dozers, spreader/compactors, loaders, drill rigs, haul trucks, cement trucks, bore drillers, rough terrain forklifts, pavers, rollers, and other rigs. All equipment would comply with applicable regulatory standards, including required noise, air emissions, safety, and energy efficiency standards.

For the purposes of this EIR, the term "construction," unless specifically indicated otherwise, includes building new facilities, rehabilitating or modifying existing facilities, demolishing existing facilities, and investigating and remediating contaminated soil. The maximum total new construction and renovation under the Illustrative Development Scenario is proposed to be 7,300,000 gsf. This includes approximately 300,000 gsf of existing space, 5,100,000 gsf of new occupiable building space construction, and 1,900,000 gsf of new parking structures. While parking structures are not considered part of the 2014 LRDP occupiable space totals, they account for potential construction-related impacts and are thus considered in this EIR analysis. Table 3-6 identifies the construction activity level for a typical construction project, divided into the major phases of construction. A 175,000 gsf project is used to represent the average new building size at the RBC. Table 3-6 also compares anticipated average and peak annual levels of construction activity.

Table 3-6
Construction Activity Levels

	Anticipated Average Construction Project (30 months total)	Anticipated Site-wide Average Annual Construction Activity	Anticipated Peak Construction Annual Average
Construction	175,00 gsf	175,000 gsf	600,000 gsf
Excavation & Replacement Volume	15,700 cubic yards	15,700 cubic yards	53,800 cubic yards
Soil Hauling	1,570 truckloads	1,570 truckloads	5,380 truckloads
Foundation	650 truckloads	650 truckloads	2,740 truckloads
Construction	3,400 truckloads	3,400 truckloads	14,380 truckloads
Total Truckloads	5,620 truckloads	5,620 truckloads	22,500 truckloads
Average Daily Truckloads	9 truckloads/day	9 truckloads/day	36 truckloads/day
Peak Daily Truckloads	25 truckloads	25 truckloads	100 truckloads

Note:
gsf gross square feet

The annual averages are approximately equivalent to one typical construction project being underway at all times at the RBC. The averages are derived by combining total project construction elements identified in the Illustrative Development Scenario (e.g., total square footage, footprint square footages, etc.) and then dividing these aggregates evenly over the 40-year planning period. In this way, the peak annual average construction activity level is over three times the annual average, or the equivalent of 3.4 typical construction projects being underway simultaneously. This activity level is intended to represent the maximum anticipated construction activity level for analytical purposes.

The excavation truck trips calculation assumes the use of 10-cubic-yard haul trucks. Project excavation estimates are based on Illustrative Development Scenario building footprints: an excavation perimeter is established 5 feet outside of and around each prospective building and its foundation. This formula is applied to each building or parking structure identified in the Illustrative Development Scenario. The structures were assumed to be an average of 4.5 stories high. While this volume is likely to be exceeded with some projects, others would require less excavation or would be balanced cut-fill excavations. Foundations are assumed to be approximately the area of the building footprints perimeter identified in the Illustrative Development Scenario and up to 10 feet deep. Per the above description, the excavated soil would be hauled in trucks, each assumed to hold 10 cubic yards. An average building project is estimated to require approximately 3,400 truckloads of materials, including rental equipment, concrete, structural steel, siding, building systems equipment, and interior finishing materials.

In accordance with LRDP Policy UI2, proposed development projects would incorporate measures to protect campus facilities from the amount of sea level rise anticipated through 2100. These measures could include raising the base elevation of parcels at the southern end of campus, using natural shore forms where practicable, and maintaining existing offshore wave sheltering structures.

