CHAPTER 4
ENVIRONMENTAL SETTING, IMPACTS, AND MITIGATION MEASURES

This chapter discusses the environmental setting, impacts, and mitigation measures for the 14 fully evaluated environmental resource areas. The resource areas and individual topic areas that were adequately addressed through the Initial Study are discussed in Section 6.5.

This chapter includes an overview of the cumulative impact analysis process. The cumulative impacts are discussed under each resource area throughout this chapter.

This chapter presents analysis of each resource area identified through preliminary environmental analysis and public scoping as likely to be affected by the proposed 2014 LRDP. This introduction summarizes the analytical approach, including key assumptions and data used in the analysis. The cumulative analysis methodology is included in this introduction, and cumulative impacts are discussed under each resource area throughout this chapter.

Scope of the EIR

The following EIR sections evaluate 14 resource areas identified in the CEQA Environmental Checklist (Appendix G) of the *State CEQA Guidelines*, as amended by Senate Bill 97 (Public Resources Code - Section 21083.0). Based on the input received during the EIR scoping process, as described in Chapter 1, Introduction, this EIR addresses the following resource areas or categories of impact in detail:

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

For each resource area listed above, the EIR describes the existing and future setting, the potential for the resource area to be significantly impacted by the proposed project, and recommended mitigation measures that may avoid, reduce, or compensate for any significant or potentially significant adverse impacts of the proposed project. A prior Initial Study (included in Appendix A) determined that the 2014 LRDP would not impact agricultural, forest, or mineral resources and would not result in certain specific individual impacts (or topics) for the resource areas that are addressed in this chapter. Each of the resource sections that follows clearly identifies those impacts that were adequately addressed in the Initial Study and are therefore not evaluated further in this EIR.

Definition of Baseline and Year of Analysis

State CEQA Guidelines Section 15125 requires that EIRs include a description of project area physical environmental conditions that exist at the time the NOP is circulated. These “baseline” physical conditions are normally used by the lead agency to measure changes that would result

from project implementation. The NOP for this Draft EIR was issued on January 4, 2013. Therefore, environmental conditions as of January 2013 represent the project baseline for CEQA purposes.

This EIR presents comparisons of anticipated 2014 LRDP development with baseline conditions to help the lead agency determine whether project implementation would substantially degrade or impact resources and/or significantly impact the environment.

Level of Significance

Under CEQA, a variety of terms are used to describe the levels of significance of adverse impacts. The definitions of terms used in this EIR are presented below.

- **Significant and Unavoidable Impact.** An impact that exceeds the defined standards of significance and cannot be avoided or reduced to a less than significant level through implementation of feasible mitigation measures.
- **Potentially Significant Impact.** An impact that exceeds or may exceed the defined significance standard and that can be avoided or reduced to a less than significant level through implementation of feasible mitigation measures.
- **Less Than Significant Impact.** Impacts that are adverse but that do not exceed the specified standards of significance.
- **No Impact.** The project would not impact a specified environmental resource.

Format of Resource Topic Sections

Each resource topic considered in this chapter is addressed under five primary subsections: Introduction, Environmental Setting, Regulatory Considerations, Impacts and Mitigation Measures, and References. An overview of the information included in these sections is provided below.

Introduction

The introduction section describes the topic to be analyzed and the contents of the analysis. It also lists relevant issues and concerns identified by agencies and the public during the Draft EIR scoping process.

Environmental Setting

This section describes the existing site and surroundings and those features or conditions that may be affected by the proposed project (e.g., existing land uses, existing soil conditions, existing traffic conditions, etc.).

Regulatory Considerations

This section presents relevant federal, state, and local laws, regulations, plans, and policies. Only those laws, regulations, and policies that are pertinent to the impact analysis are included.

Impacts and Mitigation Measures

Standards of Significance. Each resource topic included in this section identifies standards of significance used to evaluate impacts derived from Appendix G of the *State CEQA Guidelines* and the UC CEQA Handbook.

CEQA Checklist Items Adequately Addressed in the Initial Study. This subsection identifies and discusses the individual checklist items (also referred to as standards of significance) that are not evaluated in detail in this EIR.

Analytical Methods. This section summarizes the methodology used to estimate and evaluate the impacts. Impacts are evaluated quantitatively where possible and qualitatively where quantification is not feasible.

RBC 2014 LRDP Policies. This section presents the 2014 LRDP policies that are relevant to the resource. Because these policies would be binding on all future RBC projects, they are considered a part of the proposed project; impact significance is evaluated after considering the mitigating effect of the policies.

LRDP Impacts and Mitigation Measures. This section presents the environmental effects from the construction and operation of the 2014 LRDP using the standards of significance. All impacts are numbered (for instance, LRDP Impact AES-1 refers to the first impact under Aesthetics and Visual Quality) and shown in bold type. For each impact, a summary impact statement is presented along with a conclusion with respect to the impact's significance before and after mitigation. Mitigation measures are numbered to correspond to the impact. Impacts and mitigation measures are numbered consecutively within each resource topic. This section also identifies and describes environmental protection practices, essentially measures that could be implemented to further reduce the magnitude of impacts that already fall below the standard of significance. Unlike mitigation measures, these practices are not required to be implemented as part of the project. Projects will, however, be asked to consider and incorporate these measures, and implementation will be monitored in the ongoing mitigation monitoring and reporting program.

Cumulative Impacts and Mitigation Measures. Cumulative impacts that may result from the project are discussed at the end of each resource section. The approach used to evaluate cumulative impacts is summarized in Cumulative Impact Analysis section below.

References

This section lists the references used to prepare the environmental setting and impact analysis for each resource section.

Cumulative Impact Analysis

CEQA Guidelines Section 15355 defines cumulative impacts as two or more individual effects which, when considered together, are substantial or which compound or increase other environmental impacts. A cumulative analysis describes the "incremental impact of the project when added to other, closely related past, present, or reasonably foreseeable probable future projects" which can result from "individually minor but collectively significant projects taking place over a period of time."

Cumulative impacts that may result from or be compounded by the project are discussed in the appropriate Chapter 4 sections. Each Chapter 4 section describes the cumulative setting for the individual resource area along with cumulative growth under specific projects and long-term development plans.

To project a cumulative framework to the LRDP planning year of 2050, the EIR cumulative impact analysis relies on long-range planning and policy documents that forecast population, employment, and land use patterns. This includes all relevant general plans, specific plans, and other long-range planning documents for which a jurisdiction has adopted growth, development, and land use policies. In this case, such documents include the City of Richmond General Plan 2030 and the South Shoreline Specific Plan (under development). This approach is consistent with CEQA Guidelines Sec. 15130(b), which recommends analysis of a "summary of projections

from adopted local, regional, statewide plan, or related planning documents, that describes or evaluates conditions contributing to a cumulative effect."

The Richmond General Plan 2030 includes policies, land use goals, and population, employment, and housing forecasts through 2030. Since full LRDP development is expected to occur through 2050, the cumulative analysis may consider other regional or statewide planning and land use documents that include forecasts through the 2050 timeframe. The South Shoreline Specific Plan tiers off the General Plan 2030 and proposes land use categories and densities to enhance the economic, residential, and recreational vitality of this area. The General Plan is discussed in detail below.

Although local plans project well into the future, they do not correspond to the development time frame of the 2014 LRDP. In many instances, such plans also lack sufficient detail to enable thorough aggregation of area-wide growth and impacts with LRDP growth and impacts. The risk that these plans may become outdated, may no longer be accurate due to changed circumstances, or may be based on a shorter planning horizon must be factored when considering this analysis.

Pursuant to CEQA requirements, the cumulative impacts analysis should also consider relevant past, present, and probable future projects for the 2014 LRDP programmatic project components. The South Shoreline Specific Plan is expected to tier off the General Plan 2030 and propose land use categories and densities to enhance the economic, residential, and recreational vitality of this area.

For the 2014 LRDP, the cumulative setting includes foreseeable development plans and policies in the Richmond Southern Shoreline Planning Area and other areas where plan or specific projects may contribute to the cumulative setting, given the timeframe applicable to development under the LRDP. The cumulative development assumptions include several projects in the vicinity of the RBC site that either are under construction or are approved and awaiting construction. In addition, the cumulative development assumptions include projects anticipated under applicable zoning and development ordinances and provisions and under the land use goals and policies of the previous and current general plans.

Cumulative Plans and Projects

The following is a list of past, present, or reasonably foreseeable plans and projects that comprise components of the cumulative setting that are considered for analysis of the impacts associated with the 2014 LRDP.

Information for Alameda is provided below in support of the impacts analysis of project alternatives presented in Chapter 6.

Richmond

Richmond General Plan 2030. This general plan was adopted by the City of Richmond in 2012. The RBS site is within the Southern Shoreline Planning Area, one of five designated planning areas under the General Plan.

The General Plan 2030 has an approximately 20-year planning horizon. However, the Plan does not anticipate when the development identified in the Plan would occur. In addition, the Plan's designation of a site or area for a certain use does not necessarily mean the site will be built or redeveloped within the next 20 years. Therefore, to determine a more realistic projection for

future development in the City, the Plan's population and job growth estimates use a "regional share" approach assuming that Richmond will capture a particular share of Contra Costa County's projected regional population and employment growth.

According to the General Plan, Richmond's share of regional population growth was 8.39 percent between 1980 and 2005. The Association of Bay Area Governments (ABAG) projects Richmond will capture 10.91 percent of regional population growth through 2030. However, because the goals and policies of the General Plan are geared to stimulate higher intensity development within the City, the General Plan assumes that Richmond will capture 13 percent of the regional population growth through 2030. The number of jobs that would be generated was calculated based on ABAG projected ratio of jobs to population for Richmond in 2030 (0.48 jobs per person). Based upon this methodology, the City estimated that there would be an increase in population of 30,147 and an additional 22,488 jobs under the General Plan. The City also estimated that approximately 15,548 housing units would be added under the General Plan.

The General Plan 2030 designates the RBC site as "Change Area 16: Southern Gateway." The Southern Gateway area is south of Interstate 580 (I-580) and east of Regatta Boulevard. The Southern Gateway area is envisioned as a revitalized area that would include a mixture of high-intensity light industrial and commercial uses anchored by a large-scale research and development campus at the RBC site. The General Plan envisions a vibrant mix of new and existing uses that would harmonize with ecologically-sensitive areas, maximizing Bay views and providing efficient connections to regional transportation routes, including I-80 and I-580, as well as the multimodal San Francisco Bay Trail. The area has been designated Business/Light Industrial consistent with this vision.

South Shoreline Specific Plan. The RBC site is within the Southern Shoreline Planning Area of the City of Richmond General Plan 2030. The South Shoreline Specific Plan is currently under preparation. The Plan area comprises the southeastern portion of the City of Richmond that is west and south of I-580. It includes areas designated for light industrial, commercial, and residential uses, and it includes the entire RBC site and adjacent sites. This plan tiers off the recently adopted City of Richmond General Plan 2030; therefore, it is anticipated that the Specific Plan will include policies promoting higher residential densities as well as policies promoting the continuation of industrial, research, and development uses. Given the location and size of the RBC site within the Specific Plan area, the planning efforts for the 2014 LRDP would be complemented by those for the Specific Plan, which anticipates development of the RBC though 2050.

Bio-Rad Laboratories Office/R&D Lab Upgrade Project. The project would construct one 16,888 square foot building to enclose office, research and development laboratory uses. The project site is located at 3110 Regatta Boulevard, adjacent to the RBC site, and is 3.95 acres in size. The proposed building would replace six existing dilapidated metal structures and accessory buildings with on structure. The new structure would be used for the same activities and sited within the same location on the property.

Marina Bay Ferry Terminal. The Water Emergency Transportation Authority is considering the construction of a ferry terminal on Richmond's south shoreline in the vicinity of Marina Way and Sheridan Point, west of the Ford Assembly Building. The project is currently undergoing environmental review with the City of Richmond.

Marina Bay/Trails Landscaping. The Richmond Public Works Department, in coordination with the Marina Bay Neighborhood Council, Parks and Recreation, and the Harbor Master, is

constructing pathway and public trail improvements that include landscaping, lighting, sidewalks, and parks. These improvements are being implemented in accordance with City's Landscape Management Master Plan.

Officer Bradley A. Moody Memorial Underpass. The Officer Bradley A. Moody Memorial Underpass project would construct a roadway undercrossing in place of the existing grade crossing on Marina Bay Parkway between Regatta Boulevard and Meeker Avenue. With increased rail activity in recent years and forecasts for growth in the future, long trains are more frequently traversing Richmond grade crossings. In the South Richmond Shoreline area, low maximum train speeds result in traffic blockages for 20-30 minutes at a time with no alternate access, as all north-south ingress and egress to this area is impacted at closely-spaced grade crossings.

The underpass at Marina Bay Parkway will reduce traffic congestion and allow emergency vehicles to access the Marina Bay Area unimpeded. Additionally, the project would improve access to proposed Water Emergency Transportation Authority ferries and improve air quality by reducing emissions of idling vehicles.

Ford Building Rehabilitation Project. The Ford Building Rehabilitation Project is redeveloping the former Ford Assembly Plant at the foot of Harbor Way into a mixed-use facility along the Richmond southern shoreline. The proposed mixture of uses would include offices, retail centers, industrial / research and development sites, restaurants, residential areas, the Rosie the Riveter Visitor Center, and the Craneway Pavilion event center. The building size is approximately 460,000 square feet.

Terminal One Development Project. The Terminal One Development Project would redevelop approximately 13.8 acres of shoreline property immediately east of Ferry Point and Miller/Knox Regional Shoreline Park and west of the Richmond Yacht Club and Brickyard Cove. Current development plans include constructing approximately 285 luxury condominiums on approximately 11 acres of the site. In addition, the project would develop an approximately 1.5-acre park and an open space area along the shore adjacent to and including the terminal pier. A new segment of the Bay Trail would be developed as part of this project.

Alameda

City of Alameda General Plan 2010. The general plan establishes the City of Alameda's development policies for the period 1990-2010. Its purpose is to guide residents, businesses, policymakers and elected officials in making choices about public and private activities that shape the City's physical environment. The general plan's policies reinforce five themes:

- Maintain the City's island setting, by making the shoreline more visible and accessible.
- Maintain the City's small town feeling by not constructing tall buildings, freeways, highway commercial strips, or vast tracts of look-alike housing.
- Respect the City's history by emphasizing restoration and preservation as essential to Alameda's economic and cultural environment.
- De-emphasize the automobile by supporting transit improvements, ferry service, reduction of peak-hour use of single-occupant vehicles, and creating enjoyable pedestrian environment.

- Support multi-use development on the Northern Waterfront by priority space for boating activities, retention of seaports and related industries, and extension of an existing residential neighborhood to a new 10-acre park.

The City has updated its general plan in recent years including the Housing Element in 2012 and the Transportation Element in 2011. Alameda Point is an individual element in the general plan.

Alameda Point Element. The cumulative setting for Alameda Point is generally the entire Alameda Point site (formerly NAS Alameda) and areas in the City of Alameda within half a mile of the site. The site has a land use designation of "Mixed Use." Goals and policies in the Alameda Point element are similar to those of the general plan. Additional themes include:

- Transportation—increase accessibility to local and regional transit systems, integrate pedestrian and bicycle usage, and preserve view corridors.
- Open Space, Conservation and Cultural Resources—provide open space and recreational opportunities to serve new residents and employees, and preserve Alameda Point's Historic District, buildings, development patterns, and open spaces.
- Health and Safety (including flood control, fire hazards, environmental cleanup, emergency management)—support improvement programs that address water quality, urban runoff, and flooding; mitigate factors that are conducive to fire hazards and identify effective means of dealing with fire hazards; continue support of cleanup of contaminated lands; and support integration of Alameda Point into the City of Alameda's Emergency Operations Plan.

Most of the former NAS Alameda runway area is now a National Wildlife Refuge. Approximately 50 acres of this area, located in the southwest corner of the current National Wildlife Refuge, are within the City and County of San Francisco. One of the guiding policies of the Alameda Point Element is to help maintain a National Wildlife Refuge that balances natural conservation with public access, education, and ship navigation.

Northern Waterfront General Plan Amendment. The Northern Waterfront General Plan Amendment was adopted in March 2007 to address the redevelopment of the area. It requires that development in the Northern Waterfront is sensitive to the character of Alameda and the unique waterfront setting. Guiding policies for housing are to provide a mix of housing types, densities, and affordability levels throughout the plan area, to support the development of "for-rent" and "for-sale" affordable housing units throughout the plan area, and to encourage and support the development of senior housing in the Northern Waterfront.

The plan also discusses specific policies for commercial development, such as to prohibit drive-through facilities, to encourage maritime and waterfront related job and business opportunities, and to encourage retail uses that offer recreational products and services. Traffic circulation is also an important theme in the plan, which aims to facilitate movement of vehicles, bicycles, and pedestrians.

Encinal Del Monte Master Plan. This master plan is intended to guide the repurposing and redevelopment of the Encinal Terminals, Del Monte Warehouse, and Chipman/Marina Cove II (Chipman) sites consistent with the General Plan Northern Waterfront goals and policies adopted in 2007. In 2009, the Alameda City Council rezoned the Encinal Terminals and Del Monte Warehouse sites for mixed-use development consistent with the General Plan policies for the area. The mixed-use zoning requires preparation of a master plan that will serve as the zoning code for the area and guide the redevelopment of the property consistent with the policies and

goals of the General Plan. This master plan also includes updated standards and requirements for the development of the Chipman site, which was previously planned and rezoned for residential use in 2000 as part of the adjacent Marina Cove neighborhood.

Marina Cove II Subdivision. The City of Alameda proposes to construct a residential subdivision of single family homes and below-market-rate duplexes on an approximately 7-acre waterfront site. The project site is located between the waterfront and Buena Vista Avenue, east of Entrance Road. Four new residential streets would extend across the project site. Each home would have an attached two-car garage and driveways would provide an additional 198 off-street parking spaces. As part of the project, an additional 0.15-acre lot would be developed along the west side of the site as public open space.

Webster Street Vision Plan. The vision plan for Webster Street was proposed by the City of Alameda in 2010. The plan seeks to improve the Webster Street area as a recognized, regional arterial as identified in the general plan. The plan proposes to divide Webster Street – which is currently a single commercial district – into four distinct districts. The four districts are Gateway (Tubes to Atlantic Avenue), Avenue (Atlantic to Lincoln Avenue), Main Street (Lincoln to Central Avenue), and Anchor (Central Avenue to Crab Cove). The plan includes specific recommendations for street improvements, such as curb extensions, pedestrian scale street lights, banners, street trees, and street furniture.

4.1 AESTHETICS AND VISUAL QUALITY

4.1.1 Introduction

This section discusses existing visual resources and analyzes the potential for development under the proposed 2014 LRDP to affect those resources. The physical characteristics of the project site and surrounding areas are discussed briefly. For a more detailed description of land uses, refer to Section 4.9, Land Use and Planning.

Public and agency NOP comments related to aesthetics and visual quality are summarized below:

- The EIR should analyze the effects of additional human activity on the shoreline's aesthetics;
- The EIR should analyze the aesthetic effects of new buildings on this lightly developed shoreline area.

4.1.2 Environmental Setting

The approximately 134-acre RBC site is at 1301 South 46th Street in the City of Richmond South Shoreline area, approximately 5 miles northwest of the UC Berkeley campus and the LBNL site in Berkeley. The City of Richmond is on land that projects into San Pablo Bay, San Pablo Strait, and San Francisco Bay. The San Pablo Potrero Hills rise to 400 feet above sea level along the Richmond shoreline in a northwest direction, abruptly ending just southwest of the Richmond Inner Harbor at Brooks Island. In contrast to the dramatic San Pablo Potrero Hills, most of the Richmond shoreline (including the proposed project site) is in the coastal lowlands.

The project site is bounded on the west by a PG&E service station, Bio-Rad Laboratories, and Meeker Slough; 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 Trail. I-580 runs parallel to Meade Street along the northeastern site boundary. The RBC site generally consists of upland areas developed with buildings used for academic, research, and privately leased activities; a north-south oriented grove of mature eucalyptus trees in the central portion of the site; coastal grassland areas; a tidal salt marsh (known as the Western Stege Marsh); and a transition zone between the upland areas and marsh. Grasslands occur in a number of meadows and comprise about 14 acres of the RBC site. The Bay Trail is south of the site.

The site is currently developed with 1,050,000 gsf of facilities, including more than 500,000 square feet of research space, the NRLF, and the EPA. The existing upland parcels are currently developed with approximately 80 one- and two-story buildings, roadways, parking lots, and landscaped areas. The majority of the existing buildings are 45 years old or older. The uplands area also contains previously disturbed, currently undeveloped open space. Land uses surrounding the RBC site include industrial and office uses, a major interstate freeway, and low-to-medium-density residential neighborhoods. Regatta Boulevard, along the northern 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 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 Meade Street boundary.

4.1.3 Regulatory Considerations

Federal

There are no specific federal regulations pertaining to land use consistency or compatibility that would apply to the evaluation of visual resources.

State

California Scenic Highway Program: Section IV of the California Department of Transportation (Caltrans) Guidelines for the Official Designation of Scenic Highways defines a Scenic Corridor as the area of land generally adjacent to and visible from the highway. No California Scenic Highways exist in the project viewshed, so no state regulations pertaining to scenic resources are applicable.

Local

The RBC site is University-owned property where work within the University's mission is performed on land owned or controlled by The Regents. As a state entity, the University is exempt under the state constitution from compliance with local land use regulations, including general plans and zoning. The University seeks to cooperate with local jurisdictions to, the extent feasible, to reduce any physical consequences of potential land use conflicts. The following sections summarize provisions in the Richmond Municipal Code and policies from the City of Richmond General Plan as they relate to visual resources (City of Richmond 2011).

City of Richmond Municipal Code

The Richmond Municipal Code development standards guide City development practices and protect valued scenic corridors and views. The municipal code guidelines aim to create standards encouraging development of new and innovative structures while maintaining established natural and man-made views important to the City of Richmond. Article 15 of the City of Richmond Municipal Code establishes the zoning land use, design guidelines, and development protocols.

City of Richmond General Plan

The City of Richmond General Plan 2030 Land Use and Urban Design Element contains the following policies related to visual quality (City of Richmond 2011):

LU5.3 Land Use Compatibility: Require sufficient visual open space or landscaped screening between industrial operations and adjacent to residential or recreational activities to create adequate buffers.

LU5.B Design Guidelines: Develop design guidelines and standards for all land uses and development prototypes. The guidelines would build on zoning codes to promote high-quality design. Guidelines should also address compatibility between new and existing historic structures and districts, residential and adjacent non-residential uses and urban and natural areas.

LU5.C Industrial Use Buffers: New industrial uses established adjacent to existing residential or commercial uses shall incorporate measures to minimize impacts to residential uses such as enclosure of industrial activities in buildings, use of screening for visually unattractive uses, site design, soundproofing and landscaping.

The 2030 General Plan EIR determined that the effects on aesthetics and visual resources from future development pursuant to the General Plan would be significant and unavoidable. Although development could improve aesthetic quality at a local level, views and scenic vistas could be substantially impacted. No mitigation is available for this impact. New sources of light and glare would be introduced. Mitigation measures would be implemented to reduce light and glare

impacts, but the impacts would remain significant and unavoidable. Cumulative impacts would also be significant and unavoidable.

4.1.4 Impacts and Mitigation Measures

Standards of Significance

The impacts on aesthetics and visual resources from the implementation of the 2014 LRDP would be considered significant if they would exceed the following Standards of Significance, in accordance with Appendix G of the *State CEQA Guidelines* and the UC CEQA Handbook:

- Substantially degrade the existing visual character or quality of the site and its surroundings;
- Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway;
- Have a substantial adverse effect on a scenic vista; or
- Create a new source of substantial light or glare that would adversely affect day or nighttime views in the area.