3.8 OPERATIONS

While LBNL and UC Berkeley have a close existing partnership, they are distinct administrative entities of the University. Upon determination by the Regents to approve the 2014 LRDP and certify the associated Environmental Impact Report, UC Berkeley and LBNL are expected to establish a joint committee to oversee operations at the site. The committee would advise the LBNL Director and the UC Berkeley Chancellor on strategic and operational matters. However, UC Berkeley would continue to have ultimate administrative control of, and responsibility for, the Richmond properties (see also the Implementation section).UC Berkeley currently is responsible for land use and design process at the University's Richmond properties and would continue to be under the RBC LRDP. RBC implementation would be a unique cooperative effort of LBNL and UC Berkeley.

New RBC facilities built by either UC Berkeley or LBNL are expected to be operated by the respective institution. New facilities built by private sector entities would be subject to operational oversight by UC Berkeley or LBNL, as determined by the chancellor and director under the advice of the joint operating committee.

3.9 RFS CONTAMINATION

Between the mid-1800s and the late 1900s, the Richmond South Shoreline Area was home to numerous assembly and chemical manufacturing facilities, including the Kaiser Shipyards and Stauffer Chemical. The California Cap Company manufactured blasting caps, shells, and explosives on portions of the RBC site from the 1870s to the 1940s. When the University of California purchased the property in 1950, it obtained space and facilities for expanding research and academic programs for a growing post-World War II student population. However, along with owning the property the University became responsible for addressing legacy contamination from industrial activities that occurred prior to its ownership.

In 1999, the University began investigating site contamination under the oversight of the San Francisco Bay Regional Water Quality Control Board. The main contaminants identified were metals from the California Cap Company's mercury fulminate manufacturing plant and pyrite cinder waste that originated from sulfuric acid production at the former neighboring Stauffer Chemical plant. The metals included arsenic, cadmium, copper, lead, mercury, selenium, and zinc, some of which can be toxic to humans and wildlife if ingested (eaten) or inhaled as dust. Portions of Western Stege Marsh also contained low pH (acidic) orange-stained groundwater and sediments resulting from pyrite cinders disposed of in the marsh. In addition, an isolated area of polychlorinated biphenyl (PCB) contamination was found at a storm drain outfall in Meeker Slough.

UC Berkeley established a multi-year program to remove contaminants from the site. Work began in 2002 with removal of the largest areas of contaminated soil which were excavated, treated, and transported off-site to approved treatment and disposal facilities. Excavated areas were replaced with clean bay mud or clean dirt and restored with native marsh and coastal terrace prairie plants.

In 2005, after completion of removal of the major source areas, investigation and remediation oversight was transferred to the California Department of Toxic Substances Control (DTSC).

DTSC required additional soil and groundwater sampling of the upland portions of the site in addition to requiring the owner of the neighboring former Stauffer Chemical site to investigate and cleanup areas of groundwater contamination at the property boundary. In 2008, the California Department of Public Health and the Federal Agency for Toxic Substances Control and Disease Registry completed a Public Health Assessment for the Richmond Field Station and determined the site to be safe for normal activities.

With DTSC's approval, the University would conduct environmental actions to ensure there are no unsafe or unwarranted exposures to historic contaminants at the RBC site from former operations at the RFS. Because these actions are required prior to development of certain portions of the RBC site, they are considered part of the proposed project and would be implemented in concert with 2014 LRDP development. The actions would be conducted under a proposed RAW prepared in accordance with the California Health and Safety Code Section 25356.1(h)(1), if approved by DTSC, or pursuant to the existing site investigation and remediation order. The RAW would establish the remedy for certain portions of the project site that are defined as developable and designated for Research, Education, and Support land use in the 2014 LRDP and groundwater at the RFS.

The remedy would include site-wide prescriptive requirements, consisting of land use controls (deed restrictions and a soil management plan), and specific proposed cleanup actions, consisting of soil excavation at an area with mercury contamination from historical production of mercury fulminate, soil excavation at Building 120/Corporation Yard, soil excavation at select locations with PCB contamination, and groundwater remediation near Building 280B. The soil excavation areas are within the southern portion of the site, while the groundwater remediation would occur in the RBC site's north central portion. Continued investigation within the Natural Open Space areas of the RFS site would continue under the DTSC Order.