CEQA Checklist Items Adequately Addressed in the Initial Study

The NOP Initial Study analysis concluded that further analysis of the following issues was not required in the EIR:

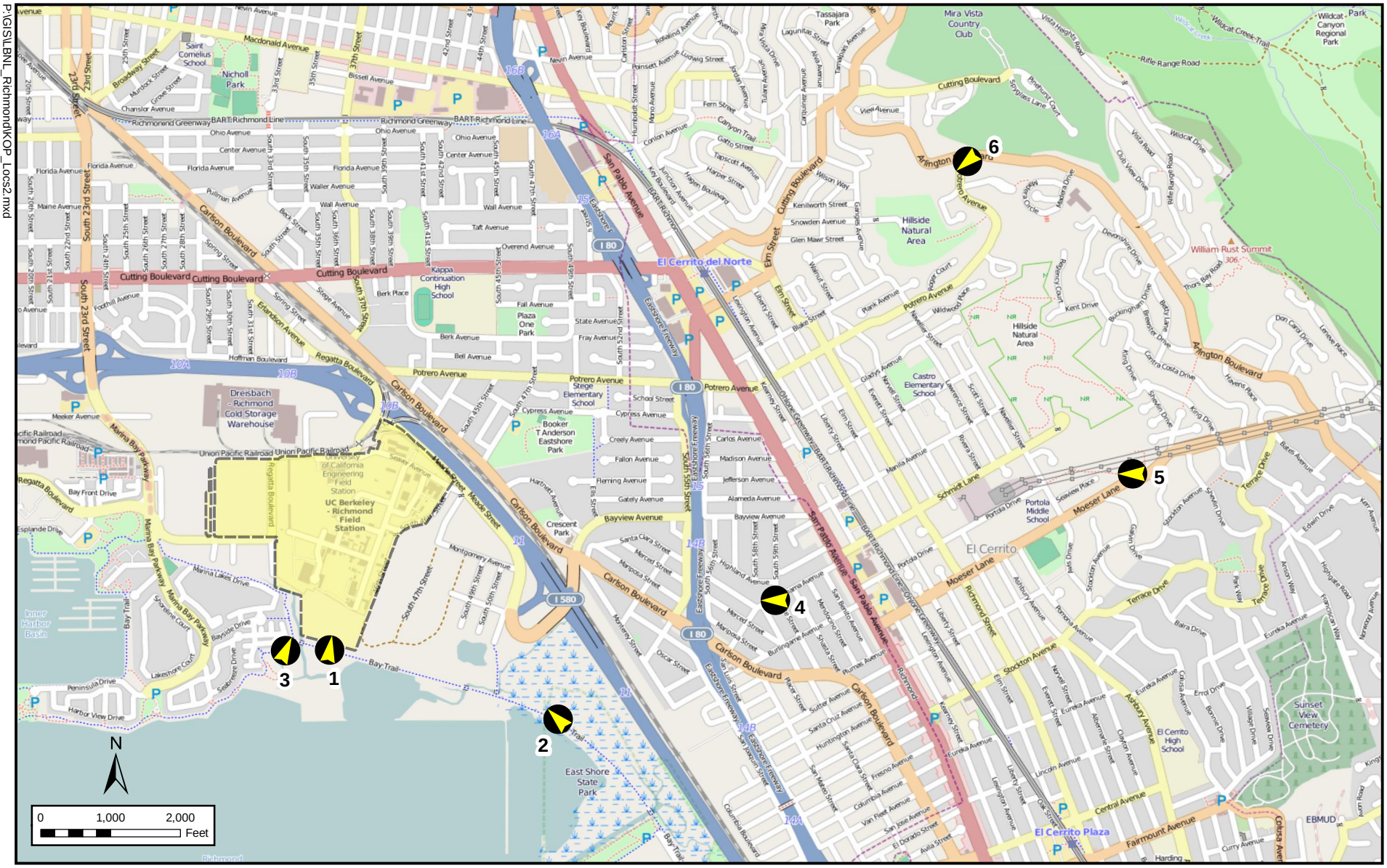
- Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway.

The Initial Study determined that the RBC site does not contain scenic resources and is not on or near a state scenic highway. Regional access to the site is by I-80 and I-580. Portions of I-580 are designated as scenic—from its junction with State Route 24 to the San Leandro city limit, and a portion in eastern Alameda County away from the project area. Therefore, no impact would occur to scenic resources within a state scenic highway. The remaining checklist items are analyzed below.

Analytical Methods

Applicable planning documents (including City of Richmond documents) were reviewed to identify the types of land uses intended for the area, along with the guidelines for visual resources protection or preservation. Consideration was given to the existing visual setting in the project viewshed (defined as the geographical area in which the project can be seen). The project's potential visual changes were assessed to determine impact significance, following the CEQA Guidelines checklist questions listed above. Potential project impacts were evaluated using a public viewpoint analysis, among other tools and information sources. Viewpoints representing the most sensitive locations from which the project would be seen were analyzed and simulated. Visual simulations of the proposed development are on Figures 4-1 to 4-7. Once all potential impacts were examined, impact significance was determined based on CEQA standards, and appropriate mitigation measures were identified. Under CEQA, any required mitigation must be feasible and specific to an identified impact. Because perception of aesthetic impacts is inherently subjective to individual observers, a conservative interpretation of the analysis is used in this EIR.

P:\GIS\BNL_Richmond\KOP_Locs2.mxd



Key Observation Point (KOP) Location

Proposed Project Location

Key Observation Point Locations

Richmond, California

TETRA TECH

Figure 4-1

Source: ArcGIS Online, OpenStreetMap and contributors.

RBC Site, 2013 existing conditions. Northward view from key observation point 1.
(Photograph taken 2/9/2013).

RBC Site, 2050 Illustrative Development Scenario conditions.
Northward view from key observation point 1.
(Conceptual simulation does not depict building articulation or details).

Key Observation Point 1 Visual Simulation

TETRA TECH

Richmond, California

Figure 4-2

RBC Site, 2013 existing conditions. Northwestward view from key observation point 2.
(Photograph taken 2/9/2013).

RBC Site, 2050 Illustrative Development Scenario conditions.
Northwestward view from key observation point 2.
(Conceptual simulation does not depict building articulation or details).

Key Observation Point 2 Visual Simulation

TETRA TECH

Richmond, California

Figure 4-3

RBC Site, 2013 existing conditions. Northeastern view from key observation point 3.
(Photograph taken 2/9/2013).

RBC Site, 2050 Illustrative Development Scenario conditions.
Northeastern view from key observation point 3.
(Conceptual simulation does not depict building articulation or details).

Key Observation Point 3 Visual Simulation

TETRA TECH

Richmond, California

Figure 4-4

RBC Site, 2013 existing conditions. Westward view from key observation point 4.
(Photograph taken 2/9/2013).

RBC Site, 2050 Illustrative Development Scenario conditions.
Westward view from key observation point 4.
(Conceptual simulation does not depict building articulation or details).

Key Observation Point 4 Visual Simulation

TETRA TECH

Richmond, California

Figure 4-5

RBC Site, 2013 existing conditions. Westward view from key observation point 5.
(Photograph taken 2/9/2013).

RBC Site, 2050 Illustrative Development Scenario conditions.
Westward view from key observation point 5.
(Conceptual simulation does not depict building articulation or details).

Key Observation Point 5 Visual Simulation

TETRA TECH

Richmond, California

Figure 4-6

RBC Site, 2013 existing conditions. Southwestward view from key observation point 6.
(Photograph taken 2/9/2013).

RBC Site, 2050 Illustrative Development Scenario conditions.
Southwestward view from key observation point 6.
(Conceptual simulation does not depict building articulation or details).

Key Observation Point 6 Visual Simulation

TETRA TECH

Richmond, California

Figure 4-7

RBC 2014 LRDP Policies

The RBC 2014 LRDP policies related to aesthetics and visual quality resources include the following:

- LU5 – Land Use Policy on Community: The Richmond Bay Campus will be an asset to residents of local East Bay communities.
  - Provide programs and facilities on site that can be used for education and outreach to the local community including an arts program that helps to establish the campus as a visitor destination.
  - Support integration of the campus into the Richmond South Shoreline Area; remove peripheral fencing as adequate population is achieved; and consider adjacent uses in decisions on building siting and design.
  - Allow convenient multi-mode access to the campus and promote public transit, bicycle, and pedestrian transportation modes.
  - Identify Lark Drive and Regatta Boulevard as urban streets where the public realm will be designed to support a pedestrian environment with retail and other amenities to integrate with the neighboring community fabric.
- LU4 – Land Use Policy on Growth: Ensure that the campus grows in a logical and cost-effective manner.
  - Retain existing uses on campus for as long as possible and evaluate opportunities to retain or relocate uses on -site for the long term.
  - Concentrate development to preserve future capacity while maintaining natural areas.
  - Create complete collections of buildings and open spaces as development progresses.
  - Phase growth to create the critical mass of activities and population needed to support amenities.
  - Plan and develop infrastructure to allow logical and cost effective extensions to support future development.
  - Implement LRDP provisions for development undertaken by the private sector for synergistic uses by public or private entities.
- S3 – Sustainability Policy on Site Development: Embody environmental stewardship and respect the unique character of the Richmond Bay Campus in site development.
  - Draw on the neighborhood context and prominently feature the natural assets including climate, wetlands, and proximity to the San Francisco Bay and the Bay Trail.
  - Actively promote sustainability as a core value at the campus and provide practical opportunities for innovation and education in sustainable design.
  - Manage soil contamination as a component of each construction project.

LRDP Impacts and Mitigation Measures

LRDP Impact AES-1: Development under the 2014 LRDP could substantially degrade the existing visual character and quality of the RBC site and its surroundings. (*Potentially Significant; Less than Significant with Mitigation*)

The RBC site has retained its historical industrial character. With the proposed project, existing development would be gradually replaced by a mixture of buildings and facilities with greater massing and density. RBC 2014 LRDP implementation would result in visual and aesthetic changes that could alter the site's character as visible from certain public vantage points. Such viewpoints include those from Regatta Boulevard, South 46th Street, and San Francisco Bay Trail. Changes would be associated with (1) demolition of specific existing buildings, (2) development of new buildings, (3) proposed landscaping and other on-site improvements, and (4) the pattern of clustered development. Implementation of any major new campus development would likely result in the construction of buildings and increased traffic in the area.

Any major new campus projects would be reviewed at each stage of design by the UC Berkeley Design Review Committee. The project provisions would be guided by the RBC 2014 LRDP, the Physical Design Framework for the RBC, and neighborhood concept plans or project specific design guidelines prepared for each such project. They would also be subject to design review and approval by The UC Regents or their designee.

Each neighborhood would have a central space around which concentrations of active uses—dining, meeting rooms, recreation or building lobbies—would be focused. According to the RBC 2014 LRDP, these central spaces might also have an iconic element such as a vertical marker of substantial height, sculpture, fountain, or other landscape element to act as a place-making and orienting device. These spaces would be designed to create a more collegial environment that encourages and facilitates interaction among employees and guests. The specific configuration and design of new development within these neighborhoods would be guided by the Physical Design Framework and concept plans cooperatively developed by LBNL and UC Berkeley.

Approximately 25 acres would be designated Natural Open Space to preserve those areas the University plans to protect from development and maintain in their natural condition. Since new buildings would not be permitted to intrude into such preservation areas, and since new development would have a research character somewhat similar to that in surrounding land uses, the visual changes might not appear significant to some observers. However, such changes might be perceived by other observers as intrusive and substantially altering of the site's scenic background elements.

The site's visual character would continue to appear as buildings among grassland, trees and shrubs, and implementation of the LRDP Principles and Policies would be expected to reduce potential effects on visual character. Some new buildings allowable under the LRDP could be more visually intrusive than others, particularly from certain viewpoints. Many current buildings would be replaced by taller, larger, and/or more massive new buildings. 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 common, with heights of 100 feet for a five-story building. Also, for example, potential development would introduce substantial building massing in the mid-ground, behind the Western Stege Marsh and lowland areas, as viewed from the San Francisco Bay Trail. In addition, Regatta Boulevard and South 46th Street views would include new, larger mid-ground buildings even as the overall visual site character may appear relatively unchanged. As a result, it is anticipated that some observers might perceive

a substantial adverse change in the on-site visual character from construction of the campus or from construction of individual buildings. Because perception of aesthetic impacts is inherently subjective to individual observers, a conservative interpretation of the analysis is used in this EIR: the RBC 2014 LRDP development could alter the site's visual quality and character in a potentially significant manner.

Construction and demolition activities would also create temporary visual changes related to the presence of construction equipment, materials, and workforce, as well as debris and dust.

However, as noted, the site's visual character is of a historically industrial and currently research-institutional nature. Under LRDP development, older industrial and institutional buildings would be replaced by modern buildings of a somewhat similar nature, but the site's overall scale and density would increase over decades of RBC development. It is these latter elements that could potentially be aesthetically objectionable to some off-site viewers. Nevertheless, this project would not be constructed in a single phase or time period, but gradually over several decades. Therefore, the scale of change would not be so sudden as depicted in the "before" and "after" visual simulations in this chapter but would rather occur piecemeal, a single building or a few buildings at a time, over a very long (from a viewer's point of view) period. Even a viewer who spent decades in the site vicinity would be unlikely to experience campus development as a dramatic change, but rather as a series of small changes as older buildings were removed and new buildings were constructed. In addition, LRDP Mitigation Measure AES-1 would ensure that the existing visual character and quality of the RBC site would not be substantially degraded by a project under the LRDP or by development under the LRDP at full implementation. With implementation of LRDP Principles and Policies as well as mitigation measure LRDP MM AES-1, operational and construction-related impacts on visual character and quality would be less than significant.

LRDP MM AES-1: The University shall develop and implement a Physical Design Framework that protects the visual quality of both the on- and off-campus environments through provisions that address building scale, materials, and color schemes. The Physical Design Framework shall include best management practices and procedures for avoiding or minimizing aesthetic nuisances in demolition, construction, and operational phases of the project. Design review processes for planning of new buildings and development shall be clearly articulated and followed throughout the life of the project.

Increased RBC scale and density would be addressed in a number of ways through the Physical Design Framework and subsequent plans: buildings would be restricted in height and height zones would further restrict heights in certain locations. Building facades would be broken up by architectural and design features so as to minimize the appearance of mass and bulk. Reflective material would be restricted, which, would minimize the appearance of the new buildings particularly at greater distances. Trees and other landscaping features would be used to further break up, obscure, or minimize RBC development. Aesthetically objectionable appurtenances such as stacks, machinery, tanks, and HVAC systems on top of buildings would be sheltered from view wherever practical. Demolition debris and long-term construction supplies and equipment would be stored such that – to the extent practicable – they would not be visually intrusive from off-site viewpoints.

LRDP Impact AES-2: Development under the 2014 LRDP would not adversely affect any scenic vistas at the RBC site and its vicinity. (*Less than Significant*)

Views of the RBC site from public viewing points to the north are limited due to the presence of on- and off-site trees and the visual buffer of I-580. The most readily available public viewpoints are from the San Francisco Bay Trail and South 46th Street. Under the 2014 LRDP project, views from the San Francisco Bay Trail observation points would change, but not substantially. Foreground views would continue to comprise the marsh and lowland areas transitioning gently to the developed upland portion of the RBC site. In mid-ground views, anticipated project buildings would be visible; some of these new buildings would be built adjacent to existing structures, while others would replace existing structures. Due to the setback between the Bay Trail and the proposed site, views available to trail users are not expected to change significantly.

The RBC site has natural areas on and near it, such as the San Francisco Bay, Western Stege Marsh, and coastal grasslands. Because the area topography is relatively flat, panoramic views from the RBC site of San Francisco Bay, the Bay Bridge, and the San Pablo Potrero Hills are available in the background, while views of marsh and coastal grasslands are available in the foreground and mid-ground. With implementation of the RBC LRDP, on-site views will remain available from open spaces and plazas, as well as from buildings. Scenic vistas from viewpoints in the hills surrounding the RBC site would remain after campus development. Buildings may be tall enough to be visible, but are expected to alter a very small portion of scenic vistas of the Bay and other natural areas as viewed from these areas. Views would not be obstructed by campus development. Implementation of the RBC LRDP would have a less than significant impact on the view of scenic vistas, and no mitigation would be required.

Mitigation Measure: No mitigation measure is required.

LRDP Impact AES-3: Development under the 2014 LRDP would create new sources of light and glare that would not adversely affect regional day or nighttime views. (*Less than Significant*)

With the inclusion of new buildings and facilities, RBC development could create new sources of light and glare visible from off-site viewpoints. The proposed campus buildings would require on-site nighttime lighting for safety and security. Such new light sources would include exterior building illumination; lighted facilities; parking lots or structures; vehicle headlights; and glare from reflective building, pavement, and vehicle surfaces. Because project lighting would be designed to limit off-site light spill and because the project site is relatively far from residential areas, there is expected to be no appreciable effect on ambient light and glare conditions in sensitive surrounding areas. To the extent that light and glare associated with the project would be visible from off-site, they would be seen in the context of the extensive nighttime lighting that already characterizes the area. Project structures constructed pursuant to the 2014 LRDP would not include large areas of highly reflective material that would produce glare, so the proposed LRDP would not affect the amount of daytime glare in the area. The project site would be in an area planned for research and development with existing similar uses in the vicinity. For these reasons, projects under the RBC 2014 LRDP do not have the potential to create new sources of substantial light or glare that could have adverse impacts on day- or nighttime views.

In the event that nighttime construction activities take place, illumination that meets state and federal worker safety regulations would be required. The majority of nighttime construction work, if any, is anticipated for building interior work following the completion of exterior walls.

Task-specific lighting would be used to the extent practical while complying with worker safety regulations.

LRDP ENVIRONMENTAL PROTECTION PRACTICES AES-3a, AES-3b, and AES-3c are not required but could be implemented to further reduce the magnitude of these less than significant effects.

LRDP ENVIRONMENTAL PROTECTION PRACTICE AES-3a:

Lighting for new development projects could be designed to include shields and cut-offs that minimize light spill onto unintended surfaces and minimize atmospheric light pollution.

LRDP ENVIRONMENTAL PROTECTION PRACTICE AES-3b:

To reduce off-site lighting impacts, lighting at the campus could be restricted to areas where it would be required for safety, security, and operation. Exterior lights could be hooded, and lights could be directed on-site so significant light or glare would be minimized. For areas where lighting is not required for normal operation, safety, or security, switched lighting circuits could be provided, allowing these areas to remain dark at most times, minimizing the amount of lighting potentially visible off-site. In parking lots, lights could be equipped with motion sensors that reduce the lights to half of their brightness when no motion is detected.

LRDP ENVIRONMENTAL PROTECTION PRACTICE AES-3c:

As part of the design review procedures, light and glare could be given specific consideration, and measures could be incorporated into the project design to minimize both. In general, exterior surfaces would not be reflective; architectural screens and shading devices are preferable to reflective glass.

Cumulative Impacts and Mitigation Measures

LRDP Cumulative Impact AES-1: **Development under the 2014 LRDP together with regional cumulative development would not result in cumulatively considerable impacts on the area's visual quality and scenic viewshed. (*Less than Significant*)**

The RBC site area is designated as a "Change Area" in the City of Richmond General Plan 2030 (City of Richmond 2011). The area is identified as "CA-3 – Ford Peninsula in Marina Bay" in the General Plan. Currently, large industrial and office buildings characterize the Ford Peninsula area. The eastern section of the Ford Peninsula area, about 2 miles from the project site, is envisioned as a mixed-use waterfront district around the marina that takes advantage of the easy access to regional freeways, waterfront location, dramatic views, and nearby employment. A new ferry terminal is proposed in this area. Development of a transit-oriented, high-intensity urban center supporting a ferry terminal within a few miles from the RBC site might contribute to a substantial cumulative aesthetic impact in that area. Views of the high intensity residential, commercial and entertainment uses after the development of the ferry terminal area would be experienced by two sensitive receptors, the San Francisco Bay Trail users and private property owners in the hills. These ferry terminal area improvements would be sufficiently distant so as not to be part of the same viewshed as the proposed RBC project.

Enhancements to the San Francisco Bay Trail are identified in the City of Richmond General Plan 2030 (City of Richmond 2011). Currently, several improvements are being considered along the

shoreline and marina to create a distinctive waterfront promenade. Shoreline development would incorporate a variety of open spaces including parks and plazas accented with native and drought tolerant landscaping. These enhancements would add to the viewshed of the nearby sensitive receptors of the proposed RBC site and would contribute to a beneficial cumulative impact.

Areas to the north and west of the site are largely built out. No substantial new development is proposed in those areas, and much of the surrounding area would remain industrial without much forecasted change. Because other development associated with Marina Bay is not expected to coincide with the RBC LRDP timeframe and is not part of the same viewshed, the cumulative aesthetic effects of the proposed project would be less than significant.

LRDP Cumulative Impact AES-2: Development under the 2014 LRDP together with cumulative development in the region would create new sources of light and glare that would not result in cumulatively considerable impacts on regional day or nighttime views. (*Less than Significant*)

Development of the RBC would add to the existing sources of light and glare in the project site. Exterior and interior lighting associated with buildings, parking lots, and other facilities, combined with illumination of roadways and walkways, would add to the sources of nighttime illumination and glare. As discussed above, these new sources of light and glare would not be substantial and would be mitigated through design measures; they would also be distant from sensitive receptors. They would often not be in the same viewshed as other cumulative light and glare sources in the region. Because of that and because the RBC site is included in the area envisioned to change in the City of Richmond General Plan 2030 (City of Richmond 2011), the project's contribution to this cumulative impact would not be considerable.

4.1.5 References

City of Richmond. 2011. *Richmond General Plan 2030.* August 2011.

University of California. 2013. Richmond Bay Campus Long Range Development Plan, Community Draft. August 12, 2013.

4.2 AIR QUALITY

4.2.1 Introduction

This section discusses existing air quality conditions and analyzes the potential for development under the proposed 2014 LRDP to affect those conditions. Section information and analysis is based on data obtained from BAAQMD and an air quality analysis technical report prepared by Golder Associates, Inc. (Golder Associates, Inc. 2013).

Air quality impacts from the emissions of criteria air pollutants and toxic air contaminants (TAC) are considered in this section. The analysis addresses both temporary emissions from construction and demolition activities on the RBC site and long-term emissions from increased vehicle traffic projected to travel to and from the RBC site and new mechanical equipment that would be installed on the project site as the campus is developed. Greenhouse gas (GHG) emissions are addressed in Section 4.6.

Public and agency NOP comments related to air quality are summarized below:

- The project design should include ways to minimize air quality impacts from vehicle traffic emissions.
- The EIR should address the air quality impacts of hazardous materials remediation, including construction equipment emissions, in a manner consistent with the regulatory requirements.
- The EIR should address the impacts of potential radionuclide releases into air.

These issues are addressed in the sections that follow.

4.2.2 Environmental Setting

Air quality is a measure of the extent to which airborne chemicals are present in quantities sufficient to adversely affect human health and the environment. Common sources of air pollutants are motor vehicles, machinery and equipment, and commercial and industrial processes (such as smelting and dry cleaning). Natural processes such as volcanic eruptions and the decomposition of plant matter also contribute to air pollution. In addition to harming human health, air pollutants can cause effects such as reducing visibility (dust and smog) and contributing to climate change.

Because outdoor air continuously moves and mixes, outdoor air quality is generally assessed at a regional rather than local level. Pollutants released to outdoor air are more concentrated near an emissions source, but over time they disperse and have a regional impact. Pollutant movement in air is influenced by conditions such as wind, topography, and temperature.

The proposed RBC site is in the San Francisco Bay Area Air Basin (Air Basin). The primary factors that determine the Air Basin's air quality are air emissions' source locations, quantities, and types. Meteorological and topographical conditions also are important factors. Meteorological conditions, such as wind speed, wind direction, and variations in the air temperature at different heights above the ground, interact with the physical features of the landscape affecting the movement and dispersal of air pollutants.

Criteria Pollutants

Common air pollutants include carbon monoxide (CO), sulfur dioxide (SO_2), nitrogen oxides (NOx), ozone, lead, and particulate matter (PM). The US Environmental Protection Agency (EPA) refers to these as criteria pollutants and uses them as indicators of air quality. Air quality in

the basin is assessed by comparing concentrations of criteria pollutants to federal and state standards. The federal standards are known as the National Ambient Air Quality Standards (NAAQS). California has adopted similar and generally more stringent standards known as the California Ambient Air Quality Standards (CAAQS).

For each criteria pollutant an Air Basin is designated as attainment or unclassified if pollutant concentrations are below the standard for that pollutant, and as nonattainment if concentrations exceed the standard. The Air Basin is designated as nonattainment for the federal 8-hour ozone and 24-hour fine particulate matter less than 2.5 microns in diameter ($PM_{2.5}$) standards. The Air Basin is designated as nonattainment for the state ozone, inhalable particulate matter less than 10 microns in diameter (PM_{10}), and $PM_{2.5}$ standards. The Air Basin is designated as attainment or unclassified for the other NAAQS and CAAQS (BAAQMD 2013a). The state and national standards and the Air Basin's attainment status are presented in Table 4.2-1.

BAAQMD monitors air quality in the Air Basin by collecting and analyzing air samples at monitoring stations throughout the region. Each station monitors selected pollutants based on local and regional conditions. Data from these stations provide an indication of air quality in the area. The data may or may not be indicative of air quality at the RBC site due to the distance from the site to the monitoring stations and differences in weather and topography between the two. The monitoring station nearest the RBC site is the Richmond station 2.8 miles northwest. The next nearest stations are San Pablo 3.3 miles northwest and Oakland West 7.3 miles southeast. Recent monitoring data from these stations are presented in Table 4.2-2.

Toxic Air Contaminants

A group of pollutants that are known or suspected to cause cancer or other serious adverse health effects are referred to as TACs. TACs are defined in the California Health and Safety Code Section 39655(a) as air pollutants "which may cause or contribute to an increase in mortality or in serious illness, or which may pose a present or potential hazard to human health." The Clean Air Act (CAA) refers to TACs as hazardous air pollutants. TACs are emitted by fuel combustion sources such as the exhaust from motor vehicle engines, by industrial processes such as manufacturing, and by commercial processes such as dry cleaners and gasoline stations. TACs are less pervasive in the atmosphere than criteria pollutants, and there are no ambient air quality standards for TACs.

BAAQMD inventories TAC emissions, conducts new source reviews, and determines TAC control and reduction strategies. BAAQMD's 2010 inventory of TAC emissions in Contra Costa County is provided in Table 4.2-3.

A TAC of particular concern in Richmond is diesel particulate matter (DPM). DPM is particulate matter emitted in the exhaust of diesel engines. DPM is known to cause cancer and respiratory illnesses and increase the risk of heart disease (California Air Resources Board [ARB] 2007). According to the City of Richmond General Plan, "DPM per square mile per year released in Richmond is six times higher than the [Contra Costa] County average and 40 times higher than the state average. More than 60 percent of the diesel pollution in Richmond comes from ships and commercial vessels, about 20 percent from diesel locomotives, and about 10 percent each from heavy duty trucks and construction equipment" (City of Richmond 2011).

Sensitive Receptors

Sensitive receptors are individuals or groups that are more susceptible to air pollution effects than the population at large. While the ambient air quality standards are designed to protect public health and are generally regarded as conservative for healthy adults, there is greater concern to

Table 4.2-1
State and National Ambient Air Quality Standards and Attainment Status

Pollutant	Averaging Time	California Concentration	California Attainment	National Concentration	National Attainment
Ozone	8 hours	0.070 ppm (137 µg/m^3)	Nonattainment	0.075 ppm	Nonattainment
	1 hour	0.09 ppm (180 µg/m^3)	Nonattainment	None	Not applicable
Carbon Monoxide	8 hours	9.0 ppm (10 mg/m^3)	Attainment	9 ppm (10 mg/m^3)	Attainment
	1 hour	20 ppm (23 mg/m^3)	Attainment	35 ppm (40 mg/m^3)	Attainment
Nitrogen Dioxide	1 hour	0.18 ppm (339 µg/m^3)	Attainment	0.100 ppm	Unclassified
	AAM	0.030 ppm (57 µg/m^3)	Unclassified	0.053 ppm (100 µg/m^3)	Attainment
Sulfur Dioxide	24 hours	0.04 ppm (105 µg/m^3)	Attainment	0.14 ppm (365 µg/m^3)	Attainment
	1 hour	0.25 ppm (655 µg/m^3)	Attainment	0.075 ppm (196 µg/m^3)	Attainment
	AAM	None	Not applicable	0.030 ppm (80 µg/m^3)	Attainment
Particulate Matter (PM_{10})	AAM	20 µg/m^3	Nonattainment	None	Not applicable
	24 hours	50 µg/m3	Nonattainment	150 µg/m^3	Unclassified
Fine Particulate Matter ($PM_{2.5}$)	AAM	12 µg/m3	Nonattainment	15 µg/m^3	Attainment
	24 hours	None	Not applicable	35 µg/m^3	Nonattainment
Sulfates	24 hours	25 µg/m^3	Attainment	None	Not applicable
Lead	Calendar quarter	None	Not applicable	1.5 µg/m^3	Attainment
	30 day average	1.5 µg/m^3	Attainment	None	Not applicable
	Rolling 3-month average	None	Not applicable	0.15 µg/m^3	Unclassified
Hydrogen sulfide	1 hour	0.03 ppm (42 µg/m^3)	Unclassified	None	Not applicable
Vinyl Chloride (chloroethene)	24 hours	0.010 ppm (26 µg/m^3)	Unclassified	None	Not applicable

AAM = annual arithmetic mean; ppm = parts per million; mg/m^3 = milligrams per cubic meter; µg/m^3 = micrograms per cubic meter

Source: BAAQMD 2013a

Table 4.2-2
Data from Nearby Air Quality Monitoring Stations

	2010			2011		
	RH	**SP**	**OW**	**RH**	**SP**	**OW**
Ozone						
Maximum 1-hour concentration (ppb)	--	97	--	--	78	57
Days exceeding the state 1-hour standard	--	1	--	--	0	0
Maximum 8-hour concentration (ppb)	--	81	--	--	58	48
Days exceeding the state 8-hour standard	--	1	--	--	0	0
Days exceeding the national 8-hour standard	--	1	--	--	0	0
Carbon monoxide						
Maximum 1-hour concentration (ppb)	--	--	2.7	--	1.9	3.5
Maximum 8-hour concentration (ppb)	--	--	1.7	--	1.0	2.7
Days exceeding the national or state standard	--	--	0	--	0	0
Nitrogen dioxide						
Maximum 1-hour concentration (ppb)	--	--	68.6	--	51	62
Maximum 24-hour concentration (ppb)	--	--	16	--	10	16
Days exceeding the national or state standard	--	--	0	--	0	0
Sulfur dioxide						
Maximum 1-hour concentration (ppb)	26.0	--	--	20.7	14.4	19.3
Maximum 24-hour concentration (ppb)	6.5	--	--	3.2	6.0	3.8
Days exceeding the national or state standard	0	--	--	0	0	0
PM_{10}						
Annual average ($\mu g/m^3$)	--	--	--	--	19.7	--
Maximum 24-hour concentration ($\mu g/m^3$)	--	--	--	--	73	--
Days exceeding the national standard	--	--	--	--	0	--
Days exceeding the state standard	--	--	--	--	1	--

RH = Richmond; SP = San Pablo; OW = Oakland West; ppb = parts per billion; $\mu g/m^3$ = micrograms per cubic meter; -- = no data

Raw data (i.e., data that have not yet been checked by BAAQMD for accuracy) for $PM_{2.5}$ are available for the Oakland West and San Pablo stations from January to early October 2013. As the data has not been verified, it is not reported in the table. The average $PM_{2.5}$ concentration at Oakland West during this time period was 12 $\mu g/m^3$, and the maximum concentration was 104 $\mu g/m^3$. At the San Pablo monitoring station, the average concentration was 11 $\mu g/m^3$, and the maximum was 68 $\mu g/m^3$.

Source: BAAQMD 2013b, 2013c

protect adults who are ill or have long-term respiratory problems, young children whose lungs are not fully developed, and older people. According to the ARB, sensitive receptors include children less than 14, persons over 65, and people with cardiovascular and chronic respiratory diseases.

BAAQMD identifies these land uses that may contain a high concentration of sensitive receptors: long-term health care facilities, rehabilitation centers, convalescent centers, retirement homes, residences, schools, playgrounds, child care centers, and athletic facilities. BAAQMD considers the relevant zone of influence for health risk assessment to be the area within 1,000 feet of the project boundary. The only sensitive receptors within 1,000 feet of the project boundary are the residences to the southwest of the RBC site in the Marina Bay neighborhood that are approximately 150 feet from the RBC development boundary.

Table 4.2-3
2010 Toxic Air Contaminant Emissions Inventory for Contra Costa County

Toxic Air Contaminant	Contra Costa County Emissions (pounds per year)	Toxic Air Contaminant	Contra Costa County Emissions (pounds per year)
Acetaldehyde	1,278.93	Hydrochloric acid mist	14,291.32
Acrolein	0.01	Hydrofluoric acid mist	4,616.70
Acrylamide	0.34	Hydrogen chloride	114,146.03
Acrylonitrile	20.17	Hydrogen fluoride	7208.63
Ammonia	1,134,465.74	Hydrogen sulfide	13,074.93
Arsenic	5.12	Isopropyl alcohol	17,742.69
Benzene	41,136.32	Lead	20.80
Benzyl chloride	0.07	Manganese	220.24
Beryllium	0.18	Mercury	248.33
Butadiene, 1,3-	139.01	Methyl alcohol	13,933.00
Cadmium	8.81	Methyl cellosolve	201.55
Carbon tetrachloride	2603.36	Methyl tertiary-butyl ether	26.09
Cellosolve acetate	40.07	Methylene chloride	18,507.77
Chlorine	1,983.64	Methylenedianiline	0.02
Chlorobenzene	317.55	Naphthalene	2,263.49
Chloroform	2,084.16	Nickel	270.36
Chromium (hexavalent)	7.15	Polycyclic aromatic hydrocarbons (benzo[a]pyrene equiv)	475.93
Cresol	4.96	Perchloroethylene	27,957.38
Dichlorobenzene	165.91	Phenol	1,078.36
Diesel engine exhaust particulate	6,192.09	Polychlorinated biphenyl	0.59
Diethanolamine	1,343.02	Propylene	1,815.72
Dioxane, 1,4-	19.47	Propylene glycol monomethyl ether	80.72
Ethyl chloride	116.06	Selenium	0.13
Ethylbenzene	3,601.61	Styrene	17,706.48
Ethylene dibromide	15.58	Sulfuric acid mist	10,279.75
Ethylene dichloride	94.84	Tetrachloroethane, 1,1,2,2-	0.12
Ethylene glycol	147.54	Toluene	53,250.81
Ethylene oxide	0.35	Trichloroethane, 1,1,1- (without dioxane)	541.04
Ethylidene chloride	20.34	Trichloroethane, 1,1,1- (with dioxane)	960.77
Formaldehyde	110,354.35	Trichloroethylene	968.99
Glutaraldehyde	84.16	Vinyl chloride	894.42
Hexachlorobenzene	0.02	Vinylidene chloride	28.37
Hexane	3,778.90	Xylene	43,743.70

Source: BAAQMD 2010

4.2.3 Regulatory Considerations

Federal

Criteria Pollutants

The federal CAA requires the EPA to establish and periodically review the NAAQS to protect public health and welfare. National standards have been established for seven air pollutants: ozone, CO, nitrogen dioxide (NO_2), SO_2, PM_{10}, $PM_{2.5}$, and lead.

The CAA requires each state to identify areas that have ambient air quality in violation of federal standards. States are required to develop, adopt, and implement a State Implementation Plan (SIP) to achieve, maintain, and enforce federal ambient air quality standards in these nonattainment areas. Deadlines for achieving the federal air quality standards vary according to air pollutant and the severity of air quality problems. The SIP must be submitted to and approved by the EPA. SIP elements are developed on a pollutant-by-pollutant basis whenever one or more air quality standard is being violated.

Hazardous Air Pollutants

Regulation of hazardous air pollutants (HAPs) under federal regulations is achieved through federal, state, and local controls on individual sources. Federal law defines HAPs as noncriteria air pollutants with short-term (acute) and/or long-term (chronic or carcinogenic) adverse human health effects. HAPs include both hazardous chemicals and radioactive materials. The 1990 federal CAA Amendments offer a comprehensive plan for achieving significant reductions in both mobile and stationary source emissions of HAPs. Under the 1990 CAA Amendments, a total of 189 chemicals or chemical families were designated HAPs because of their adverse human health effects. Title III of the 1990 federal CAA Amendments amended Section 112 of the CAA to enact an entirely new technology-based program. Under Title III, the EPA must establish maximum achievable control technology emission standards for all new and existing “major” stationary sources through promulgation of National Emission Standards for Hazardous Air Pollutants (NESHAP). Major stationary sources of HAPs are required to obtain an operating permit from BAAQMD pursuant to Title V of the 1990 CAA Amendments (a major source is defined as one that emits at least 10 tons per year of any one HAP or at least 25 tons per year of all HAPs combined).

NESHAP regulations promulgated by the EPA regulate both radioactive and non-radioactive emissions of HAPs. Subpart H of 40 CFR Part 61 established standards for emissions of radionuclides (other than radon) from facilities owned and operated by DOE. Some DOE facilities emit a wide variety of radionuclides in various physical and chemical states. The purpose of subpart H is to limit radionuclide emissions from DOE facilities so that no member of the public receives an effective dose equivalent to more than 10 millirem per year. Subpart H requires emissions sampling, monitoring, and dose calculations to determine compliance with the standard. Emissions measurement categories are determined by the greatest potential effective dose equivalent from airborne radionuclide emissions that could be received by a maximally exposed individual which is defined as a member of the public at an off-site point where there is a residence, school, business, or office. Standards for emissions of radionuclides from federal facilities not operated by DOE are covered in Subpart I of 40 CFR Part 61.

State

Criteria Pollutants

In California, air quality regulation is a joint responsibility between the ARB and local air quality management agencies. The ARB manages air quality, regulates mobile emissions sources, and oversees the activities of California counties and regional air districts. The ARB regulates local air quality indirectly by establishing CAAQS and vehicle emissions standards and by conducting research, planning, and coordination. California has adopted ambient standards that are more stringent than the federal standards for the seven criteria air pollutants. The CAAQS are established under the authority of the California Clean Air Act, which is patterned after the CAA.

The CAA and the California Clean Air Act require that SIPs be developed for areas designated as nonattainment (with the exception of areas designated as nonattainment for the state PM10 standard). On September 15, 2010, BAAQMD, in cooperation with the Metropolitan Transportation Commission (MTC) and the Association of Bay Area Governments, adopted the 2010 Clean Air Plan. The 2010 Clean Air Plan updates the Bay Area 2005 Ozone Strategy in accordance with the requirements of the California Clean Air Act to implement all feasible measures to reduce ozone; provide a control strategy to reduce ozone, particulate matter, TACs, and GHGs in a single, integrated plan; and establish emission control measures. The primary goals of the 2010 Clean Air Plan are to:

- Attain air quality standards,
- Reduce population exposure and protecting public health in the San Francisco Bay Area, and
- Reduce GHG emissions and protect the climate.

The 2010 Clean Air Plan represents the Bay Area's most recent triennial assessment of the region's strategy to attain the state one-hour ozone standard. The plan includes stationary-source control measures to be implemented through BAAQMD regulations; mobile-source control measures to be implemented through incentive programs and other activities; and transportation control measures to be implemented through transportation programs in cooperation with the MTC, local governments, transit agencies, and others.

Toxic Air Contaminants

California's TAC program was implemented in 1983 with the passage of the Toxic Air Contaminant Identification and Control Act, also known as the Tanner Bill. It was amended in 1992 to include the federal NESHAP hazardous air pollutants as state TACs. Another component of California's TAC program is the Air Toxics "Hot Spots" Information and Assessment Act of 1987 (Assembly Bill [AB] 2588) that regulates all of the TACs regulated by the Tanner Bill and additional TACs. AB 2588 includes requirements for certain facilities to quantify and report TAC emissions to the local air pollution control district that can require that the facility perform a human health risk assessment. BAAQMD regulates TACs through a permitting program and compliance with Air Toxic Control Measures (ATCM). ATCMs regulate a variety of sources of TACs including diesel engines and generators and operations that disturb naturally-occurring asbestos. The RBC site is not in an area where naturally-occurring asbestos is likely to be present (California Department of Conservation 2000).

Local

BAAQMD

BAAQMD is the agency with local air quality management authority in the nine-county San Francisco Bay Area Air Basin. BAAQMD has primary responsibility for most air quality regulatory programs, with the ARB exercising oversight responsibilities. The ARB directly implements statewide regulatory programs for motor vehicles, portable equipment, and hazardous air pollutants. BAAQMD is responsible for ensuring that federal and state air quality standards are met by monitoring ambient air pollutant levels throughout the air basin and implementing strategies to attain the standards.

BAAQMD CEQA Guidelines. BAAQMD has published CEQA Air Quality Guidelines that include thresholds of significance to assist lead agencies in evaluating the air quality impacts of projects and plans proposed in the San Francisco Bay Area Air Basin. BAAQMD's original CEQA Air Quality Guidelines were published in 1999. Revised thresholds of significance were adopted in June 2010 and a revised version of the guidelines was adopted in May 2011. The California Building Industry Association (CBIA) filed a lawsuit alleging that BAAQMD had violated CEQA by failing to review the potential environmental impacts of the revised thresholds before adopting them. On March 5, 2012, the Alameda County Superior Court issued a judgment finding that BAAQMD had failed to comply with CEQA when it adopted the June 2010 thresholds of significance. However, that decision was appealed by BAAQMD, and on July 13, 2013, the court of appeal ruled that adoption of the thresholds was not subject to CEQA.

BAAQMD Rules and Regulations. Specific rules and regulations have been adopted by BAAQMD that limit emissions that can be generated by various uses or activities. These rules regulate not only the emissions of the state and federal criteria pollutants, but also the emissions of TACs. The rules are also subject to ongoing refinement by BAAQMD. A few of the primary BAAQMD rules applicable to the project include the following:

- Regulation 2, Rule 1 (General Requirements): This rule requires new and modified sources of air pollution to acquire permits (e.g., Authority to Construct, Permit to Operate) in order to monitor stationary source emissions within BAAQMD's jurisdiction. The rule also includes a list of equipment and processes that would be exempt from permitting requirements. Among others, these include cooling towers and boilers with a heat input rating less than 10 million BTU/h fired exclusively with natural gas, liquefied petroleum gas, or a combination, and laboratories located in a building where the total number of fume hoods within the building is fewer than 50 or the total laboratory space is less than 25,000 square feet, provided that responsible laboratory management practices are used.
- Regulation 8, Rule 3 (Architectural Coatings): This rule sets limits on the reactive organic gas (ROG) content in architectural coatings sold, supplied, offered for sale, or manufactured within BAAQMD's jurisdiction. The rule also includes time schedules that specify when more stringent ROG standards are to be enforced. The rule applies during the construction phase of a project. In addition, any periodic architectural coating maintenance operations are required to comply with this rule.
- Regulation 8, Rule 15 (Emulsified and Liquid Asphalts): This rule sets limits on the ROG content in emulsified and liquid asphalt used for maintenance and paving operations. The rule includes specific ROG content requirements for various types of asphalt (e.g., emulsified asphalt, rapid-cure liquid asphalt, slow-cure liquid asphalt). This rule applies during the construction phase of a project. In addition, any future asphalt maintenance of a project's roads would be required to comply with the ROG standards set in Rule 15.

- Regulation 9, Rule 6 (Nitrogen Oxide Emission from Natural Gas-Fired Water Heaters): This rule sets a limit on the NOx emissions from natural gas-fired water heaters. The rule applies to natural gas-fired water heaters manufactured after July 1, 1992, with a heat input rating of less than 75,000 BTU/h. Water heaters subject to the rule must not emit more than 40 nanograms of NOx per joule of heat output.

City of Richmond

The proposed RBC site is a University of California property where work would be conducted within the University's mission on land that is owned or controlled by The Regents. As a state entity created by Article IX, Section 9 of the California State Constitution, the University is exempt under the state constitution from compliance with local land use regulations, including general plans and zoning. The University seeks to cooperate with local jurisdictions to reduce any physical consequences of potential land use conflicts to the extent feasible. The RBC site is in the city of Richmond. The following sections summarize objectives and policies from the City of Richmond General Plan 2030 and local ordinances as they relate to air quality.

The City of Richmond 2030 General Plan Energy and Climate Change Element (City of Richmond 2012) contains the following policy related to air quality:

- **Policy EC5.3—Air Quality:** Support regional policies and efforts that improve air quality to protect human and environmental health and minimize disproportionate impacts on sensitive population groups. Work with businesses and industry, residents and regulatory agencies to reduce the impact of direct, indirect and cumulative impacts of stationary and non-stationary sources of pollution such as industry, the port, railroads, diesel trucks and busy roadways. Ensure that sensitive uses such as schools, childcare centers, parks and playgrounds, housing and community gathering places are protected from adverse impacts of emissions.

  Continue to work with stakeholders to reduce impacts associated with air quality on disadvantaged neighborhoods and continue to participate in regional planning efforts with nearby jurisdictions and BAAQMD to meet or exceed air quality standards. Support regional, state and federal efforts to enforce existing pollution control laws and strengthen regulations.

The following action is related to this policy:

- **Action EC5.C—Air Quality Monitoring and Reporting Program:** Work with BAAQMD and other government agencies to establish and identify funding for a citywide air quality monitoring and reporting program. The air quality monitoring and reporting program would assess the cumulative impact of air pollution and toxins on human and environmental health and monitor exposure of sensitive uses such as schools, childcare centers, parks and playgrounds, housing and community gathering places.

  Collaborate with the County Health Services Department, BAAQMD, and state agencies to establish baseline exposures and to the extent feasible, document health effects associated with monitored baseline exposures and develop provisions to hold businesses and operations financially accountable for their impacts on the environment or community due to air pollution exceeding legal thresholds.

The 2030 General Plan EIR determined that the effects on air quality from future development pursuant to the General Plan would be significant and unavoidable. Future development could introduce new sources of air emissions that would contribute substantially to an existing or projected air quality violation or conflict with implementation of the Clean Air Plan. Mitigation

measures would be implemented to minimize potential impacts, but the impact would remain significant and unavoidable. Other impacts would be less than significant with mitigation. For example, development under the General Plan would not expose sensitive receptors to concentrations of carbon monoxide or toxic air contaminants in excess of the established thresholds. It would not expose a large number of people to odors. Cumulative impacts would be cumulatively considerable for potential air quality violations and conflicts with the Clean Air Plan but less than significant for exposure to carbon monoxide, toxic air contaminants, and odors.

4.2.4 Impacts and Mitigation Measures

Standards of Significance

Air quality impacts from campus development under the 2014 LRDP would be considered significant if they would exceed the following Standards of Significance, in accordance with Appendix G of the *State CEQA Guidelines* and the UC CEQA Handbook:

- Violate any air quality standard or contribute substantially to an existing or projected air quality violation
- Conflict with or obstruct implementation of the applicable air quality plan
- Expose sensitive receptors to substantial pollution concentrations
- Expose people to substantial levels of TACs, such that the exposure could cause an incremental human cancer risk greater than 10 in one million or exceed a hazard index of one for the maximally exposed individual
- Create objectionable odors affecting a substantial number of people
- 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)

The UC CEQA Handbook states that where available, the significance criteria established by the applicable air district may be used to make significance determinations.

As noted above, the significance thresholds under BAAQMD's CEQA Air Quality Guidelines were challenged by the CBIA. However, in July 2013, the court of appeal ruled that adoption of the thresholds was not subject to CEQA. Although this decision may be appealed by the CBIA, the University has determined that in this circumstance it will use the methodological approach and emissions thresholds in the BAAQMD guidelines to evaluate the impacts of the proposed project. The thresholds for the evaluation of air quality impacts from the BAAQMD CEQA Air Quality Guidelines are presented in the sections that follow.

Criteria Pollutant Emissions

Impacts from construction or direct or indirect operational emissions associated with the proposed project would be considered significant if they exceeded the following thresholds:

- 54 pounds per day of ROGs or volatile organic compounds (VOCs), NOx, or $PM_{2.5}$; or
- 82 pounds per day of PM_{10}.

The BAAQMD CEQA thresholds are the same for construction and operational emissions of criteria pollutants.

Local Community Risk and Toxic Air Contaminant Emissions

Local community risk and hazard impacts are associated with TACs and $PM_{2.5}$ because emissions of these pollutants can have significant health impacts at the local level. The proposed project would result in a significant impact if its emissions of TACs or $PM_{2.5}$ resulted in either:

- Non-compliance with a qualified risk reduction plan; or
- An incremental increase in cancer risk of more than 10 in 1 million, an increase in non-cancer risk (i.e., chronic or acute) as measured by a hazard index greater than 1.0, or an increase in $PM_{2.5}$ emissions greater than 0.3 micrograms/cubic meter ($\mu g/m^3$) annual average.

Odors

For impacts associated with odors, BAAQMD considers project operations that result in five confirmed complaints per year averaged over three years to have a significant impact.

Local Carbon Monoxide Concentrations

When sources of CO emissions are concentrated in an area, such as a large volume of vehicles at a congested intersection, a CO "hotspot" can result, meaning that CO concentrations in a localized area could exceed state or federal standards. The impact from CO emissions is considered significant if the emissions would contribute to a violation of the state standards for CO (9.0 part per million [ppm] averaged over 8 hours and 20 ppm over 1 hour).