Should additional areas of contamination be identified in the RFS portion of the Research, Education, and Support area, they would be managed in accordance with the RAW and soil management plan under the oversight of DTSC.

Any groundwater remediation resulting from with trichloroethylene (TCE) contamination originating from the adjacent Campus Bay site, except for groundwater monitoring and dewatering related to construction, would be undertaken by Zeneca and would be under the oversight of the DTSC cleanup order for that site.

3.9.1 Site-Wide Prescriptive Actions under the Proposed Removal Action Workplan

If approved by DTSC, the prescriptive portion of the RAW would consist of deed restrictions and a soil management plan, which restrict use of the property to ensure against human exposure to contaminated soil, groundwater, or soil gas. These requirements apply to all areas within the Research, Education, and Support land use designation. The land use controls under the RAW would include:

- A recorded deed restriction that (1) prohibits soil excavation or movement unless conducted according to the soil management plan; (2) prohibits groundwater use or extraction, except for dewatering purposes (extracted groundwater would be handled in accordance with all applicable laws); and (3) prohibits residential use of the property.

- A soil management plan that describes soil sampling and management to be conducted prior to any excavation activities. The soil management plan is for property management to prohibit uncontrolled land excavation or disturbance activities that may expose workers and visitors to potentially unsafe exposures of environmental contaminants which may be present at the site. The soil management plan would include requirements and guidance for future environmental investigations including minimum standards for investigation, soil screening, and air monitoring. Sample results would be compared to pre-established screening criteria, and the soil would either be removed for off-site disposal or managed on site.

The soil volume estimated requiring off-site disposal at a Class I solid waste facility is between 1,000 and 5,500 cubic yards.

3.9.2 Specific Remedial Actions under the Removal Action Workplan

The following specific remedial actions consist of soil excavation and groundwater remediation:

- Soil at an area with mercury contamination above mercury commercial screening levels and soil at Building 120/Corporation Yard above commercial screening levels would be excavated and disposed of at an appropriately licensed off-site disposal facility. Excavation would be achieved using conventional excavation equipment such as backhoes and front-end loaders. Site preparation activities, such as clearing utilities, and clearing and grubbing, would be conducted. Excavation depths would not exceed the depth of groundwater. Decontamination facilities for equipment and personnel would be located at a centralized decontamination area. Off-site disposal of soil includes transportation and disposal of contaminated soil at an appropriately permitted landfill facility based on waste characterization sampling results. Clean soil and soil with contamination below the risk-based screening values would be placed and compacted in the excavation. The soil volume estimated requiring off-site disposal at a Class I solid waste facility is between 1,200 and 2,000 cubic yards.
- Soil with concentrations above the applicable PCB screening level would be excavated and disposed of at an appropriately licensed off-site disposal facility. Excavation would be achieved using conventional excavation equipment such as backhoes and front-end loaders. Site preparation activities, such as clearing utilities, and clearing and grubbing, would be conducted. Excavation depths are estimated at less than 2 feet below ground surface. Off-site disposal of soil includes transportation and disposal of contaminated soil at an appropriately permitted landfill facility based on waste characterization sampling results. Clean soil would be placed and compacted in the excavation. The soil volume estimated requiring off-site disposal at a Class I solid waste facility is 500 cubic yards.
- Groundwater treatment at Building 280B would consist of monitoring natural attenuation processes to reduce the mass of carbon tetrachloride concentrations without active intervention. Monitoring would consist of installing monitoring wells in and downgradient of the carbon tetrachloride and incorporating these monitoring wells in the RFS groundwater monitoring program. Should monitoring reveal unexpected increases in carbon tetrachloride concentrations or carbon tetrachloride detections at unexpected locations, active treatment such as in-situ bioremediation will be evaluated.