Federal regulations and the BAAQMD CEQA Air Quality Guidelines contain a list of conditions under which a CO hotspot might be created and require a CO hotspot analysis when these conditions are met.

BAAQMD recommends CO modeling for a plan or a project in which: (1) project vehicle emissions of CO would exceed 550 pounds per day; (2) project traffic would affect intersections or roadway segments operating at level of service (LOS) E or F, or would cause a decline to LOS E or F;[9] or (3) project traffic would increase traffic volumes on nearby roadways by 10 percent or more (unless the increase in traffic volume is less than 100 vehicles per hour). Intersections are determined to operate at an LOS between A and F (LOS A being the best and LOS F being the worst) according to congestion or delay time, demand/capacity ratio, and relative flow of traffic at the intersection. Intersections that are determined to operate at LOS F or E have the potential to cause a CO hotspot (i.e., exceedance of the CAAQS). Indirect CO emissions are considered significant if they contribute to a violation of the state standards for CO (9.0 ppm averaged over 8 hours and 20 ppm over 1 hour).

If necessary, a simplified CO modeling analysis, described in the BAAQMD CEQA Air Quality Guidelines, may be used to determine localized CO concentrations. If modeling demonstrates that the source would not cause a violation of the state standard at existing or reasonably foreseeable receptors, the motor vehicle trips generated by the project would not have a significant impact on local air quality. The traffic study prepared for the proposed project indicates that six intersections would operate at an LOS of E or F, so a CO analysis is required for project operation. Under 40 CFR 93.123(c)(5) and the BAAQMD CEQA Air Quality Guidelines, a CO hotspot analysis is not required for temporary construction emissions and therefore was not conducted for project construction.

[9] Levels of service (LOS) range from A (least congested) with a condition of free flow with low volumes and high speeds to F (most congested) with stop and go, low-speed conditions with little or poor maneuverability.

Cumulative

The project would have a cumulatively considerable impact if:

- The project's criteria pollutant emissions exceed the BAAQMD CEQA thresholds.
- The project's TAC emissions, when combined with the cancer and human health risk from existing sources, result in an increased excess cancer risk of more than 100 in 1 million, an increase in non-cancer risk (i.e., chronic or acute) as measured by a hazard index greater than 10, or an increase in $PM_{2.5}$ emissions greater than 0.8 $\mu g/m^3$ annual average.

CEQA Checklist Items Adequately Addressed in the Initial Study

The NOP Initial Study deferred analysis of the project's air quality impacts to the LRDP EIR. All of the standards of significance listed above are addressed in the following analysis.

Analytical Methods

Construction and demolition activities would generate air pollutant emissions including airborne dust known as fugitive dust, emissions from the operation of on- and off-road construction equipment and vehicles, worker trips, architectural coatings such as paint, and paving off-gasses.

Operational activities would include instituting or operating several new emissions sources, including natural gas-fired boilers, cooling towers, emergency generators, laboratory chemicals use, and vehicle trips. Natural gas-fired boilers would heat buildings and cooling towers would be used to cool them. Emergency generators would serve as a back-up electricity source if there was a power failure. Laboratory chemicals would be used to support a variety of research purposes resulting in the potential for chemical emissions to be released to the atmosphere through lab hood vents on building roofs. Operational emissions would also come from delivery trucks transporting supplies to the RBC site and removing waste, additional employee vehicles, and shuttle buses traveling to and from the RBC site.

These air emission sources were estimated and analyzed in an air quality analysis technical report that was prepared for the project (Golder Associates, Inc. 2013). Air quality impacts from criteria pollutant emissions and TACs were quantitatively assessed for construction, operation, and cumulative conditions of the 2014 LRDP development. Model inputs were based on project description information. A detailed description of the analytical methods, models, and assumptions used to develop the quantitative analysis are in the report, included as Appendix B.

The estimated emissions and calculated risk values were compared to the BAAQMD CEQA thresholds listed above. Impacts are considered significant if they exceed the BAAQMD CEQA thresholds. Potential odor impacts were assessed qualitatively.

RBC 2014 LRDP Policies

The following policy from the 2014 LRDP applies to air quality.

- S3 – Sustainability Policy on Site Development: Embody environmental stewardship and respect the unique character of the Richmond Bay Campus in site development.
    - Control construction dust by implementing the BMPs defined in the BAAQMD CEQA Air Quality Guidelines.

LRDP Impacts and Mitigation Measures

Criteria Pollutants

LRDP Impact AIR-1: Criteria pollutant emissions associated with the construction and demolition activities under the 2014 LRDP would not violate an air quality standard or contribute substantially to an existing or projected air quality violation. (*Less than Significant*)

Construction and demolition associated with RBC development under the 2014 LRDP would generate air pollutant emissions including airborne dust known as fugitive dust and emissions from the operation of on- and off-road construction equipment and vehicles, worker trips, architectural coatings such as paint, and paving off-gasses. As discussed in further detail below, large construction projects would generally not occur simultaneously, although such projects may have some degree of schedule overlap.

Construction would typically begin with any necessary demolition, followed by site clearing and excavation. Soil-disturbing activities such as site excavation, elevation, and grading and placement of infrastructure and structural foundations would generate fugitive dust emissions that would contribute particulate matter to the local atmosphere.

Preliminary construction would include determining any special site or building conditions due to historic site contamination. If excavation is involved, soil that is certified clean may be shipped off site unless the project is a balanced cut-fill excavation that would reuse the soil on site. Contaminated soil would be excavated and removed by truck. Foundation work, building frame erection, and building finishing are the three major phases to follow.

Construction equipment would typically include large vehicles, stationary equipment, and hand-held equipment used on the building site and at nearby staging areas. They would be powered by diesel or gasoline engines or electricity. Such equipment would include cranes, scrapers, dozers, spreaders, compactors, loaders, drill rigs, haul trucks, cement trucks, bore drillers, rough terrain forklifts, pavers, rollers, and other rigs.

The air quality analysis considered emissions from construction equipment during each phase of construction based on the number of pieces of equipment and the duration of their use. It also considered the number of truck trips to deliver supplies and equipment, to transport soil for site grading, and to remove contaminated soil. Vehicle trips by construction workers were also considered. Construction and demolition emissions are estimated using the California Emissions Estimator Model (CalEEMod), version CalEEMod.2011.1.1. Details concerning the construction emissions estimates are in the air quality analysis technical report (Appendix B). The estimated construction emissions are presented in Table 4.2-4.

The LRDP construction emissions in Table 4.2-4 represent a typical annual level of construction and demolition that is expected to occur on the project site based on the total amount of building space that would be constructed under the 2014 LRDP.

Fugitive dust would be generated by construction activities such as excavation, site elevation, and grading. BAAQMD does not have a quantitative threshold for fugitive dust emissions from construction activities, but rather states that BMPs should be employed to control such fugitive dust emissions. Since there is no quantitative threshold for construction fugitive dust, these emissions were not quantified.

Table 4.2-4
LRDP Construction Emissions (pounds per day)

	On-site Stationary (Exhaust)	On-site Mobile (Exhaust)	Off-site Mobile (Exhaust)	Total Construction Emissions	BAAQMD CEQA Threshold
ROG/VOC	--	0.48	1.12	1.59	54
NOx	--	3.42	9.18	12.6	54
CO	--	2.56	8.14	10.7	NE
PM_{10}	--	0.16	0.29	0.45	82
$PM_{2.5}$	--	0.16	0.27	0.42	54

Note: all table units are pounds per day, rounded to two decimal places. Minor discrepancies between the totals reported in column 4 and the sum of individual values in columns 1 through 3 are a result of rounding.

-- = not evaluated; BAAQMD = Bay Area Air Quality Management District; CEQA = California Environmental Quality Act; CO = carbon monoxide; NA = not applicable; NE = not established; NOx = nitrogen oxides; $PM_{2.5}$ = fine particulate matter; PM_{10} = inhalable particulate matter; ROG = reactive organic gases; VOC = volatile organic compounds

Source: Golder Associates, Inc. 2013

As stated in the LRDP Policy S3, fugitive dust from construction activities would be controlled by implementing the construction BMPs recommended in the BAAQMD CEQA Air Quality Guidelines. The BMPs relevant to controlling fugitive dust are:

- All exposed surfaces (e.g., parking areas, staging areas, soil piles, graded areas, and unpaved access roads) shall be watered two times per day.
- All haul trucks transporting soil, sand, or other loose material off-site shall be covered.
- All visible mud or dirt track-out onto adjacent public roads shall be removed using wet power vacuum street sweepers at least once per day. The use of dry power sweeping is prohibited.
- All vehicle speeds on unpaved roads shall be limited to 15 miles per hour (mph).
- All roadways, driveways, and sidewalks to be paved shall be completed as soon as possible. Building pads shall be laid as soon as possible after grading unless seeding or soil binders are used.

All excavated soils would be managed to prevent dust, spills to the ground or water, disposal into drains, and exposure risk to people or the environment. Excavation, transportation, and handling of all soil would be required to result in no visible dust at the fence line of the excavation. Any soil material proposed to be placed as fill, whether from an off-site source or on-site source, would be kept covered or moist to facilitate eventual compaction and to control dust during earthwork operations. A water truck, water tank, or hydrant would be available to supply water in sufficient quantity on the job site while earthwork operations are underway. Sufficient water would be applied to suppress dust while exercising care to avoid generating runoff to any area outside the project boundary. Dust control measures would be implemented, as appropriate and necessary, beginning with site mobilization and continuing during all phases of the construction activities. Water would not be applied if there was a possibility of spreading contaminated soil or leaching contaminants from the soil, or if it resulted in hazardous working conditions.

Construction emissions associated with RBC development under the 2014 LRDP would not exceed the BAAQMD CEQA thresholds (Table 4.2-4), and BMPs would be implemented to control fugitive dust, resulting in a less than significant impact.

Mitigation Measure: No mitigation measure is required.

LRDP Impact AIR-2: **Operational activities associated with development under the 2014 LRDP would result in criteria pollutant emissions that would exceed BAAQMD CEQA thresholds and therefore potentially violate an air quality standard or contribute substantially to an existing or projected air quality violation. (*Potentially Significant; Significant and Unavoidable*)**

Operational activities associated with RBC development under the 2014 LRDP would include instituting or operating several new sources of criteria pollutant emissions, including natural gas-fired boilers, cooling towers, emergency generators, and vehicle trips. Emissions from each of these sources were calculated and included in the air quality analysis, as presented below:

- Natural gas-fired boilers would heat buildings and cooling towers would be used to cool them. Natural gas boilers would primarily produce NOx and TAC emissions. Cooling towers would produce emissions of particulate matter and sodium bromine (if used as a biocide), a TAC. (The human health impacts from the operational emissions of TACs from boilers and cooling towers are analyzed in LRDP Impact AIR-4 below.)
- Emergency generators would serve as a back-up electricity source if there was a power failure. Routine emissions of criteria pollutants would be associated with the maintenance testing of the emergency generators. Emergency generators would primarily produce SO_2 and DPM emissions. Emergency generators were assumed to meet EPA Tier 4 emission standards or better. This is a reasonable assumption for new generators because Tier 4 standards will be in full effect by 2015. (DPM emissions are TACs. The human health impacts from the operational emissions of DPM from emergency generators are analyzed in LRDP Impact AIR-4 below.)
- Chemicals used in the RBC laboratories would produce ROG/VOC and TAC emissions. (The human health effects from ROG/VOC and TAC emissions from laboratories are analyzed in LRDP Impact AIR-4 below.)
- Vehicle trips were also considered in the analysis. Delivery trucks would transport supplies to the RBC site and remove waste. Employees would travel by motor vehicles to and from the RBC site. Vehicle trips would result in emissions on and off site from fuel combustion and fugitive dust from tire friction that causes particles of dust on roads to become airborne. Although the RBC would provide facilities for alternative fuel vehicles such as electric and compressed natural gas vehicles, the air quality analysis assumes a typical mix of vehicle types (i.e., does not assume a higher percentage of alternative fuel cars than would normally be assumed) in order to provide a conservative analysis. Shuttle buses that would provide service to and from the RBC site would also generate emissions. (The human health effects from ROG/VOC and TAC emissions from motor vehicles are analyzed in LRDP Impact AIR-4 below.)

To the extent feasible, the estimates of operational emissions of criteria pollutants were developed taking into account proximity of retail uses to the RBC site and emissions-reducing project features included in the LRDP. These features include:

- Providing shuttle service to and from the site;
- Implementing low emission generators and compressors or equip them with supplementary exhaust pollution control systems where practical and feasible;
- Providing complete streets and bicycle facilities on the RBC site; and

- Orienting buildings to take advantage of solar heating and natural cooling and use passive solar designs.

The estimated LRDP emissions are based on the anticipated average annual activity levels assuming full development of the RBC under the 2014 LRDP. Details concerning the operational emissions estimates are in the air quality analysis technical report (Appendix B). The estimated operational emissions are presented in Table 4.2-5.

Table 4.2-5
LRDP Operational Emissions (pounds per day)

	On-site Stationary (Exhaust)	On-site Mobile (Exhaust)	On-site Fugitive Dust	Off-site Mobile (Exhaust)	Off-site Fugitive Dust	Total Operational Emissions	BAAQMD CEQA Threshold
ROG/VOC	90.10	9.38	--	36.14	--	***135.62***	54
NOx	47.20	10.50	--	52.90	--	***110.60***	54
CO	213.20	110.60	--	483.70	--	807.50	NE
PM_{10}	71.21	0.90	26.102	43.24	101.10	***242.56***	82
$PM_{2.5}$	50.20	0.83	6.400	18.21	24.82	***100.46***	54

Bold italics = exceeds Bay Area Air Quality Management District (BAAQMD) California Environmental Quality Act (CEQA) threshold

Note: all table units are pounds per day rounded to two decimal places. Minor discrepancies between the totals reported in column 6 and the sum of individual values in columns 1 through 5 are a result of rounding.

-- = not evaluated; CO = carbon monoxide; NA = not applicable; NE = not established; NOx = nitrogen oxides; $PM_{2.5}$ = fine particulate matter; PM_{10} = inhalable particulate matter; ROG = reactive organic gases; VOC = volatile organic compounds

Source: Golder Associates, Inc. 2013

As shown in Table 4.2-5, operational emissions of four criteria pollutants would exceed the BAAQMD CEQA thresholds, resulting in a significant impact. The greatest contributors of criteria pollutant emissions causing these projected exceedances are:

- ROG/VOC: exhaust emissions from employee vehicle trips and emissions from laboratories;
- NOx: exhaust emissions from employee vehicle trips and natural gas boilers; and
- PM_{10} and $PM_{2.5}$: particulate matter emissions from cooling towers and road dust from employee vehicle trips on on-site roadways, city roadways, and the freeway.

The estimated emissions that exceed the BAAQMD thresholds would result when all of the building space (up to 5.4 million square feet) is developed at RBC and the campus has a daily population of 10,000 persons. As the relationship between building space and population and the mass emission rate of criteria pollutant emissions is essentially linear, in the early stages of campus development, emissions would be substantially lower. In fact, based on an evaluation of the total projected criteria pollutant emissions, the development of up to 1,500,000 square feet of building space and associated increase in population at RBC would not result in emissions of criteria pollutants that would exceed BAAQMD CEQA thresholds.

Nonetheless, at full development of the campus, the total emissions of four criteria pollutants would exceed the applicable thresholds. As noted earlier, the 2014 LRDP includes policies requiring the University to provide shuttle service to and from the RBC site, implementation of low emissions generators and compressors (or fitting them with supplemental pollution control systems where practical and feasible), and orientation of new buildings to maximize solar heating

and natural cooling and reduce energy use associated with heating and cooling. The plan also provides for complete streets/sidewalks and commits to secure bike parking and shower changing facilities. LRDP MM AIR-2 would be implemented to minimize the impact from operational emissions. Additional reductions in operational emissions would be achieved with the implementation of LRDP MM GHG-1 (see Section 4.6), LRDP MM TRA-1 (see Section 4.11), and compliance with the new LBNL policy on sustainable building construction. However, because the benefits from each element of LRDP MM AIR-2 are difficult to quantify, and there is uncertainty whether these measures would reduce emissions of NOx, PM_{10} and $PM_{2.5}$ below the BAAQMD CEQA thresholds, it is conservatively concluded that even with mitigation, the impact would remain significant and unavoidable.

LRDP MM AIR-2: When the University has developed 1,000,000 square feet of building space on the RBC site, before approving the construction of another building, the University shall prepare and implement an operational emissions minimization program that will be composed of campus-wide programs to minimize emissions from mobile and area sources, and project-specific emissions control measures, based on project-specific analysis, to minimize emissions from area and stationary sources.

Campus-wide Control Measures

Campus-wide programs would include, but not be limited to, the following:

- Implement an enhanced TDM program to minimize vehicular traffic. The TDM program shall include the continued implementation of existing TDM measures such as provision of preferential carpool/vanpool parking; secure bike parking; showers and changing facilities; transit subsidies; Guaranteed Ride Home Program; and information to employees and students regarding alternative transportation modes. The TDM program will be expanded, following an evaluation of campus population and trip generation, to incorporate additional measures such as car share services; free transit passes; parking cash-out; daily parking charge; employee telecommuting program; compressed work schedules; infrastructure that allows employees to interact or conduct meetings and business without traveling; and a dedicated transportation coordinator.
- Convert campus fleet to low-emission, alternative fuel, and electric vehicles over time.
- Use electric equipment for landscape maintenance.
- Implement an educational program for faculty and staff and distribute information to students and visitors about air pollution problems and solutions.
- Develop centralized utilities such as a central plant (in place of individual boilers in buildings).

Stationary and Area Source Control Measures

When the University has developed 1,000,000 square feet of building space on the RBC site, if and when a specific building project is proposed that would add new stationary or area sources of emissions to the RBC site, the University will conduct a project-specific air quality impact assessment. If significant impacts are identified, project-specific mitigation measures will be implemented, which would include, but not be limited to, the following:

- Select solar or low-emission boilers.
- Select low-emission cooling towers.
- Other control measures determined appropriate for the specific project based on project-specific analysis.

Toxic Air Contaminants

LRDP Impact AIR-3: Construction and demolition associated with development under the 2014 LRDP would not expose people to substantial levels of TACs or expose sensitive receptors to substantial pollutant concentrations in excess of the relevant BAAQMD CEQA thresholds. (*Less than Significant*)

Human health effects from TAC emissions that would occur in association with construction and demolition activities under the 2014 LRDP were analyzed in a human health risk assessment. The assessment calculated the estimated cancer risk, chronic and acute health hazards, and $PM_{2.5}$ concentrations that would be experienced at the maximally exposed individual on the project site as well as off-site in the nearby residential and non-residential areas. Table 4.2-6 presents the results of this analysis compared to the BAAQMD CEQA thresholds.

As shown in Table 4.2-6, construction and demolition TAC emissions under the 2014 LRDP would not result in human health risks or $PM_{2.5}$ concentrations for the maximally exposed individual that would exceed the BAAQMD CEQA thresholds, and therefore the impact would be less than significant.

As Table 4.2-6 indicates, potential cancer risk, and chronic and acute hazard indices were not calculated for the on-site worker. The human health effects from TACs emitted by future construction activities under the LRDP on on-site workers at the RBC cannot be reasonably analyzed at this time for a number of reasons. Human health impacts are dependent on the relationship between the TAC source and the receptors. The sequence in which future buildings would be constructed on the site is not known at this time. Although Figure 3-4, LRDP Conceptual Layout, provides a general representation of the likely arrangement of future buildings on the RBC site, it is not known at this time which buildings will be constructed and occupied first and which ones will be constructed subsequently, and therefore under what circumstance there could be a receptor near a construction site and downwind of the construction activities. Furthermore, the scale of the construction project that could be located close to an occupied building, and therefore the magnitude of TAC emissions, cannot be predicted at this time. The relative location of the receptor and the scale and size of the construction project are essential data without which the human health effects cannot be evaluated without undue

Table 4.2-6
Health Risk Assessment for LRDP Construction

Assessment	Maximally Exposed Individual	BAAQMD CEQA Threshold
Cancer Risk		
Off-site Resident	3.3 in a million	10 in a million
Off-site Worker	2.6 in a million	10 in a million
On-site Worker	--	10 in a million
Chronic Hazard		
Off-site Resident	0.003	Hazard Index less than 1.0
Off-site Worker	0.06	Hazard Index less than 1.0
On-site Worker	--	Hazard Index less than 1.0
Acute Hazard		
On-site	--	Hazard Index less than 1.0
Off-site	--	Hazard Index less than 1.0
$PM_{2.5}$ Annual	0.018 µg/m^3	0.3 µg/m^3

-- = not evaluated; $PM_{2.5}$ = fine particulate matter; µg/m^3 = micrograms per cubic meter; Bay Area Air Quality Management District (BAAQMD) California Environmental Quality Act (CEQA)

Source: Golder Associates, Inc. 2013

speculation. Consistent with CEQA requirements, when future construction projects are proposed at the RBC, they will be evaluated for their potential to result in significant health effects on nearby receptors, including on-site workers.

However, it is unlikely that TACs emitted during construction of future buildings on the RBC site would result in significant human health impacts on on-site workers. Previously, a Phase 1 development program was proposed on the RBC site involving the grading of about 16 acres in the southern portion of the RBC site and the construction of approximately 600,000 square feet of building space. That project would have been immediately adjacent to and upwind of existing on-site worker receptors at the RBC site. The analysis of the human health effects of the construction TACs associated with the Phase 1 development program was completed before the project was discontinued. That analysis showed that human health impacts from Phase 1 construction activities on the nearby existing worker receptors immediately north and northeast of the Phase 1 site would have been less than significant.

Mitigation Measure: No mitigation measure is required.

LRDP Impact AIR-4: **Operational activities associated with development under the 2014 LRDP would expose people to substantial levels of TACs or expose sensitive receptors to substantial pollution concentrations in excess of the relevant BAAQMD CEQA thresholds. (*Potentially Significant; Significant and Unavoidable*)**

Non-radioactive Toxic Air Contaminants

Potential impacts to human health from exposure to the operational TAC emissions associated with RBC development under the 2014 LRDP were analyzed in a human health risk assessment.

The risk assessment included TAC emissions from a variety of sources that are anticipated to be developed on the RBC site under the 2014 LRDP. TAC sources and types of TACs that would be emitted by operational activities include the following:

- Boilers: benzene, toluene, propylene, formaldehyde, toluene, xylenes, lead, and mercury;
- Cooling towers: bromine;
- Generators: DPM;
- Laboratories: 44 laboratory chemicals (see air quality analysis technical report in Appendix B for a listing of chemicals);
- Vehicles: acrolein, benzene, toluene, ethylbenzene, xylenes, methanol, naphthalene, n-hexane, lead, and propylene.

TAC emissions from natural gas-fired boilers, cooling towers, emergency generators, and vehicles were quantified using methods described above under LRDP Impact AIR-2. TAC emissions from chemical use in laboratories were also quantified. Laboratory chemicals would be used for a variety of research purposes resulting in the potential for the TAC emissions to reach the atmosphere through lab stacks on building roofs. To estimate wet lab emissions, as a first step, LBNL and UC Berkeley reviewed chemical use in existing labs at the LBNL campus and the UC Berkeley main campus and prepared lists of chemicals that are anticipated to be used in the future wet labs at RBC. For the identified lab chemicals, emissions were estimated using methodologies followed by LBNL and UC Berkeley in previous health risk assessments prepared for their respective main sites. These methodologies are based on either annual chemical use data or emission factors for laboratory chemicals related to square footage of laboratory space. A full list of the TACs and operational emissions estimates, including a discussion of the methodologies, are found in the air quality analysis technical report in Appendix B.

The estimated emissions were then modeled using a dispersion model to estimate TAC concentrations and the estimated concentrations were used in conjunction with appropriate toxicity factors (including age sensitivity factors) and length of exposure assumptions to estimate potential cancer and non-cancer health effects on on-site worker receptors and off-site residential and worker receptors. The assessment calculated the estimated cancer risk, chronic and acute health hazards, and $PM_{2.5}$ concentrations that would be experienced at the maximally exposed individual on the RBC site (on-site worker) as well as the maximally exposed individual (both off-site resident and off-site worker) off-site in the nearby residential and non-residential areas. Table 4.2-7 presents the results of this analysis compared to the BAAQMD CEQA thresholds.

As shown in Table 4.2-7, the lifetime excess cancer risk, chronic health hazard, and the off-site acute health hazard associated with RBC development under the 2014 LRDP would be below the applicable BAAQMD CEQA thresholds. However, two values in Table 4.2-7 exceed the thresholds. The estimated acute hazard index for on-site worker (1.06) exceeds the applicable threshold, and the annual $PM_{2.5}$ concentration of 0.89 $\mu g/m^3$ (which would occur off-site) also exceeds the applicable threshold. Therefore, TAC emissions from operational activities associated with RBC development under the 2014 LRDP would result in a significant impact. The greatest contributors to the exceedance of the acute hazard index on site are formaldehyde and chloroform emissions from laboratories, and formaldehyde and nitrogen dioxide emissions from boilers and motor vehicle exhaust. The greatest contributors to the $PM_{2.5}$ exceedance off-site are emissions from employee vehicle trips and natural gas boilers.

The estimated TAC emissions that result in the exceedance of the BAAQMD thresholds would result when all of the building space (up to 5.4 million square feet) is developed at RBC and the campus has a daily population of 10,000 persons. As the relationship between building space and

Table 4.2-7
Health Risk Assessment for LRDP Operations

Assessment	Maximally Exposed Individual	BAAQMD CEQA Threshold
Cancer Risk		
Off-site Resident	8.9 in a million	10 in a million
Off-site Worker	3.1 in a million	10 in a million
On-site Worker	4.9 in a million	10 in a million
Chronic Hazard		
Off-site Resident	0.07	Hazard Index less than 1.0
Off-site Worker	0.27	Hazard Index less than 1.0
On-site Worker	0.36	Hazard Index less than 1.0
Acute Hazard		
On-site	***1.06***	Hazard Index less than 1.0
Off-site	0.89	Hazard Index less than 1.0
$PM_{2.5}$ Annual	***0.89 µg/m³***	0.3 µg/m³

Bold italics = exceeds BAAQMD CEQA threshold

$PM_{2.5}$ = fine particulate matter; µg/m³ = micrograms per cubic meter

Source: Golder Associates, Inc. 2013

population and the mass emission rate of TAC emissions is essentially linear, in the early stages of campus development, TAC emissions would be substantially lower and the impacts identified in Table 4.2-7 would not occur.

Nonetheless, at full development of the campus, the total TAC emissions would have the potential to result in an acute hazard index that exceeds 1.0, and $PM_{2.5}$ concentrations that exceed the applicable thresholds. LRDP MM AIR-2 (described above) would be implemented to minimize the impact from $PM_{2.5}$ emissions. Because the benefits from each element of LRDP MM AIR-2 are difficult to quantify, there is uncertainty whether the mitigation measure would adequately reduce $PM_{2.5}$ emissions below the BAAQMD CEQA threshold. Therefore, it is assumed that the impact would remain significant and unavoidable.

LRDP MM AIR-2 would also minimize emissions from on-site boilers and reduce the significant impact to on-site workers. In addition, LRDP MM AIR-4 is proposed to minimize TAC emissions from RBC laboratories, which would reduce the impact to the on-site workers to a less than significant level.

Radioactive Materials

The future wet labs at the RBC are expected to involve the use of some radioactive materials. As with other hazardous materials, the most probable potential pathway for public or environmental exposure to radioactive material would be air emissions from routine use of these materials inside the labs. Based on historical data from LBNL laboratory operations at a number of other locations, exposure to airborne radionuclides at the RBC would be less than 0.1 percent of EPA and DOE regulatory limits and less than 0.001 percent of the threshold below which risks of health effects are considered either too small to be observed or are nonexistent (Health Physics

Society 2010). Furthermore, all labs owned and operated by the DOE at the RBC will be subject to standards in Subpart H of the NESHAP regulations. Subpart H limits radionuclide emissions from DOE facilities so that no member of the public receives an effective dose equivalent of more than 10 millirem per year. Subpart H also requires emissions sampling, monitoring, and dose calculations to determine compliance with the standard. Based on the most recent evaluation of emissions from the UC Berkeley Central Campus (UC Berkeley 2012 Annual Radiation Safety Report), the radiation dose to the maximally exposed member of the public resulting from the use of licensed radioactive materials in the UC Berkeley RBC laboratories would be expected to be much less than the Central Campus, which had a calculated maximum dose of less than 5 percent of the 10 millirem/year dose limit imposed by the EPA. For these reasons, the emissions from the use of radioactive materials in RBC laboratories developed pursuant to the proposed 2014 LRDP would have a less than significant impact.

LRDP MM AIR-4: To reduce the effects from RBC laboratory emissions of formaldehyde and chloroform, the University shall implement one of the following measures in conjunction with every laboratory project that involves the use of these chemicals:

- Implement one or more emission control technologies on laboratory fume hoods or stacks. Controls will be limited to portions of the laboratory that involves the use of formaldehyde and chloroform. Controls will be selected specific to the chemical emissions to be controlled (formaldehyde or chloroform or both chemicals), and in the case of laboratory stacks, may include, as appropriate, activated carbon filters, scrubbers, biofilters, flares, catalytic converters, cryogenic condensers, vapor recovery systems, and thermal oxidizers.
- Demonstrate that the project's use of formaldehyde and chloroform will be at least 10 percent below that assumed for the LRDP human health risk assessment.

In the event that neither measure can be implemented, the laboratory project shall demonstrate by preparing a new human health risk assessment that the maximum acute hazard from project emissions, in conjunction with existing site emissions and future emissions under the 2014 LRDP, will not exceed a hazard index of 1.0.

Other Air Quality Impacts

LRDP Impact AIR-5: Development under the 2014 LRDP would conflict with or obstruct implementation of the applicable air quality plan. (*Potentially Significant; Significant and Unavoidable*)

The 2010 Clean Air Plan is the plan that would be applicable to the proposed project. The BAAQMD suggests that in order to evaluate whether a project or a plan is consistent with the 2010 Clean Air Plan, the lead agency can evaluate three questions: 1) Does the project support the primary goals of the 2010 Clean Air Plan, which includes the attainment of air quality standards? 2) Does the project include applicable control measures from the 2010 Clean Air Plan? And 3) Does the project disrupt or hinder implementation of any 2010 Clean Air Plan control measures? RBC development pursuant to the 2014 LRDP is evaluated relative to these three questions below.

Support Primary Goals of the 2010 Clean Air Plan

As discussed under LRDP Impact AIR-1, construction associated with RBC development under the 2014 LRDP would result in emissions that do not exceed BAAQMD CEQA thresholds. Therefore the emissions would not hinder the attainment of air quality standards. However, as discussed under LRDP Impact AIR-2 above, emissions from RBC operational activities would exceed the BAAQMD CEQA thresholds. Therefore, 2014 LRDP implementation would conflict with the 2010 Clean Air Plan, and the impact would be significant.

LRDP MM AIR-2 would be implemented to minimize this impact. Because the benefits from the elements of LRDP MM AIR-2 are difficult to quantify and there is uncertainty whether the emissions would be reduced below the BAAQMD CEQA threshold, it is assumed that the impact would remain significant and unavoidable.

Include Applicable 2010 Clean Air Plan Control Measures

The 2010 Clean Air Plan contains 55 control measures aimed at reducing air pollution in the Bay Area. The 2014 LRDP includes policies to guide RBC development to be sustainable. These policies are consistent with the applicable Clean Air Plan Land Use and Local Impact measures, Energy and Climate measures, Mobile Source measures, and Transportation control measures included in the 2010 Clean Air Plan. In addition, LRDP MM AIR-2 and LRDP MM GHG-1 include a range of measures that are consistent with the Clean Air Plan control measures. Therefore, the proposed project would not conflict with the 2010 Clean Air Plan under this criterion.

Hinder Implementation of 2010 Clean Air Plan Control Measures

The proposed project does not include any element that would hinder the implementation of any of the Clean Air Plan control measures. Therefore, the proposed project would not conflict with the 2010 Clean Air Plan under this criterion.

In summary, although RBC development under the proposed LRDP would not conflict with the 2010 Clean Air Plan under three criteria provided by the BAAQMD, it would nonetheless result in emissions of criteria pollutants that would exceed BAAQMD CEQA thresholds even after mitigation and would therefore interfere with the attainment of air quality standards. The impact would be significant and unavoidable for reasons presented above.

Mitigation Measure: Implement LRDP MM AIR-2.

LRDP Impact AIR-6: Development under the 2014 LRDP would not create objectionable odors affecting a substantial number of people. (*Less than Significant*)

Construction Emissions

Construction activities at the RBC could generate temporary odors from fuel combustion, paving, and architectural coatings. These odors would be temporary and limited to the immediate project area and would be unlikely to affect a substantial number of people in the surrounding area. Therefore, the impact on air quality from construction-phase odors would be less than significant.

Operational Emissions

Land uses primarily associated with odorous emissions include waste transfer and recycling stations, wastewater treatment plants, landfills, composting operations, petroleum operations, food and byproduct processes, factories, and agricultural activities, such as livestock operations. The proposed project does not include any of these types of land uses. In addition, the proposed project would not be sited near any of these recognized sources of odors. Operational activities at

RBC that could generate odors would be the use of laboratory chemicals and preparation of food in the food service areas. These odors would be controlled by ventilation systems and fume hoods and limited to the immediate area around the source. Therefore, the impact on air quality from odors generated by operational activities would be less than significant

Mitigation Measure: No mitigation measure is required.

LRDP Impact AIR-7: Development under the 2014 LRDP would not create a carbon monoxide hotspot, an area where the carbon monoxide concentration would exceed the state ambient air quality standards. (*Less than Significant*)

Construction Emissions

Under 40 CFR 93.123(c)(5) and the BAAQMD CEQA Air Quality Guidelines, a CO hotspot analysis is not required for construction emissions as construction activities are short term and are considered unlikely to result in a CO hotspot. Therefore such an analysis was not conducted.

Operational Emissions

Operational activities at the RBC would generate increased vehicle traffic on area roads. The traffic study prepared for the proposed project indicates that under 2035 conditions with full development of the RBC under the 2014 LRDP, six intersections would operate at an LOS of E or F. A CO analysis was performed for these intersections to determine if CO emissions generated by project-related traffic would contribute to a violation of the state standards for CO (9.0 ppm averaged over 8 hours and 20 ppm over 1 hour). The analysis was performed using a simplified spreadsheet version of the CALINE4 model with EMFAC2007 CO vehicle emissions factors and background CO concentrations from the San Pablo monitoring station (the nearest monitoring station where CO data are collected). The maximum CO concentrations at the study intersections would be 2.4 ppm averaged over 1 hour and 1.3 ppm averaged over 8 hours. Because these concentrations are well below the state 1-hour and 8-hour standards (see Table 4.2-1), carbon monoxide impacts on air quality from operational activities would be less than significant.

Mitigation Measure: No mitigation measure is required.

Cumulative Impacts and Mitigation Measures

LRDP Cumulative Impact AIR-1: Development under the 2014 LRDP would result in a cumulatively considerable increase in criteria pollutant emissions 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). (*Potentially Significant; Significant and Unavoidable*)

BAAQMD's CEQA Air Quality Guidelines state that if a project's criteria pollutant emissions exceed the CEQA thresholds, then that project's impacts would also be cumulatively considerable. As shown in Table 4.2-4, the project's criteria pollutant emissions during RBC construction would be less than the BAAQMD CEQA thresholds. However, as shown in Table 4.2-5, operational emissions would exceed the applicable thresholds. Because the project's operational criteria pollutant emissions would exceed BAAQMD CEQA thresholds, the RBC at full development under the 2014 LRDP would make a cumulatively considerable contribution to the significant cumulative impact on regional air quality, and the impact would be significant.

LRDP MM AIR-2 would be implemented to minimize this impact. Because the benefits from each element of LRDP MM AIR-2 are difficult to quantify and there is uncertainty whether this would reduce emissions below the BAAQMD CEQA thresholds, it is assumed that the impact would remain significant and unavoidable.

Cumulative MM AIR-1: Implement LRDP MM AIR-2.

LRDP Cumulative Impact AIR-2: **Development under the 2014 LRDP would not result in an increase in non-cancer risk (i.e., chronic or acute) as measured by a hazard index greater than 10, but would result in a cumulatively considerable increase in cancer risk of more than 100 in 1 million and an increase in $PM_{2.5}$ concentration greater than 0.8 µg/m^3 annual average. (*Potentially Significant; Significant and Unavoidable*)**

BAAQMD's CEQA Air Quality Guidelines include standards and methods for determining the significance of cumulative health risk impacts. A cumulative health risk determination first considers the health risks from existing permitted sources and major roadways near a project (i.e., within a 1,000-foot radius of the source, also considered the zone of influence for health risks). That health risk is then added to the health risk estimated for the proposed project to determine whether the cumulative health risk thresholds would be exceeded.

Table 4.2-8 presents existing sources of TACs within 1,000 feet of the RBC site boundary to establish the cumulative setting for analysis of human health impacts. All of the sources listed in the table are within 1,000 feet of the RBC site boundary. The data reported in the table are from the BAAQMD database.

Construction TAC Emissions

Table 4.2-9 presents the results of the cumulative health risk assessment and the annual increase in $PM_{2.5}$ concentrations from anticipated annual construction activities at the RBC under the 2014 LRDP.

As shown in Table 4.2-9, if estimated human health risk from LRDP construction TAC emissions is added to the risk from existing sources in the area, the cumulative cancer risk and chronic health risk would be below the BAAQMD CEQA thresholds. However, the annual increase in $PM_{2.5}$ concentrations from the cumulative projects, including the proposed project, would exceed the BAAQMD CEQA thresholds for construction under cumulative conditions. As the table shows, the total $PM_{2.5}$ concentration from existing sources (1.47µg/m^3) already exceeds the BAAQMD CEQA threshold. The project's construction activities would make a very small incremental contribution to the existing significant cumulative impact. The primary RBC sources of $PM_{2.5}$ are exhaust emissions from on- and off-road construction vehicle travel and construction equipment use.

The numbers reported in Table 4.2-9 were calculated using the methodology provided in the BAAQMD CEQA Air Quality Guidelines which is a simplified method of estimating cumulative health effects without conducting detailed modeling of the emissions from existing sources in the area. In the event that results obtained from the simplified method exceed thresholds, a lead agency can conduct detailed modeling of the emissions from the existing sources and the proposed project together to estimate the cumulative impact. The University conducted such an

Table 4.2-8
Existing Sources Within 1,000 Feet of the RBC Site Boundary

ID	Name	Address	Cancer Risk (in a million)	Chronic Hazard Quotient	$PM_{2.5}$ ($\mu g/m^3$)
5462	Bio-Rad Laboratories	3110 Regatta Boulevard	36.1	0.374	0.028
G9842	RFS	1301 South 46th Street	0[a]	0[a]	NA[a]
15755	Grace Baking	3200G Regatta Boulevard	0.0576	0.00002	0.53
G7543	Pacific Gas and Electric Company	1100 South 27th Street	1.1	0.0016	NA
17029	Verizon Wireless, Richmond	South 27th Street and Pierson Avenue	8.5[b]	0.003[b]	0.002[b]
93	Safeway Stores, Inc. Bakery Plant	905 South 34th Street	0.03	0.00001	0.617
G7555	Stop and Shop	800 Carlson Boulevard	2.37	0.0034	NA
15508	Wareham Property Group EPA Laboratory	1337 South 46th Street, Building 201	19[b]	0.0067[b]	0.34[b]
851	I-580 (East/North of Freeway)	300 feet from maximally exposed individual	50.4	0.041	0.279
		Total	91.1[c]	0.42	1.47

ID = identification number; NA = not applicable; $PM_{2.5}$ = fine particulate matter; RFS = Richmond Field Station; $\mu g/m^3$ = micrograms per cubic meter

[a] The BAAQMD database reports zero values for the RFS under existing conditions. However, the RFS currently contains a few boilers, emergency generators, laboratories, and a gasoline filling station. While most of these existing sources at RFS will be removed in conjunction with new development under the 2014 LRDP, some of these existing sources are expected to remain on the RBC site in the foreseeable future. Human health effects from the sources expected to remain are reported in Tables 4.2-13 and 4.2-14.

[b] The data reported for sources 17029 and 15508 are for emergency generators at a distance of more than 280 meters from the maximally exposed individual. BAAQMD guidance allows these results to be multiplied by 0.04 (diesel generator attenuation factor), greatly reducing their contribution to the total.

[c] The total includes the risk from sources 17029 and 15508 after attenuation.

Source: Golder Associates, Inc. 2013

an analysis for LRDP construction $PM_{2.5}$ emissions using $PM_{2.5}$ emissions data for existing sources and default release parameters provided by the BAAQMD. The analysis revealed that the cumulative annual increase in $PM_{2.5}$ concentrations from existing sources plus the LRDP construction activities would be 0.30 µg/m3, instead of 1.49 $\mu g/m^3$ as reported in Table 4.2-9 above. Therefore, based on detailed modeling, the cumulative impact from LRDP construction $PM_{2.5}$ emissions would be less than significant.

Table 4.2-9
LRDP Cumulative Construction Health Risk Assessment

Source	Construction		
	Cancer Risk (in a million)	**Chronic Hazard Quotient**	**$PM_{2.5}$ ($\mu g/m^3$)**
Existing Sources within 1,000 feet of RBC Site Boundary (Table 4.2-12)	91.1	0.42	1.47
Existing Sources on the RBC Site	0.3	0.001	0,00
LRDP Emissions	3.3	0.003	0.02
Cumulative Emissions	94.7[a]	0.42	***1.49***
BAAQMD CEQA Threshold	100	10	0.8

Bold italics = exceeds BAAQMD CEQA threshold

$PM_{2.5}$ = fine particulate matter; RBC = Richmond Bay Campus; $\mu g/m^3$ = micrograms per cubic meter

[a] The TAC sources at Verizon Wireless (ID 17029 in Table 4.2-12 above) and at the EPA Lab (ID 15508) are emergency generators. The BAAQMD human health risk assessment guidelines note that cancer risk from emergency generators attenuates with distance and the guidelines provide a generator distance multiplier of 0.04 to be applied to the maximum impact value for emergency generators. That multiplier was applied to these two sources in estimating the total cancer risk under cumulative conditions.

Source: Golder Associates, Inc. 2013

Although the refined analysis above demonstrates that the cumulative $PM_{2.5}$ impacts would be less than significant, and pursuant to LRDP Policy S3, the University has committed to implementing the construction mitigation measures recommended by the BAAQMD to minimize all construction emissions, which will ensure that the LRDP construction emissions of $PM_{2.5}$ will not make a cumulatively considerable contribution to a significant $PM_{2.5}$ impact, the University nonetheless conservatively concludes that the cumulative impact related to $PM_{2.5}$ emissions from LRDP construction would be significant and unavoidable.

Operational TAC Emissions

Table 4.2-10 presents the results of the cumulative health risk assessment and the annual increase in $PM_{2.5}$ concentrations from anticipated annual operational activities at the RBC under the 2014 LRDP.

As shown in Table 4.2-10, if human health risk from LRDP operational TAC sources is combined with the risk from existing TAC sources in the area, the cumulative chronic health risk would be below the BAAQMD CEQA threshold. However, the cumulative cancer risk and the annual increase in $PM_{2.5}$ concentrations from the cumulative projects, including the proposed project, would exceed the BAAQMD CEQA thresholds, resulting in a significant impact. The primary RBC contributors to the cancer risk are natural gas boilers and diesel generators, while the primary RBC contributors to the $PM_{2.5}$ exceedance are road dust from employee vehicle trips and natural gas boilers.

Table 4.2-10
LRDP Cumulative Health Risk Assessment

Source	Operation		
	Cancer Risk (in a million)	**Chronic Hazard Quotient**	**$PM_{2.5}$ ($\mu g/m^3$)**
Existing Sources within 1,000 feet of RBC Site Boundary (Table 4.2-12)	91.1	0.42	1.47
Existing Sources on the RBC Site	2.4	0.00	0.0
LRDP Emissions	8.9	0.07	0.89
Cumulative Emissions	***102.4***[a]	0.49	***2.36***
BAAQMD CEQA Threshold	100	10	0.8

Bold italics = exceeds BAAQMD CEQA threshold

$PM_{2.5}$ = fine particulate matter; RBC = Richmond Bay Campus; $\mu g/m^3$ = micrograms per cubic meter

[a] The TAC sources at Verizon Wireless (ID 17029 in Table 4.2-12 above) and at the EPA Lab (ID 15508) are emergency generators. The BAAQMD human health risk assessment guidelines note that cancer risk from emergency generators attenuates with distance and the guidelines provide a generator distance multiplier of 0.04 to be applied to the maximum impact value for emergency generators. That multiplier was applied to these two sources in estimating the total cancer risk under cumulative conditions.

Source: Golder Associates, Inc. 2013

The analysis above is considered highly conservative because the cumulative results are obtained by simply adding the maximum impacts from all existing sources and are not obtained by modeling the TAC emissions from existing sources (i.e., the maximum impact at any location). The results conservatively add the maximum value for each source together and do not provide for any attenuation of risk that occurs with distance from the source to the maximally exposed individual receptor for the project. As noted in Table 4.2-10 above, a distance multiplier was applied only to generators and to none of the other sources. If a similar distance multiplier is applied to all existing sources (most of which are greater than 500 meters from the maximally exposed individual receptor) and the incremental cancer risk from the project site is added in, the maximum cancer risk at the maximally exposed individual receptor would be 64.4 in a million, well below the BAAQMD CEQA threshold for cancer risk.

Furthermore, studies conducted by the ARB showed that due to programs and controls that were put in place and increasing regulation especially of diesel emissions, statewide human health risks from existing sources decreased by 45 percent between 1990 and 2000 (ARB undated). Additional reductions are projected in the future to result from the ARB's Diesel Risk Reduction Plan, ARB's implementation of ACTMs, the BAAQMD's Air Toxics Program, and its implementation of NESHAPs.

The information above notwithstanding, the University is committed to minimizing its impact on the local community and the environment. Therefore, it will implement LRDP MM AIR-2 to minimize $PM_{2.5}$ and vehicle TAC emissions, and Cumulative MM AIR-2b to ensure that as new TAC sources are added to the RBC site, the site's impact on the community is evaluated and appropriate TAC controls are added to the projects or existing sources retrofitted so that the RBC site does not contribute substantially to a significant human health effect on or in the vicinity of the RBC site. Compliance with the performance standard included in Cumulative MM AIR-2b will ensure that the project will not result in a significant impact related to cancer risk. However, there remains uncertainty whether the University will be able to control its $PM_{2.5}$ emissions

adequately to render its contribution to the cumulative $PM_{2.5}$ impact cumulatively not considerable (i.e., less than significant). Therefore the University concludes that the impact related to $PM_{2.5}$ concentrations would be significant and unavoidable.

Cumulative MM AIR-2a: Implement LRDP MM AIR-2 to minimize $PM_{2.5}$ and vehicle TAC emissions.

Cumulative MM AIR-2b: When the University has developed 500,000 square feet of R&D building space on the RBC site, before approving the construction of another R&D building, LBNL and UC Berkeley will prepare an updated human health risk assessment (HHRA) that will estimate and report the human health effects of RBC operations on on-site and off-site receptors. If the HHRA indicates that there would be no significant health effects from RBC operations (project level or cumulative, based on significance thresholds applicable at that time), no further action is required.

In the event that significant human health effects are indicated, LBNL and UC Berkeley will implement control measures to minimize TAC emissions from laboratories, parking garages, other stationary sources, or other measures to reduce the human health effects from RBC TAC emissions to levels below applicable significance thresholds.

Control measures for new or existing laboratories could include, but would not be limited to, the measures listed in LRDP MM AIR-4.

Control measures for parking structures could include, but would not be limited to, the following:

- Locate parking structures to be as distant as possible from receptors to the north of the campus;
- Control parking structure emissions through a collection and bag house system.

LRDP Cumulative Impact AIR-3: **Under cumulative conditions, development under the 2014 LRDP would not create a carbon monoxide hotspot, an area where carbon monoxide would exceed the state ambient air quality standards. (*Less than Significant*)**

Construction Emissions

Under 40 CFR 93.123(c)(5) and the BAAQMD CEQA Air Quality Guidelines, a CO hotspot analysis is not required for temporary construction emissions and therefore was not conducted.

Operational Emissions

The maximum CO concentrations at the six intersections that would operate at LOS E or F would be 2.4 ppm averaged over 1 hour and 1.3 ppm averaged over 8 hours. Because these concentrations are below the state 1-hour and 8-hour standards, cumulative air quality impacts from the proposed project's operational emissions of CO would be less than significant.

Mitigation Measure: No mitigation measure is required.

4.2.5 References

ARB (California Air Resources Board). 2007. Health Risk Assessment for the BNSF Railway Richmond Railyard. Internet website: http://www.arb.ca.gov/railyard/hra/bnsf_richmond_hra.pdf. November 2007.

_____. Undated. Reducing Toxic Air Pollutants in California's Communities: A Decade of Success in Reducing Air Toxics. (Factsheet) Internet website: http://www.arb.ca.gov/toxics/brochure.pdf.

BAAQMD (Bay Area Air Quality Management District). 1999. BAAQMD CEQA Guidelines: Assessing the Air Quality Impacts of Projects and Plans. Planning and Research Division. Internet website: http://www.baaqmd.gov/~/media/Files/Planning%20and%20Research/Plans/CEQA%20Guide/ceqa_guide.ashx. December 1999.

_____. 2010. Toxic Air Contaminant Inventory for 2010, County Totals by Pollutant. Internet website: http://www.baaqmd.gov/Divisions/Engineering/Air-Toxics/Toxic-Air-Contaminant-Control-Program-Annual-Report.aspx. December 2010.

_____. 2012. CEQA Air Quality Guidelines. Internet website: http://www.baaqmd.gov/Divisions/Planning-and-Research/CEQA-GUIDELINES/Updated-CEQA-Guidelines.aspx. May 2012.

_____. 2013a. Air Quality Standards and Attainment Status. Internet website: http://hank.baaqmd.gov/pln/air_quality/ambient_air_quality.htm. Accessed January 11, 2013.

_____. 2013b. Annual Bay Area Air Quality Summaries. Internet website: http://baaqmd.gov/Divisions/Communications-and-Outreach/Air-Quality-in-the-Bay-Area/Air-Quality-Summaries.aspx. Accessed May 20, 2013.

_____. 2013c. Air Quality Data Display System: 2013, $PM_{2.5}$ Continuous. Note: Unchecked data that may contain errors. Internet website: http://gate1.baaqmd.gov/aqmet/AQYearly.aspx. Accessed October 14, 2013.

California Department of Conservation. 2000. A General Location Guide for Ultramafic Rocks in California - Areas More Likely to Contain Naturally Occurring Asbestos. August 2000.

City of Richmond. 2011. General Plan. Planning and Building Services Department. Internet website: http://www.cityofrichmondgeneralplan.org/. September 2011.

Golder Associates, Inc. 2013. Air Quality and Human Health Risk Impact Assessment, University of California/The University of California at Lawrence Berkeley National Laboratory – Proposed Richmond Bay Campus Long Range Development Plan. November 14, 2013.

Health Physics Society. 2010. Radiation Risk in Perspective: Position Statement of the Health Physics Society. Internet website: http://hps.org/documents/risk_ps010-2.pdf. July 2010.

4.3 BIOLOGICAL RESOURCES

4.3.1 Introduction

This section presents existing RBC site biological resources and analyzes the potential for development under the 2014 LRDP to affect those resources. Information and analysis in this section is based on California Natural Diversity Database (CNDDB) searches (CNDDB 2012), several previous reports including RFS Habitat Assessment Report and RFS Constraints Analysis (WRA and Jane Valerius Environmental Consulting 2011a, 2012), the RFS Remediation Project IS (URS 2003), UC Richmond Field Station's Remnant Coastal Terrace Prairie (Amme 2005), RFS Grasslands Constraints Analysis (WRA and Jane Valerius Environmental Consulting 2013), The Manual of California Vegetation (Sawyer et al. 2009), and Richmond Field Station Remediation Project Biological Assessment Report (Blasland, Bouck, and Lee, Inc. 2003). A Tetra Tech biologist and professional wetland scientist conducted a site visit and general biological survey on January 4, 2013 (Tetra Tech 2013a). Tetra Tech biologists delineated wetlands on February 13 and 15, 2013 (Tetra Tech 2013b).

The biological resources discussed in this section are vegetation communities, wildlife habitats, wildlife movement corridors, common wildlife, special-status plant and wildlife species, and sensitive natural communities, including wetlands.

Public and agency NOP comments related to biological resources are summarized below:

- Conduct a thorough biological site survey;
- Analyze project impacts on all biological resources;
- The site contains remnant native coastal prairie grasslands that occur in very few locations, possibly only at this site;
- Native coastal prairie grasslands should be preserved on-site, and direct and indirect impacts should be prevented during construction and subsequent operations, including by use of buffer zones;
- Remnant California poppy (*Eschscholzia californica*) and Rancheria clover (*Trifolium alborpurpureum*) populations should be preserved in landscaping plans;
- Specify a weed management plan for the project, including controlling threats to the native grasslands, controlling invasive species such as Italian fennel and pampass grass in the marsh;
- Use local-endemic ecotypes wherever native plants are prescribed;
- Demolition, tree removal, construction, and restoration activities may impact wildlife;
- Impacts on species listed under the US or California Endangered Species Act, including California clapper rail, may require mitigation and permitting;
- Implement measures to reduce impacts on wildlife: minimize outdoor lighting, restrict human presence near sensitive habitats, control trash, reduce construction and operating noise, use bird-safe building standards, avoid structures that could serve as raptor perches near the shoreline, and provide setbacks from the shoreline;
- The project area is adjacent to recently restored wetlands; and
- Comply with local and regional land use laws, regulations, and plans.

4.3.2 Environmental Setting

Vegetation Communities

The project site has five general vegetation communities: native grasslands, non-native grasslands, ornamental/landscaping, eucalyptus stands, and tidal salt marsh (Figure 4-8).

Native Grassland

Native grassland communities include California oatgrass and purple needlegrass alliances. California oatgrass grassland is dominated by California oatgrass (*Danthonia californica*). Other species noted in this community includes soft chess (*Bromus hordaceus*), Italian ryegrass (*Lolium multiflorum*), English plantain (*Plantago lanceolata*) and bristly ox-tongue (*Picris echioides*). This community has been reported in all meadows except the Far North Meadow (URS 2007) (Figure 4-8). Harding grass (*Phalaris aquatica*), a non-native species, has invaded much of the oatgrass grassland areas and some areas are slowly transitioning into coastal scrub by the invasion of coyote brush (*Baccharis* pilularis) (URS 2007).

Purple needlegrass grassland also occurs in several areas. Purple needlegrass (*Nasella pulchra*) is typically found in deep soils with high clay content. Nonnative species are also common in this community type and include rattail fescue (*Vulpia myuros*), sixweeks fescue (*Vulpia bromoides*), silver European hair grass (*Aira caryophyllea*), ripgut brome (*Bromus diandrus*), soft chess, and red brome (*Bromus madritenisis*). This community has been reported in all meadows except the Far North Meadow (URS 2007).

California "coastal prairie" or "coastal terrace prairie" are "communities," or conglomerations of native perennial and/or annual grasses that inhabit moist, temperate areas of the California coastal region. Such grasslands occurring along the north and central California coast experience a milder climate than interior grasslands, with weather mediated by fog. These grasslands are typically dense or tall and may be naturally patchy, reflecting differences in soils and moisture availability. Although none of the species found in a coastal prairie are necessarily rare or endangered, the grassland community itself is an uncommon configuration of species. As noted in Table 4.3-1 below, there are no known occurrences of special status (endangered or rare) plant species occurring at the RBC site. However, some plants occurring at the site are uncommon locally.

A 1999 report estimated that moist grasslands occur on about 7,000 acres in the San Francisco Bay Area, a decline from approximately 60,000 acres in historic times (Goals Project 1999). Coastal terrace prairie may be characterized by different species; the oatgrass and purple needlegrass community at the RFS makes up an even smaller portion of the remaining moist grasslands. In addition to occurrences at the RFS, coastal prairie grasslands occur in the vicinity at portions of the San Pablo Peninsula, such as Point Molate (City of Richmond 2013). Coastal prairie grasslands also occur on Brooks Island (Goals Project 1999).

The RFS occurrence of coastal terrace prairie is considered unique as "the only Coastal Terrace Prairie in lowland clay soils in the greater East Bay Area." This soil type comprises the majority of the RBC site upland area (Amme 1993). A 1993 study concluded that "the remnant coastal prairie grassland at Richmond Field Station is scientifically and ecologically invaluable, and virtually impossible to recreate" (Amme 1993). In August of 1996, then-UC Berkeley Chancellor Chang-Lin Tien wrote then-Assembly member Tom Bates proposing, subject to approval, a commitment to incorporate a wetland and grassland reserve into long range plans at the Richmond Field Station. The letter identified approximately 8.7 acres of coastal grasslands at the RFS site, setting this acreage aside as a reserve. This acreage is at the core of the Natural Open Space proposed in the LRDP (Figure 4-8).

This figure depicts existing conditions across the RBC site and the area designated as Natural Open Space in the 2014 LRDP.

- Drainage Swale
- Natural Open Space Designation
- RBC Site Boundary
- Wetlands
- Marsh Boundary
- Building
- Monarch Butterfly Roosting Area
- Coastal Terrace Prairie
- Disturbed Coastal Terrace Prairie
- Non-Native Dominated Grassland on Fill
- Ornamental Trees
- Eucalyptus
- Surface Water
- Cordgrass (*Spartina foliosa*)
- Salty Susan (*Jaumea carnosa*)
- Bulrush (*Scirpus americanus*)
- Saltgrass (*Distichlis spicata*)
- Pickleweed (*Salicornia virginica*)
- Ecotone
- Restored Native Upland
- Non-Native Transitional Upland
- Mud
- Seasonal Freshwater Wetlands

Biological Resources

Richmond, California

Figure 4-8

Source: Esri, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, and the GIS User Community.
Biological resources - RFS Current Conditions Report 2008.

R:\NEW\29511_LBL_Second_Campus\Maps\EIR\Biological Resources_rev.mxd 11/12/2013 - YE

UC Berkeley has maintained its commitment through passive preservation of the grasslands. However, since 1996 the grasslands have also been the subject of some restoration effort (Watershed Project 2007) and of academic study at UC Berkeley.

Grasslands are a dynamic resource, and human understanding of coastal prairie grasslands has evolved over time. Based upon its reserve status, the RFS reserve areas were left undisturbed and mowing of them was discontinued beginning in the 1990s. Stewards have since learned that native grasslands should not go untouched, but instead are sustained by disturbances such as mowing, fire, grazing and burrowing that help reduce competition from non-native species. Native grasslands have been shown to benefit from types of disturbance that help to limit invasion by non-native species, or limit invasion by successional species (Immel-Jeffery et al. 2013). In the 1993 study of the RFS, the area west of Building 280 at the RFS was not identified as coastal terrace prairie grassland. Known as the Northwest Meadow, it was mowed routinely, and today exhibits characteristics of a high quality coastal terrace prairie grassland (WRA and Jane Valerius 2013). Meanwhile other areas have deteriorated (RFS 2012 Restoration Report, ESPM 187, p. 6; page 22). In 2007, mowing protocols for the reserve areas were re-instituted and are followed today.

Since 1993 the effort to protect grasslands in the city of Richmond has expanded. The East Bay chapter of the California Native Plant Society has designated the entirety of the Richmond shoreline as a botanical priority protection area. CNPS is an advocacy organization with not-for profit status; members of CNPS include biologists and horticulturists as well as amateur enthusiasts. CNPS has developed a “Rare Natural Communities Initiative” stating that “of key importance to CNPS are those vegetation communities that are, in and of themselves, rare” including “high quality stands of native north coastal terrace prairie” (CNPS Undated).

The science of restoration, once thought to be “nearly impossible” (Stromberg et al. 2007) has progressed and evidence of restoration can be seen at the RBC site as well as elsewhere in California (e.g., CNPS Undated, Kraft et al. 2007, Watershed Project 2007). Restoration can be a very detailed and resource intensive process; it requires a detailed management strategy for many years after initial project implementation (Stromberg et al. 2007, Kraft et al. 2007).

The coastal terrace grassland community on the RBC site is composed of valley needlegrass grassland (also known as purple needlegrass alliance) and California oatgrass bunchgrass grassland alliance. The community at the site is considered to be a “sensitive natural community of limited distribution” under protocols prepared by CDFW (CDFG 2009).

It is common for grasslands to be variable in quality and species composition. This is the case for the grasslands at the RBC site as described below. The highest quality meadows on the site are identified here as the “sensitive natural community.”

WRA and Jane Valerius Environmental Consulting (2013) evaluated the condition of these grasslands in spring 2012 to update the previous condition assessment by URS (2007). Their goal was to rank the quality of coastal-terrace prairie grassland habitat based on presence of absolute cover of purple needlegrass (5%) and/or California oatgrass (greater than 25%), as described by the membership rule of the series in the Manual of California Vegetation (Sawyer et al. 2009); the quality ranking was not dependent on the presence of other native plant species. The rankings used to classify the RBC meadows are:

- *High Quality*: California oatgrass (>50%) or purple needlegrass (>20%),
- *Medium Quality*: California oatgrass (25-50%) or purple needlegrass (5-19%), and
- *Low Quality*: California oatgrass (0-24%) or purple needlegrass (0-4%).

Further qualitative evaluation of the coastal-terrace prairie grass was based on:

- Consideration of nearby populations and total species distribution,
- The consideration of nearby occurrences of special-status communities and natural community distribution, and
- Analysis of potential threats, including those from invasive species, to the plants and natural communities.

The evaluation concluded that there are 22 acres of high quality coastal terrace prairie grassland habitat at the RBC site (WRA and Jane Valerius Environmental Consulting 2013).

The grasslands that support high-quality coastal terrace are in the Big Meadow, West Meadow, Northwest Meadow, and EPA North Meadow in the central-western portion of the RBC site (WRA and Jane Valerius Environmental Consulting 2013). The Big Meadow represents the only known coastal-terrace prairie grassland on lowland clay soils (Clear Lake-Cropley and Capay-Rincon soil types) in the greater East Bay Area (Amme 2005). The coastal-terrace prairie grassland community in the Big Meadow, West Meadow, and other meadows supports populations of plant species with very limited distribution in Contra Costa and Alameda Counties (EBCNPS 2004).

Non-Native Annual Grassland

Non-native annual grasslands on the RBC site are primarily dominated by Harding grass, wild oats (*Avena* sp.), ripgut brome, soft chess, Italian ryegrass, and hare barley (*Hordeum murinum* ssp. *leporinum*) along with non-native forbs such as English plantain, geraniums (*Geranium dissectum* and *G. molle*), black mustard (*Brassica nigra*), chicory (*Cichorium intybus*), and teasel (*Dipsacus fullonum*) (WRA and Jane Valerius Environmental Consulting 2011a). Non-native annual grasslands are dispersed throughout much of the RBC site.

Portions of the annual grassland habitat were noted to include wetland plants such as umbrella sedge (*Cyperus eragrostis*), Dallis grass (*Paspalum dilitatum*), bristly ox-tongue (*Picris echioides*) and bird's- foot trefoil (*Lotus corniculatus*).

Ornamental/Landscaped

Areas around buildings include landscaping and ornamentals such as cotoneaster (*Cotoneaster* sp.), firethorn (*Pyracantha* sp.), blackwood acacia (*Acacia melanoxylon*), wax myrtle (*Myrica californica*), Monterey pine (*Pinus radiata*), and olive (*Olea Europa*) (WRA and Jane Valerius Environmental Consulting 2011a).

Eucalyptus Stands

The eucalyptus stands are dominated by blue gum (*Eucalyptus globulus*). Understory is limited under the blue gum trees and is composed of non-native annual grasses and forbs. The eucalyptus stands occur in the central portion of the RBC site and run from north to south (WRA and Jane Valerius Environmental Consulting 2011a) (Figure 4-8). A majority of the trees were planted more than a century ago by the California Cap Company to create a blast barrier between the cap company and the adjacent properties. Recent tree failures have shown the stands are infected with heart rot, a fungal disease that causes the decay of wood at the center of the tree. Heart rot is a major factor in the economics of logging and the natural growth dynamic of many older forests. As the fungi grow, they decay more wood and the tissue becomes increasingly soft and weak. The trees will continue to grow around the decayed heart wood because the live wood is not affected; however the extensive decay makes the tree more susceptible to broken branches and causes sudden failure of the tree. Increased failures of the eucalyptus trees at the RBC site have been occurring over the last 10 years (Shackleton 2013).

Salt Marsh

Western Stege Marsh on the southern portion of the RBC site includes high marsh, low marsh, tidal mudflat, and open water slough habitats (Blasland, Bouck, and Lee, Inc. 2003) (Figure 4-8). The high marsh is dominated by inland saltgrass and the low marsh is dominated by pacific cordgrass (*Spartina foliosa*). Inland saltgrass is typically found in temperate grassland with sparse shrub layer. The areas that are now Western Stege Marsh and the transition area just north of the marsh were historically intertidal mudflats. Offshore breakwaters constructed in the 1930s and the rerouting of Meeker Creek from further west to its current location resulted in soil deposition and transition of the mudflats to the tidal marshland which exists today.

Wetland and Aquatic Features

Western Stege Marsh and Meeker Slough, in the Natural Open Space in the southern portion of the RBC site, include high marsh, low marsh, tidal mudflat, and open water slough habitats (Blasland, Bouck, and Lee, Inc. 2003; Tetra Tech 2010). They are all jurisdictional wetlands (Figure 4-8). The primary hydrologic feature in the area is the approximately 40- to 50-foot wide Meeker Slough. The high marsh is dominated by inland saltgrass and the low marsh is dominated by pacific cordgrass. Inland saltgrass is typically found in temperate grassland with sparse shrub layer. Habitats can be irregularly flooded or permanently saturated with shallow water table in haline or saline water chemistry (WRA and Jane Valerius Environmental Consulting 2011a). Western Stege Marsh is considered a sensitive natural community. The saltmarsh habitat provides high quality wildlife habitat for numerous special-status species and also functions to reduce erosion and sedimentation.

Prior to the RBC site's ownership by UC, historical industrial operations on it and adjacent properties caused sediment contamination in the Western Stege Marsh (Tetra Tech 2010). UC Berkeley undertook Western Stege Marsh remediation beginning in 2002 in response to the October 2001 San Francisco Bay RWQCB Order (No. 01-102) issued to UC Berkeley and Zeneca. Remediation was conducted in three phases during 2002, 2003 and 2004. Five years of remediation monitoring was completed in 2010.

Other than Western Stege Marsh and Meeker Slough, additional small areas of wetland could be present on the RBC site. Most of the site has not yet been delineated. Ponded water has been observed in annual grassland habitat for extended periods throughout the rainy season and may constitute potentially jurisdictional seasonal wetlands. These ponded areas were noted to include wetland plants, such as umbrella sedge, Dallis grass, bristly ox-tongue, and bird's-foot trefoil. Given the low-lying aspect of the grassland areas and adjacency to the tidal salt marsh, some of the depressional areas in the grassland may qualify as jurisdictional wetlands.

A wetland delineation (Tetra Tech 2013b) was conducted for the southeastern portion of the RBC site in February 2013. One 300-square foot herbaceous wetland swale was identified and delineated downstream of a drainage channel, approximately 50 feet east of the southeastern corner of the EPA Building (Figure 4-8).

The most common plant species observed in the wetland swale were brown-headed rush (*Juncus phaeocephalus*), followed by Harding grass. Clay loam soils with characteristics indicative of hydric soils are present. The wetland swale water source is largely from the drainage channel from the north. To the east, a second culvert appears to also convey water, as indicated by the location of known underground water conveyances. Water is conveyed southward from the wetland swale through a third culvert where it flows to another open swale for approximately 20 feet. Beyond this point, there is very little evidence of an open swale. Another underground culvert carries water off the RBC site to Western Stege Marsh. Due to topographic variation (gradual sloping to the southeast) below the third culvert and lack of sufficient moisture, the

wetland swale does not appear to be directly hydrologically connected to navigable waters of Meeker Slough; as a result, the wetland swale does not appear to be jurisdictional and is periodically maintained as a drainage ditch. USACE has not yet made its formal jurisdictional determination, but during an inspection of the site, USACE staff commented that the features do not appear to be jurisdictional for these reasons.

Wildlife Habitats

Grasslands

Grassland habitat, including native and non-native grasslands, provides primary habitat, such as nesting and foraging, and secondary habitat, such as movement corridors. Small species using this as primary habitat include reptiles and amphibians, such as southern alligator lizard (*Gerrhonotus multicarinatus*), western fence lizard (*Sceloporus occidentalis*), and Pacific slender salamander (*Batrachoseps attenuatus*). These grasslands may also attract seed-eating and insect-eating birds and mammals. The site's low-growing, sparse vegetation may provide nesting substrate for a variety of birds that prefer nesting open lands, such as killdeer (*Charadrius vociferus*) (WRA and Jane Valerius Environmental Consulting 2011a).

Saltmarsh

The Richmond Inner Harbor and associated saltmarsh in Western Stege Marsh is on the RBC site southern boundary. Species occurring in the salt marsh habitat include great blue heron (*Ardea herodius*) and great egret (*Ardea alba*). They forage in the salt marsh and nest in nearby riparian areas. Shorebirds, such as black-necked stilt (*Himantopus mexicanus*), willet (*Catoptophorus semipalmatus*), and American avocet (*Recurvirostra americana*), use salt marshes for foraging on crustaceans and arthropods. Waterfowl use saltmarshes for feeding and resting during the winter and spring migrations along the Pacific Flyway. Feral cats and red fox (*Vulpes vulpes*), both non-native species, have become a recent threat to mammalian and avian species using salt marshes and other wetlands. Saltmarsh habitat provides important foraging and drinking areas for bats such as *Myotis* species and pallid bat (*Antrozous pallidus*). Several special status wildlife species are unique to this habitat, including California clapper rail (*Rallus longirostris obsoletus*) that has been reported in Western Stege Marsh (WRA and Jane Valerius Environmental Consulting 2011a).

Eucalyptus Stands

RBC site eucalyptus stands are shown on Figure 4-8. The monarch butterfly (*Danaus plexippus*) is known to form tight aggregations during the winter months, often in eucalyptus trees, for cover and thermal regulation. Monarchs historically depended on native California trees but, due to land development, logging, and land management, have had to rely more on non-native eucalyptus trees in the last century. Potential negative impacts of eucalyptus trees on monarch butterflies are not well understood. Eucalyptus appears to offer less protection to butterflies and birds from wind and precipitation than native pines, cypress, and redwood (Stock et al. no date; Williams 2002). The eucalyptus trees provide cover and potential nesting habitat for raptors and songbirds. Because of the physical characteristics of these trees, nests are more likely to be shaken out of eucalyptus trees by the wind. Thus, eucalyptus may provide habitat for monarchs and birds, and be a sink, attracting these species to a habitat that can be harmful. Because any large tree has some potential for roosting bats, especially those with hollows or loose bark, bats could roost in these trees. The lack of understory minimizes the use of this habitat by insects and invertebrates (WRA and Jane Valerius Environmental Consulting 2011a).

Developed

There are several structures on the RBC site (Figure 4-8). Bird species that potentially use these structures include passerines (songbirds), such as barn swallow (*Hirundo rustica*) and black

phoebe (*Sayornis nigricans*), and raptors, such as barn owl (*Tyto alba*). These species have adapted to the disturbances associated with human settlements and will nest and forage near humans. In general, the nesting season for both passerines and raptors typically begins at the end of February and may last up to mid-August.

Buildings also provide bat roosting habitat. Because bats show high roost fidelity, it is possible for older structures to provide roost habitat for decades. Not all buildings available to bats provide the temperature, humidity, and other requirements for bats. As a result, not all buildings provide suitable roost habitat (WRA and Jane Valerius Environmental Consulting 2011a).

Wildlife Movement Corridors

Wildlife movement includes migration (*i.e.*, usually one way per season), inter-population movement (*i.e.*, long-term genetic flow) and small travel pathways (*i.e.*, daily movement corridors in an animal's territory) (McCullough 1996). While small travel pathways usually facilitate movement for daily home range activities such as foraging or escape from predators, they also provide connection between outlying populations and the main corridor, permitting an increase in gene flow between populations.

Overall, the RBC site provides a mosaic of habitats that are accessible to mobile wildlife species, particularly birds. The site offers foraging, nesting, and roosting habitats for many species. Movement corridors in the RBC site include the Western Stege Marsh to the south, Meeker Slough that runs along the western border and the meadows in the western portion of the site (Figure 4-8). The eucalyptus stands provide movement corridors for those species that require cover, such as wild turkey (*Meleagris gallopavo*) and California towhee (*Pipilo crissalis*). The developed habitat provides a potential area for movement for common mammalian species, such as raccoon (*Procyon lotor*), skunk (*Mephitis mephitis*), and opossum (*Didelphis virginiana*).

Wildlife

Wildlife resources at the RBC site and vicinity include invertebrates, fish, reptiles, amphibians, birds, and mammals (including bats). Developed areas provide little habitat value to most wildlife species; therefore, wildlife on the property consists of species that have adapted to the human-influenced landscape. The general lack of understory growth does not provide much habitat for insects and invertebrates and in turn, there are few reptiles (which feed upon insect prey). In general, wildlife species are not expected to be found in any consistent numbers at the RBC site and the available habitat would mainly be used for cover or resting. Small mammal species may be found on the property such as the cottontail (*Sylvilagus bachmani*), black-tailed hare (*Lepus californicus*), house mouse *(Mus musculus*), deer mouse (*Peromyscus maniculatus*), pocket gopher (*Thomomys bottae*), and squirrel species such as *Spermophilus beecheyi*. Striped skunk, and red fox (*Vulpes vulpes*) prey on the smaller mammal species.

Other species may pass through or fly over the property. Typical bird species include gulls (*Larus* spp.), swallows (*Hirundo* spp.), northern mockingbird (*Mimus polyglottos*), European starling (*Sturnus vulgaris*), American crow *(Corvus brachyrhynchos*), western meadowlark (*Sturnella neglecta*), belted kingfisher (*Ceryle alcyon*), western bluebird (*Sialia mexicana*), Saltmarsh common yellowthroat (*Geothylpis trichassinuosa*), Alameda song sparrow (*Melospiza melodia pusilla*), and the western meadowlark (*Sturnella neglecta*).

There are numerous RBC site structures that may be used by various passerine bird species, such as barn swallow and black phoebe, and raptor species, such as barn owl. These species have adapted to the human disturbance and nest and forage near humans. In general, the nesting season for passerines and raptors typically begins at the end of February and may last to mid-August.

The conclusion of the nesting season varies according to species; certain bird species can produce up to three broods each year (WRA and Jane Valerius Environmental Consulting 2011a).

The state of California considers the monarch butterfly (*Danaus plexippus*) to be restricted in its distribution, declining throughout its range, or associated with declining habitats in California. This species is well known for its long migrations. They travel between 1,200 and 2,800 miles or more from the United States and Canada to central Mexican forests where they overwinter. The mountain forests provide areas for hibernation and the less extreme climate gives them a better chance to survive. Monarchs seasonally occur in the RBC site eucalyptus stands and landscaped areas. They use the eucalyptus trees for cover and for thermal regulation during the winter months as described in the earlier Eucalyptus Stands section (WRA and Jane Valerius Environmental Consulting 2011a). Surveys of the coastal-terrace prairie grasslands for moth and butterfly species in the early 1990s found five or six species not known to occur in the East Bay previously. These species are rare in the East Bay area but not special status species.

Special-Status Species

The analysis addresses all special-status species with the potential to occur on the RBC site. For this EIR, special-status species are those that are legally protected by CDFW, USFWS, or the Migratory Bird Treaty Act (MBTA). State and federally listed species known or that have the potential to occur are listed in Table 4.3-1. Legally protected species include those that are federally listed as endangered, threatened, or candidate species; that are state listed as endangered, rare, threatened, California fully protected, or species of special concern; or that are listed in the MBTA. Protected species include those plant species listed as 1A or 1B on the California Native Plant Society (CNPS) plant list (CNDDB 2012). The 1A list is for plants presumed to be extinct in California, and the 1B list is for plants that are rare or endangered in California and elsewhere. Special-status species that have been confirmed at the RBC site or have potential to occur there (WRA and Jane Valerius Environmental Consulting 2011a) are listed in Table 4.3-1.

Birds

The RBC site vegetation communities offer perching and roosting opportunities for a variety of avian species including raptors. Many bird species, including all raptors, are protected under the MBTA. Passerine birds such as the Allen's (*Selasphorus sasin)* or Anna's hummingbird (*Calypte anna*) (also MBTA protected) may occur as they feed on the flower nectar in the developed, horticultural landscaped areas. Raptors such as the American kestrel (*Falco sparverius*), osprey (*Pandion haliaetus*), and northern harrier (*Circus cyaneus*) likely roost, forage, and nest in the eucalyptus. A variety of other bird species may nest at the RBC site, including on existing site buildings. Bird species that may nest on and in the buildings include cliff swallow (*Petrochelidon pyrrhonota*), barn swallow, black phoebe, barn owl, and American kestrel.

The marsh provides habitat for open water species, including pied-billed grebe (*Podilymbus podiceps*), double-crested cormorant (*Phalacrocorax auritus*), caspian tern (*Sterna caspia*), and a variety of duck species, all of which are protected under MBTA. The federal and state endangered California clapper rail is known to nest and forage in Western Stege Marsh and Meeker Slough. Other marsh birds with the potential to occur are the Saltmarsh common yellowthroat and the Alameda song sparrow, both protected as a California Species of Concern and under MBTA. Overall, there is moderate potential for passerines to nest in the RBC project site and for saltmarsh shorebirds to occur or possibly nest in the saltmarsh. Raptors are likely to occur in buildings and other roost sites.

Table 4.3-1
Special Status Species That Could Occur at the RBC Site

Common Name	Scientific Name	Federal/State/ CNPS Status	Habitat	Likelihood of Occurrence / Notes
Invertebrates – None. No suitable habitat present for special status insects.				
Fish – None. No suitable habitat present for special status fish.				
Amphibians				
California red-legged frog	*Rana aurora draytonii*	FT/CSC/--	Lowlands and foothills in or near permanent sources of deep water, with dense, shrubby, or emergent riparian vegetation. Requires 11-20 weeks of permanent water for larval development.	None. No suitable habitat present.
Reptiles				
Western pond turtle	*Clemmys marmorata*	--/CSC/--	Ponds, marshes, rivers, streams, and irrigation ditches with aquatic vegetation. Needs basking sites and upland habitat for egg-laying.	None. No suitable habitat present.
Alameda whipsnake	*Mastiocophis lateralis euryxanthus*	FT/ST/--	Chaparral and scrub habitats, adjacent grasslands, oak savanna and woodland habitats.	None. No suitable habitat present.
Birds				
Burrowing owl	*Athene cunicularia hypugea*	--/ST/--	Open, dry grasslands, deserts, prairies, farmland and scrublands with abundant active and abandoned mammal burrows. Prefers short grasses and moderate inclined hills.	Low: Reported adjacent to the site to the east.
Saltmarsh common yellowthroat	*Geothylpis trichas sinuosa*	--/CSC/--	Nests in fresh and salt marshes in tall grasses, tule patches and willows. Prefers thick cover for foraging and dense vegetation for nesting.	Present. Observed in Western Stege Marsh.
California black rail	*Laterallus jamaicensis coturniculus*	--/ST/--	Freshwater marshes, wet meadows, and shallow margins of saltwater marshes bordering larger bays.	Low. Suitable salt marsh habitat present. No observations.
Alameda song sparrow	*Melospiza melodia pusilla*	--/CSC/--	Found in tidal sloughs in the Salicornia marshes. Nests in Grindelia bordering slough channels.	Present. Reported from Western Stege Marsh. Habitat occurs in Western Stege Marsh.
California clapper rail	*Rallus longirostris obsoletus*	FE/SE/--	Salt water and brackish marshes in vicinity of tidal sloughs. Associated with pickleweed growth.	Present. Has been documented in Western Stege Marsh.
Black phoebe	*Sayornis nigricans*	--/--/--	Nests in manmade structures on ledges and in buildings. Nest made of mud pellets, dry grasses, weed stems, plant fibers and hair.	Present. Suitable habitat present in buildings.

Table 4.3-1
Special Status Species That Could Occur at the RBC Site

Common Name	Scientific Name	Federal/State/ CNPS Status	Habitat	Likelihood of Occurrence / Notes
Allen's hummingbird	*Selasphorus sasin*	--/--/--	Nests in wooded areas, meadows, or thickets along shaded streams, on a branch low down on stem, although placement height varies between 10 inches and 90 feet.	Moderate. Suitable habitat present in aquatic and landscaped areas.
Western meadowlark	*Sturnella neglecta*	--/--/--	Nests in grasslands removed from trees and shrubs. Nest is domed in structure.	Moderate. Suitable grassland habitat present.
Barn owl	*Tyto alba*	--/--/--	Nests in tree cavities, crevices between the fronds of palm trees or small caves in cliffs or banks and in buildings. Nests are typically 10 feet above ground.	Moderate, Suitable habitat occurs in buildings.
Mammals				
Pallid bat	*Antrozous pallidus*	--/CSC/--	Day roosts include rock outcrops, mines, caves, buildings, bridges, and hollows and cavities in a wide variety of tree species. High reliance on oak woodland habitat in many portions of its range in California.	Moderate. Potentially suitable habitat present in buildings and large trees.
California myotis	*Myotis califiornicus*	--/--/--	Roosts in caves, mine tunnels, crevices in rocks and buildings, generally near forested areas. Feeds low among trees or over shrubs.	Moderate. Potentially suitable habitat present in buildings.
Small-footed myotis	*Myotis ciliolabrum*	--/--/--	Roosts in caves, mine tunnels, crevices in rocks and buildings, generally near forested areas. Feeds around canopy, often low to the ground, higher in open habitat.	Moderate. Potentially suitable habitat present in buildings.
Long-eared myotis	*Myotis evotis*	--/--/--	Day roosts in hollow trees under exfoliating bark, and crevices in rock outcrops. Found roosting under bark of small black oaks in northern California. Found throughout California.	Low. Potentially suitable habitat present in buildings and trees.
Fringed myotis	*Myotis thysanodes*	--/--/--	Roosts in colonies in caves, cliffs and attics of old buildings. Will also use trees as day roosts.	Moderate. Potentially suitable habitat present in buildings and trees.
Yuma myotis	*Myotis yumanensis*	--/--/--	Roosts colonially in cares, tunnels and buildings. Inhabits arid regions.	Moderate. Potentially suitable habitat present in buildings.

Table 4.3-1
Special Status Species That Could Occur at the RBC Site

Common Name	Scientific Name	Federal/State/ CNPS Status	Habitat	Likelihood of Occurrence / Notes
Salt-marsh harvest mouse	*Reithrodontomys raviventris*	FE/SE/--	Prefers dense cover of native pickleweed (*Salicornia virginica*). Will use upper zone of peripheral halophytes (salt-tolerant plants) to escape the higher tides, and also move into the adjoining grasslands during the highest winter tides.	Low. Saltmarsh on-site may provide habitat.
Brazilian free-tailed bat	*Tadarida brasiliensis*	--/--/--	Roosts in large aggregations, primarily in buildings, caves, mines, and bridges. May remain in SF Bay Area during winter, active during dry/warm periods.	High. Potentially suitable habitat present in buildings.
Salt-marsh wandering shrew	*Sorex vagrans halicoetes*	--/CSC/--	Occupies tidal marshes that provide dense cover, abundant food (primarily invertebrates), suitable nesting sites, and fairly continuous ground moisture. Occupies "medium high marsh," about 6 to 8 feet above sea level, and in lower- lying marsh not regularly inundated.	Low. Saltmarsh on-site may provide habitat.
Plants				
Bent-flowered fiddleneck	*Amsinckia lunaris*	--/--/1B	Woodlands and grasslands between 50 and 500 meters elevation.	Low. No occurrences in project area. Not seen in surveys.
Pallid manzanita	*Arcostaphylos pallida*	FT/SE/1B.1	Coastal bluff scrub, cismontane woodland, valley and foothill grassland. Flowers from March to June.	Low. No occurrences in project area. Not seen in surveys.
Alkali milk-vetch	*Astragalus tener* var. *tener*	--/--/1B	Low ground, alkali flats, and flooded lands; in annual grassland, playas, or vernal pools between 1 and 170 meters elevation.	Low. Not known to occur in project area. Not seen during surveys.
Round-leaved filaree	*California macrophylla*	--/--/1B.1	Cismontane woodland, valley and foothill grassland on clay soils. Flowers from March to May.	Low. No occurrences in project area. Not seen in surveys.
Coastal bluff morning-glory	*Calystegia purprata ssp. saxicola*	--/--/1B.2	Coastal dunes, coastal scrub, North Coast coniferous forest. Flowers from May to September	Low. No occurrences in project area. Not seen in surveys.
Point Reyes bird's-beak	*Cordylanthus maritimus* ssp. *palustris*	--/--/1B	Coastal salt marsh with *Salicornia* spp., *Distichlis* spp., and *Spartina* spp. between 0 and 15 meters (49 feet) elevation.	Low. No occurrences in project area. Not seen in surveys. Believed to be extirpated in Alameda and

Table 4.3-1
Special Status Species That Could Occur at the RBC Site

Common Name	Scientific Name	Federal/State/ CNPS Status	Habitat	Likelihood of Occurrence / Notes
				Contra Costa Counties.
Fragrant fritillary	*Fritillaria liliaceae*	--/--/1B.2	Cismontane woodland, coastal prairie, coastal scrub, valley and foothill grassland. Often found in serpentine soils. Flowers from February to April.	Low. No occurrences in project area. Not seen in surveys.
Santa Cruz tarplant	*Holocarpha macradenia*	FT/SE/1B.1	Coastal prairie, coastal scrub, valley and foothill grassland, often on clay or sandy soils. Flowers from June to October.	Low. No occurrences in project area. Not seen in surveys. Believed to be extirpated in Alameda and Contra Costa Counties.
Robust monardella	*Monardella villosa ssp. globosa*	--/--/1B.2	Openings in broadleaf, upland forest and chaparral, cismontane woodland, coastal scrub, valley and foothill grassland. Flowers from June to July.	None. No suitable habitat present.
California seablite	*Suaeda californica*	FE/--/1B	Restricted to the upper intertidal zone of coastal salt marsh along the perimeter of a bay.	Low. No occurrences in project area. Not seen in previous surveys. Believed to be extirpated in Alameda and Contra Costa Counties.

Source: WRA and Jane Valerius Environmental Consulting 2011a

Federal Status
FE = Endangered. Species in danger of extinction throughout all or significant portion of its range.
FT = Threatened. Species likely to become endangered in foreseeable future throughout all or a significant portion of its range.
FPD = Proposed delisting.

California State Status
SE = Endangered. Species whose continued existence in California is jeopardized.
ST = Threatened. Species, although not presently threatened with extinction, that is likely to become endangered in the foreseeable future.
CNPS = California Native Plant Society
CSC = Species of Concern.
RBC = Richmond Bay Campus
SFP = State Fully Protected under Sections 3511 and 4700 of the Fish and Game Code.
SR = State Rare
CFP = California Fully Protected

California Native Plant Society
1A = Plants presumed extinct in California
1B = Plants that are rare or endangered in California and elsewhere.

Salt-Marsh Harvest Mouse

The salt-marsh harvest mouse (*Reithrodontomys raviventris)* is both federally and state endangered. It occurs in saltmarshes and may potentially be found in the RBC site marshland, which provides suitable habitat. It inhabits tidal and non-tidal salt and brackish marshes around the San Francisco Bay. Optimal habitat typically contains a dense mat of vegetation cover and open areas composed of pickleweed (*Sarcocornia pacifica [Salicornia virginiana*]) or other salt marsh species, such as fat hen, salt grass, annual grasses, baltic rush, and alkali heath, with no pickleweed present (WRA and Jane Valerius Environmental Consulting 2011a). This species also can move into adjoining grasslands during high winter tides. Development has removed much of the salt marsh harvest mouse habitat and few mice are considered to survive in created wetlands without peripheral halophyte (salt tolerant upland species) zone.

There is a low potential for saltmarsh harvest mouse to move into the upland habitat during high tides. This species could, but is unlikely, to occur at the RBC site. A saltmarsh harvest mouse survey in Western Stege Marsh in November 2001 found the potential for them to occur to be unlikely. Shellhammer noted that the marshes in the southeastern Richmond Shoreline area are historically new and that previous surveys at the neighboring Hoffman Marsh were also negative.

Bats

Bats use a wide variety of natural and man-made roost sites. Natural roost sites include caves, tree hollows, rock crevices, and exfoliating tree bark. Some species roost only in caves or rock crevices, others only in trees, and others are not as selective. Buildings are important for many bat species and provide significant bat roosting habitat. Bats show high roost fidelity; older structures in particular may have provided roost habitat for decades. Bats select buildings based on a variety of factors that vary by species. Selection factors may include temperature, humidity, building design, materials, location, and proximate human activity. Buildings provide day roosting opportunities in crevices and cavities that afford protection and retain heat during night-roosting hours. Bats are affected by roost disturbance; bats roosting in buildings become habituated to noise from human activity. Typically, if the protection afforded by the roost is sheltered from wind, light, or other disturbances, bats will take up residence in large numbers in structures. More than one bat species can use a structure at one time if it is large enough, and the same structure can be used differentially either daily (i.e., day or night roost), or seasonally (i.e., overwintering [hibernacula] or dispersal roost), or by reproductive status (maternity roost). Old structures provide particularly suitable roost habitat for bats due to the construction materials, design, and often open condition of the surfaces that permit easy entry and exit. Most of the RBC site's potentially occurring bat species live in California year-round and likely change roosts seasonally from hibernacula in the winter to day roosts, night roosts, and maternity roosts in the summer (WRA and Jane Valerius Environmental Consulting 2011a). Because of the variety of locations and patterns that these bats can use, bat use of buildings and trees on site cannot be ruled out for any season.

Special-status bat species with the potential to occur in the existing buildings include the Brazilian freetailed bat (*Tadarida Brasiliensis*), the most common species in the area as there is suitable building habitat on site; also the pallid bat (*Antrozous pallidus*), Townsend's big eared bat (*Corynorhinus townsendii townsendii*), California myotis (*Myotis californicus*), small footed myotis (*Myotis ciliolabrum*), fringed myotis (*Myotis thysanodes*), and Yuma myotis (*Myotis yumanensis*) (WRA and Jane Valerius Environmental Consulting 2011a).

Critical Habitat

Critical habitat is designated by the USFWS. Critical habitat is a specific geographic area determined to be essential for conservation of a threatened or endangered species and possibly requiring special management or protection. There is no critical habitat for any listed species in

or adjacent to the RBC site (WRA and Jane Valerius Environmental Consulting 2011a; USFWS 2012).

4.3.3 Regulatory Considerations

Federal

Endangered Species Act of 1973

The Endangered Species Act (ESA) (16 USC, 1531-1543) and subsequent amendments establish legal requirements for the conservation of threatened and endangered species and the ecosystems on which they depend.

ESA Section 7 requires federal agencies, in consultation with the Secretary of the Interior or the Secretary of Commerce, to ensure that actions they authorize, fund, or carry out are not likely to jeopardize the continued existence of threatened or endangered species or to destroy or adversely modify critical habitat for these species. The USFWS and National Marine Fisheries Service share responsibilities for administering the ESA. Section 7 regulations governing interagency cooperation are in 50 CFR, Part 402. Federal agencies are required to consult with the USFWS or National Marine Fisheries Service on actions that may affect listed species. A resulting Section 7 biological opinion may include a statement authorizing a take (i.e., to harass, harm, pursue, hunt, wound, kill) that might occur incidental to an otherwise legal activity. The LRDP is not a federal action, and is not subject to Section 7 of the ESA. Individual projects implemented under the LRDP would be subject to ESA Section 7 if they were associated with a federal action; in such cases, the federal lead agency is responsible for undertaking the Section 7 process.

Section 9 of the ESA lists prohibited actions, including "take" of listed species of fish and wildlife without special exemption. Take is defined as "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect or attempt to engage in any such conduct." "Harm" includes significant habitat modification or degradation that kills or injures a listed species by significantly impairing behavioral patterns, such as breeding, feeding, or sheltering. "Harass" is defined as actions that significantly disrupt a listed species' normal behavior patterns, including breeding, feeding, and sheltering.

Section 10 of the ESA provides a nonfederal applicant a mechanism to obtain incidental take authorization for federally listed threatened or endangered species.

Clean Water Act

The Clean Water Act (33 USC, 1251-1376) establishes legal requirements for restoring and maintaining the chemical, physical, and biological integrity of the nation's waters.

Section 401 requires an applicant for a federal permit to discharge into waters of the United States to first obtain state certification that the discharge would comply with other Clean Water Act provisions. The RWQCBs administer the certification program in California.

Section 404 establishes a permit program, administered by the USACE, regulating dredge or fill material discharge into waters of the US, including wetlands. Under Clean Water Act Section 404, a wetland is determined by hydric soils, hydrophytic vegetation, and wetland hydrology.

The USACE's Section 404 implementing regulations are in 33 CFR, Parts 320-330. Implementation guidelines, referred to as the Section 404(b)(1) Guidelines, were developed by the EPA and the USACE (40 CFR, Part 230). The guidelines allow the discharge of dredged or

fill material into an aquatic system only if there is no practicable alternative that would have less adverse impact.

To be protected under Sections 404 and 401 of the Clean Water Act, wetlands and other waters of the US must be one of the following:

- Traditional navigable waters;
- Wetlands next to traditional navigable waters;
- Nonnavigable tributaries of traditional navigable waters that are relatively permanent, where the tributaries typically flow year-round or have continuous flow at least seasonally (e.g., typically three months); or
- Wetlands that directly abut the tributaries described in the previous bullet (USACE 2008).

The USACE would decide jurisdiction over the following waters, based on a fact-specific analysis, to determine whether they have a significant nexus with a traditional navigable water:

- Nonnavigable tributaries that are not relatively permanent;
- Wetlands next to nonnavigable tributaries that are not relatively permanent; or
- Wetlands next to but that do not directly abut a relatively permanent nonnavigable tributary.

Migratory Bird Treaty Act

The MBTA (16 USC, 703-711) is a treaty signed by the United States, Canada, Mexico, and Japan that makes it unlawful at any time, by any means or in any manner, to pursue, hunt, take, capture, or kill migratory birds. The law applies to the removal of nests (such as swallow nests on bridges) occupied by migratory birds during the breeding season. The MBTA makes it unlawful in the United States to take these species, their nests, their eggs, or their young.

Noxious Weed Act of 1974

This act provides for the control and management of nonindigenous weeds injurious or potentially injurious to agricultural and commercial interests, wildlife resources, or the public health. Under this act, the Secretary of Agriculture has the authority to designate plants as noxious weeds and to inspect, seize, and destroy products and to quarantine areas, if necessary, to prevent the spread of such weeds.

Fish and Wildlife Conservation Act, 16 USC 2901

This Act encourages all federal departments and agencies to use their statutory and administrative authority, to the maximum extent practicable and consistent with each agency's statutory responsibilities, to conserve and promote conservation of nongame fish and wildlife and their habitats.

Executive Order 13112 – Invasive Species

Federal agencies are directed to use their authorities to prevent, detect, eradicate, and control invasive species in a cost effective and environmentally sound manner. Agencies should not authorize or fund activities that would introduce and spread invasive species in the US unless the activity benefits would clearly outweigh the harm and all feasible and prudent measures to minimize the harm would be taken.

Executive Order 13186 – Responsibilities of Federal Agencies to Protect Migratory Birds

Federal agencies whose actions are likely to negatively impact migratory bird populations are directed to develop and implement with USFWS, within two years, a memorandum of understanding that promotes migratory bird populations. To support the migratory bird conventions, federal agencies should:

- Integrate bird conservation principles, measures, and practices into agency activities;
- Avoid or minimize, to the extent practicable, adverse impacts on migratory bird resources when conducting agency actions; and
- Restore and enhance migratory bird habitat.

State

California Environmental Quality Act

CEQA (PRC. 21000 et seq.) was enacted in 1970 to fully disclose environmental impacts prior to state and local public agency discretionary action such as project approval or permit issuance. With regard to biological resources, CEQA considers other plants to be "sensitive" (or "special status"), in addition to federally or state listed species (14 CCR, Chapter 3, Article 20), Section 15280). Sensitive species include plants on the CNPS List 1A (presumed extinct), List 1B (rare, threatened, or endangered in California and elsewhere; eligible for state listing), or List 2 (rare, threatened, or endangered in California but more common elsewhere; eligible for state listing). To be conservative, CNPS List 3 (plants for which more information is needed) and List 4 (plants of limited distribution) are also considered sensitive. Sensitive wildlife species include federally or state listed species as well as CDFW-listed wildlife species of special concern.

California Endangered Species Act

The California Endangered Species Act (CESA) (Fish and Game Code 2050 et seq.) establishes the policy of the state to conserve, protect, restore, and enhance threatened or endangered species and their habitats. CESA mandates that state agencies not approve projects that would jeopardize the continued existence of threatened or endangered species if reasonable and prudent alternatives are available. There are no state agency consultation procedures under CESA. For projects that affect a species listed under both CESA and the federal ESA, compliance with the federal ESA would satisfy CESA if the CDFW were to determine that the federal incidental take authorization is consistent with CESA under Fish and Game Code Section 2080.1. For projects that would result in a take of only a state listed species, the applicant must apply for a take permit under Section 2081(b).

Native Plant Protection Act

California's Native Plant Protection Act (Fish and Game Code, 1900-1913) requires all state agencies to use their authorities to conserve endangered and rare native plants. Provisions of the Native Plant Protection Act prohibit the taking of listed plants from the wild and require a land owner to notify the CDFW at least 10 days in advance of any change in land use where the CDFW has notified the land owner of the presence of rare or endangered plants. This allows the CDFW to salvage listed plant species that would otherwise be destroyed. The applicant is required to conduct botanical inventories and consult with the CDFW, as appropriate, during project planning to comply with the provisions of this act and sections of CEQA that apply to rare or endangered plants.

Streambed Alteration Agreements, Fish and Game Code, Sections 1600-1616

Under the Fish and Game Code, CDFW jurisdiction occurs in any natural river, stream, or lake water body. The term stream, including creeks and rivers, is defined in Title 14, California Code

of Regulations (CCR), Section 1.72. An applicant is required to notify CDFW before constructing any project that would divert, obstruct, or change the natural flow, bed, channel, or bank of any river, stream, or lake. Preliminary notification and project review typically occur during the environmental process. When a fish or wildlife resource may be substantially adversely affected, CDFW is required to propose reasonable project changes to protect the resource. These modifications are formalized in a Streambed Alteration Agreement that becomes part of the plans, specifications, and bid documents for the project.

Fish and Game Code, Sections 3511, 4700, 5515, and 5050

The Fish and Game Code states that fully protected species "...may not be taken or possessed at any time and no provision of this code or any other law would be construed to authorize the issuance of permits or licenses to take any fully protected species, although take may be authorized for necessary scientific research." This "fully protected" designation was the strongest and most restrictive regarding the take of these species. In 2003, the code sections dealing with fully protected species were amended to allow the CDFW to authorize take resulting from recovery activities for state-listed species.

Fish and Game Code, Sections 3503 and 3513

Section 3503 prohibits the take and possession of any bird egg or nest, except as otherwise provided by this code or subsequent regulations. Section 3513 provides for the adoption of the MBTA's provisions. As with the MBTA, this state code offers no statutory or regulatory mechanism for obtaining an incidental take permit for the loss of nongame migratory birds. The administering agency for these sections is the CDFW.

Local

The proposed RBC site is University-owned property where work within the University's mission is performed on land owned or controlled by The Regents. As a state entity, the University is exempt under the state constitution from compliance with local land use regulations, including general plans and zoning. However, the University seeks to cooperate with local jurisdictions to reduce any physical consequences of potential land use conflicts to the extent feasible. The RBC site is in the city of Richmond. The following sections summarize objectives and policies from the City of Richmond General Plan and the Eastshore State Park General Plan as they relate to biological resources.

City of Richmond 2030 General Plan

The City of Richmond 2030 General Plan – Conservation, Natural Resources and Open Space (City of Richmond 2012) contains the following goals, policies, and actions related to biological resources:

GOAL CN1: Preserved and Restored Natural Habitat and Biodiversity. Continue to preserve and restore natural habitat and associated plants and wildlife including wetlands, baylands, riparian areas, oak woodlands and other sensitive biological resources. Take restoration efforts such as controlling invasive species, re-establishing natives, daylighting creeks and reclaiming priority conservation areas to maintaining critical habitat and biodiversity. Carefully balance natural lands, habitat and protection of multiple species with the need to accommodate development.

The following policies (more detail is available in the plan) are outlined in relation to Goal CN1:

- **Policy CN1.1 – Habitat and Biological Resources Protection and Restoration.** Natural habitat is essential to ensuring biodiversity and protecting sensitive biological resources.
- **Policy CN1.2 – Local Native Plant Species.** Promote the use of locally propagated native plant and tree species and remove and control the spread of invasive exotic plant species.
- **Policy CN1.3 – Urban Creek Restoration.** Encourage the restoration of urban creeks and coordinate with property owners and local interest groups in the restoration efforts.

The following actions (more detail is available in the plan) are outlined in relation to this Goal CN1:

- **Action CN1.A – Habitat Conservation.** Work closely with Contra Costa County, the East Bay Chapter of the CNPS, and the East Bay Regional Park district to develop habitat conservation plans.
- **Action CN1.B – Priority Conservation Areas.** The City will identify areas of the City with significant natural habitat, open space and recreation resources and promote conservation, preservation and environmental rehabilitation.
- **Action CN1.C – Creek Access Easement.** Identify and create access easements, where practical, for creek maintenance and public access to creekside amenities.
- **Action CN1.D – Creek Corridor Performance Standards.** Establish performance standards for creek corridors.
- **Action CN1.E – Habitat Restoration.** Work with other jurisdictions, public and private property owners to restore sensitive habitat that has been degraded, but has potential for rehabilitation including brownfield and contaminated sites.
- **Action CN1.F – Special Status Species Protection Methods.** Implement the special status survey methods of the CDFW, USFWS, Contra Costa County Department of Agriculture and CEQA requirements.
- **Action CN1.G – Landscape Design Guidelines.** Update and implement the City's Landscape Design and Development Guidelines to conform to bay friendly landscape standards.
- **Action CN1.H – Urban Creek Restoration.** Where feasible, restore creek corridors in urban areas. Creeks currently diverted in culverts or hardened channels should be restored to their natural state.

GOAL CN2: Conserved Open Space. Conserve open space to ensure that Richmond's expansive shoreline, network of parklands, trails, hillsides and undeveloped natural areas remain viable in supporting biological communities and providing sanctuary for future generations. Conserve open space, expand public access to open space, where appropriate, and acquire additional lands where feasible. Continue to protect surrounding hills and viewsheds as character-defining features that provide scenic backdrops and publicly accessible trails and vistas.

The following policies (more detail is available in the plan) are outlined in relation to Goal CN2:

- **Policy CN2.1 – Open Space and Conservation Areas.** Preserve open space areas along the shoreline, creeks, and in the hills to protect natural habitat and maintain the integrity of hillsides, creeks and wetlands.
- **Policy CN2.2 – Richmond Shoreline.** Conserve, protect and enhance natural and cultural resources along the Richmond shoreline.
- **Policy CN2.3 – Natural Topography and Hillside Protection.** Protect natural topography to preserve and enhance Richmond's natural beauty and require developers to concentrate residential development below the 400 foot elevation.
- **Policy CN2.4 – Agricultural Lands.** Preserve agricultural lands for sustained crop production, grazing and farming.
- **Policy CN2.5 – Access to Large-Scale Natural Areas.** Improve access to large-scale natural areas in the City including regional parks along the shoreline and in the hills.
- **Policy CN2.6 – Protect Soil and Reduce Erosion.** Minimize soil depletion and erosion. Prevent erosion caused by construction activities. Retain natural vegetation and topography and minimize grading of hillsides.
- **Policy CN2.7 – Parkland Preservation.** Maintain high quality parklands and play areas to serve current and future residents. Require new development and redevelopment projects to provide additional parkland or funding to purchase and maintain parklands.
- **Policy CN2.8 – Mineral Resources.** Preserve mineral resources in undeveloped areas that have been classified by the State Mining and Geology Board as having statewide or regional significance for possible future extraction.

The following actions (more detail is available in the plan) are outlined in relation to Goal CN2:

- **Action CN2.A – Transfer of Development Rights Program.** Develop a program that targets areas for Transfer of Development Rights (TDR) which exchange development privileges from natural areas to parts of the City with infill or redevelopment potential.
- **Action CN2.B – Open Space Easements.** Consider opportunities for establishing open space easements where natural resources may be protected or accessed on private property.
- **Action CN2.C – Parkland Dedication Ordinance.** Update the parkland dedication ordinance that requires new development and redevelopment projects to provide adequate park and recreation opportunities to maintain the 3.0 acres per 1,000 population standard in applicable planning areas through a combination of park types as defined in the Parks and Recreation Element (to be updated and refined in the parks master plan).
- **Action CN2.D – Open Space Plan.** Develop and implement an open space plan to enhance public open space in the City.

The remainder of the goals, policies, and actions in the plan that could indirectly affect biological resources include Goal CN3 – Improved Water Quality, Goal CN4 – Improved Air Quality, Goal CN5 – Environmental Sustainability, and Goal CN6 – A Healthy Urban Environment.

The 2030 General Plan EIR determined that biological resources impacts from future development pursuant to the General Plan would be less than significant. Future development would not significantly impact special status species either directly or through habitat modification. It would not significantly interfere with the movement of native resident or

migratory fish or wildlife species or have a significant adverse effect on wetlands, riparian habitat, or other sensitive natural communities. It would not conflict with any local policies or ordinances protecting biological resources. No mitigation measures would be required. Cumulative impacts would be less than significant.

Eastshore State Park General Plan

The Eastshore State Park General Plan was adopted to guide future efforts to balance recreation and conservation, protect and enhance the natural resource base, and expand opportunities for public enjoyment of the shoreline setting of the park. Policies that apply to the South Richmond shoreline portion of the state park are:

- **PI/SR-7:** Removal of invasive exotic plant species and re-vegetation with native plant species in Hoffman Marsh and along South Richmond shoreline.
- **PI/SR-8:** Coordinate with the owners of the adjacent tidal marsh, mudflat, subtidal, and upland habitat areas to ensure adequate protection of this valuable natural area.
- **PI/SR-9:** Explore the possibility of adding one or two new vista point seating areas along the Bay Trail north of Point Isabel.
- **PI/SR-10:** Incorporate interpretive panels into the vista points and other key points along the Bay Trail that explore the natural, cultural and social history of this portion of the park project.
- **PI/SR-11:** Provide fencing along the Bay Trail where necessary to protect tidal marshes, tidal mudflats, and water birds from disturbance.

4.3.4 Impacts and Mitigation Measures

Standards of Significance

The impacts on biological resources from campus development under the 2014 LRDP would be considered significant if they would exceed the following Standards of Significance, in accordance with Appendix G of the *State CEQA Guidelines* and the UC CEQA Handbook:

- 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 Wildlife or US Fish and Wildlife Service;
- 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 Wildlife or US Fish and Wildlife Service;
- 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; or
- 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;
- Conflict with any local applicable policies protecting biological resources.

CEQA Checklist Items Adequately Addressed in the Initial Study

The analysis in the Initial Study prepared for the project and circulated with the NOP concluded that further analysis of the following issue was not required in the EIR:

- Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other applicable habitat conservation plan.

The RBC site and its vicinity is not known to be subject to or designated for any adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved conservation plan. Further analysis is not required.

Analytical Methods

Methods used to evaluate biological resources impacts included CNDDB searches (CNDDB 2012), several biological reports documenting surveys and assessments conducted at the RFS, both specifically for this project and for previous projects. These include the RFS Habitat Assessment Report and RFS Constraints Analysis (WRA and Jane Valerius Environmental Consulting 2011a, 2012), the RFS Remediation Project IS (URS 2003), UC Richmond Field Station's Remnant Coastal Terrace Prairie (Amme 2005), the RFS Grasslands constraints Analysis (WRA and Jane Valerius Environmental Consulting 2013), and Richmond Field Station Remediation Project Biological Assessment Report (Blasland, Bouck, and Lee, Inc. 2003). Methods included consultation with experts on California grasslands at UC Berkeley. Tetra Tech conducted a general biological survey (Tetra Tech 2013a) in January 2013. This survey assessed the current conditions of the southeastern portion of the RBC site existing habitats, and included identification of potential wetland areas. Tetra Tech conducted a wetland delineation survey in February 2013 to identify potential wetland boundaries in the same area (Tetra Tech 2013b).

RBC 2014 LRDP Policies

The RBC 2014 LRDP policies related to biological resources include the following:

- LU1 – Land Use Policy on Development Capacity: Provide for development of up to 5,400,000 square feet of facilities.
    - Maximize density to reduce overall building footprints, conserve open space, and share attractive views.
- OSL1 – Open Space and Landscape Policy on Primacy of Landscape: The landscape of the Richmond Bay Campus, its unique location at the edge of San Francisco Bay, and the coastal prairie grasslands will be protected and featured in the daily experience of the campus.
    - Feature ornamental landscaping at the public realm and entry points to create a more welcoming and vibrant campus; the palette will be selected for non-invasives and with sensitivity to protection of natural open spaces.
    - Implement feasible means to effectively remove and stop the spread of invasive species from sensitive marsh and grasslands.
    - Establish buffers, setbacks, and procedures to review new plantings to protect and enhance coastal plant communities and wildlife habitat on the site.
    - Provide visual connections to the bay, surrounding hills, and natural features of the site and incorporate interpretive elements, public art, and signs into the open space areas to create educational opportunities.

    - Refer to the site's natural features and employ ecologically-sensitive native plantings in the site's landscape design.

- OSL3 – Open Space and Landscape Policy on Sustainability: New landscapes will be consistent with "Bay-friendly" design.
    - Design landscaping that does not rely on irrigation from potable water after an initial establishment period. Specify native species where practical and foster biodiversity which supports and enhances local ecosystems. Coordinate landscape design and maintenance efforts with the surrounding community where possible.
- S9 – Sustainability Policy on Health and Wellness: Richmond Bay Campus development will promote health and wellness of the community, including employees, visitors, and ecosystems associated with the site.
    - Provide walkways with signs interpreting the ecological value of the grassland and marsh areas.

LRDP Impacts and Mitigation Measures

LRDP Impact BIO-1: Development under the 2014 LRDP would not have a substantial adverse effect on special-status plant species. *(Less than Significant)*

The RBC site includes natural areas such as the Western Stege Marsh and coastal grasslands (Figure 4-8). While these areas provide potential habitat for some special-status plant species (Table 4.3-1), no special-status plants have been observed in these habitats during site surveys.

As shown in Figure 4-8, the proposed 2014 LRDP designates approximately 25 acres of the RBC site as Natural Open Space. This designation encompasses those areas the University plans to protect from development and restore and/or maintain in their natural condition. Disturbance of these natural areas would be limited under the LRDP. Minor disturbance from maintenance, research, and educational activities would be expected on occasion. Improvements in these zones would be limited to minor access roads for maintenance vehicles and interpretive boardwalks or pathways, consistent with conservation goals.

Because no special-status plant species have been documented on the site during extensive botanical surveys (Amme 1993, Lidicker et al. 2003, URS 2007, WRA and Jane Valerius Environmental Consulting 2011a) or by the CNDDB, it is unlikely that protected species are present. Because the areas with the most suitable habitat for special-status plant species would be protected from development and no special-status species have been documented, impacts on special-status plant species are not likely to occur from LRDP implementation. Effects on sensitive natural communities are described under LRDP Impact BIO-5.

Mitigation Measure: No mitigation measure is required.

LRDP Impact BIO-2: **Development under the 2014 LRDP could adversely affect special-status bird species protected under the MBTA, ESA, and/or CESA and result in nest abandonment and reproductive failure.** ***(Potentially Significant; Less than Significant with Mitigation)***

The RBC site includes natural areas such as the Western Stege Marsh and coastal grasslands and numerous older, wooden buildings that could be nesting or roosting sites for various bird species (Figure 4-8). These areas provide potential nesting habitat for special-status bird species (Table 4.3-1). There is a high potential for nesting passerines, protected by the MBTA, to occur in multiple RBC site habitats. These include saltmarsh common yellowthroat and Alameda song sparrow in Western Stege Marsh; black phoebe on man-made structures; and western meadowlark in grasslands. California clapper rail, listed as endangered under the ESA and CESA, has been documented in Western Stege Marsh. Burrowing owl and California black rail, state threatened species, have not been documented on-site, but the site does contain potential owl (grasslands) and clapper rail (marsh) habitat. Raptors, protected by the MBTA and California Code Sections 3503 and 3503.5, are likely present as described in Section 4.3.2.

Because the RBC site provides suitable nesting habitat for MBTA, ESA, and/or CESA-protected birds, loud noise within 100 feet of nests during the nesting period (approximately March 1 through August 15) could result in nest abandonment and "take" of young. Such noise could be from building demolition and construction, site preparation, utilities rerouting, and tree removal during construction.

The construction footprint would be outside of clapper rail habitat and thus minimize potential noise impacts. Nevertheless, noise and other human disturbance—especially related to construction and demolition activities—near the marsh could affect avian use and result in flushing, avoidance, or nest abandonment.

The projected campus population increase from 300 to 10,000 by 2050 could cause indirect impacts on nesting birds. This population increase would have the potential to result in long-term adverse impacts on special status species birds from operations. More people on the site would increase the probability of humans and pets walking into or near sensitive habitats such as Western Stege Marsh, which could alter bird behavior. Although not likely, disturbance of nesting birds, including the endangered California clapper rail, could decrease reproductive success. Also indirect disturbance from nearby operational noise sources could occur. Because campus facilities would not be located within the Natural Open Space areas, there are not likely to be direct effects on Western Stege Marsh.

Implementing LRDP MM BIO-2 would reduce potential impacts on special-status birds from construction and operations to less than significant.

LRDP MM BIO-2: Where practical, avoid construction, demolition, or renovation activities in areas adjacent or nearby to marshland nesting bird habitat during the nesting season (March 1 – August 31).

If construction, demolition, or renovation were proposed to occur in areas adjacent or nearby to marshland nesting habitat during the nesting season, a nesting bird survey shall be performed by a qualified biologist up to approximately 7 days prior to work commencing, up to 100 feet beyond the project boundary. If no birds or evidence of birds are found, no further action is required, provided work commences within approximately 1 week of the

survey to prevent "take" of individual birds that may have begun nesting after the survey.

If active nests or young are observed during the pre-construction surveys, construction, demolition, or renovation in the affected project area shall not commence within 100 feet of the occupied nest until after the young have fledged.

Engage in ESA Section 7 consultation (formal or informal, as appropriate) with the USFWS for implementation level LRDP components if those components constitute a federal action (approvals or funding) to address any potential impacts on California clapper rail. Develop appropriate measures with USFWS and implement them.

Establish a 150-foot-wide temporary "no disturbance" buffer around the wetland/upland boundary of Western Stege Marsh/Meeker Slough when construction occurs during the breeding season (mid-March to July). This buffer would protect and buffer potential California clapper rail habitat and nesting areas during construction by prohibiting entry into this area.

Post interpretative California clapper rail signs in and near Western Stege Marsh/Meeker Slough. Signs should include seasonal use restrictions (e.g., stay on designated trails, pets on leash), to reduce disturbance potential during construction and operations.

LRDP Impact BIO-3: **During the bat breeding season, tree and building removal and other construction activity associated with development under the proposed 2014 LRDP could result in a substantial adverse effect on bats.** ***(Potentially Significant; Less than Significant with Mitigation)***

Several bat species may occur at the RBC site (Table 4.3-1). Brazilian free-tailed bat is the most likely to occur. No bat species federally or state-listed as threatened or endangered are likely to occur. One species, pallid bat, is a California species of concern. Bats may inhabit abandoned RBC buildings or exfoliating tree bark crevices or hollow tree cavities. This would most likely occur in the site's perimeter areas. Tree and building removal could result in direct bat mortality. Construction noise and human disturbance could cause maternity roost abandonment and subsequent death of young. With implementation of LRDP MM BIO-3, the proposed project would not result in a substantial adverse effect on bats, and the effect would be reduced to less than significant. This measure would apply to all project sites containing trees and buildings suitable for bat roosts.

LRDP MM BIO-3: 2014 LRDP implementation projects shall avoid disturbance to special-status bats' maternity roosts during the breeding season in accordance with the following procedures for Pre-Construction Special-Status Bat Surveys and Subsequent Actions. No more than 2 weeks prior to commencement of any concrete breaking or similarly noisy construction/demolition activity during the breeding season (March 1 through August 31), a qualified bat biologist shall conduct pre-demolition surveys of all potential special-status bat breeding habitat in the disturbance vicinity. Depending on the survey findings,

the following actions shall be taken to avoid potential adverse effects on breeding special-status bats:

1. If active roosts are identified during pre-construction surveys, a no-disturbance buffer shall be created by the qualified bat biologist, in consultation with the CDFW, around active roosts during the breeding season. The size of the buffer shall take into account factors such as:
   a. Noise and human disturbance levels at the project site and the roost site at the time of the survey and the noise and disturbance expected during the construction,
   b. Distance and amount of vegetation or other screening between the project site and the roost, and
   c. Sensitivity of individual nesting species and the behaviors of the bats.
2. If pre-construction surveys indicate that no roosts of special-status bats are present, or that roosts are inactive or potential habitat is unoccupied, no further mitigation is required.
3. Pre-construction surveys are not required for demolition or construction scheduled to occur during the non-breeding season (September 1 through February 28).
4. Noisy demolition or construction as described above (or activities producing similar substantial increases in noise and activity levels in the vicinity) commencing during the non-breeding season and continuing into the breeding season do not require surveys (as it is assumed that any bats taking up roosts would be acclimated to project-related activities already under way). However, if trees are to be removed during the breeding season, the trees shall be surveyed for roosts prior to their removal, according to the survey and protective action guidelines 1a through 1c, above.
5. Bat roosts initiated during demolition or construction are presumed to be unaffected by the activity and a buffer is not necessary.
6. Destruction of roosts of special-status bats and overt interference with roosting activities of special-status bats shall be prohibited.
7. The noise control procedures for maximum noise, equipment, and operations identified in Section 4.10, Noise, shall be implemented.

LRDP Impact BIO-4: Development under the 2014 LRDP would not have a substantial adverse effect on monarch butterfly. *(Less than Significant)*

The monarch butterfly is not listed as threatened or endangered under either the ESA or CESA, but it is considered by the state of California to be either restricted in its distribution, declining throughout its range, or associated with declining habitats in California. This butterfly has been documented at the RBC site and occupies the eucalyptus stands and the developed, horticultural landscaped areas (Figure 4-8). This species uses the eucalyptus trees during the winter months

for cover and thermal regulation. Eucalyptus tree removal would reduce the available habitat for monarch butterflies. As described earlier (Section 4.3.3, Eucalyptus Stands subsection), eucalyptus creates habitat that attracts monarchs, but that habitat may act as a "sink" - attracting monarchs to a habitat that can be harmful to the species. Therefore, eucalyptus removal would have a mixed effect that is neither exclusively adverse nor beneficial. The LRDP's impacts on the monarch butterfly would not be considered substantial adverse effects on the monarch butterfly because it is not a special-status species. LRDP ENVIRONMENTAL PROTECTION PRACTICE BIO-4 could be implemented to further reduce the magnitude of these effects.

LRDP ENVIRONMENTAL PROTECTION PRACTICE BIO-4:

The University could develop and implement a successional tree planting plan that would maintain the availability of monarch butterfly wintering habitat at the RBC site.

Mitigation Measure: No mitigation measure is required.

LRDP Impact BIO-5: Development under the 2014 LRDP could have a substantial adverse effect on sensitive natural communities. *(Potentially Significant; Less than Significant with Mitigation)*

Campus development under the 2014 LRDP could have adverse effects on the RBC site coastal-terrace prairie grassland habitat. Construction and operational activities and a campus population increase would potentially increase risk of adverse impacts on the high quality grasslands. Direct impacts, such as soil compaction, could occur from people driving vehicles through the grasslands. Indirect impacts include increased potential weed intrusion due to construction-related soil perturbation and unintentional seed distribution from the increased numbers of people and vehicles. This potential effect is addressed below.

There are 22 acres of high quality grassland habitat, considered a sensitive natural community, at the RBC site. These are within the Big Meadow, Northwest Meadow, West Meadow, and EPA Meadow North (WRA and Jane Valerius Environmental Consulting 2013). In 15 of the 22 high quality grassland acres, comprising the majority of the area within the Big, West, and EPA North Meadows, direct impacts from the LRDP would be minimal, as these acres would be part of the 25-acre Natural Open Space area. The purpose of this open space would be to retain these resources in their natural condition. The activities that would occur in protected coastal terrace prairie grassland habitat would be limited to maintenance, field research, and education. Improvements in this zone would be limited to minor access roads and structures, and boardwalks or pathways to facilitate maintenance, field research, and education. There would be a buffer between grasslands and new buildings (see Figures 3-3 and 3-4).

As noted, the LRDP designates 15 of 22 high quality grassland acres as part of the 25.2-acre Natural Open Space. Approximately seven acres of high quality grassland, including the Northwest Meadow and outside edges of the Big Meadow, would be within the Research, Education and Support Area as indicated on Figure 4-8. The Northwest Meadow is newly identified as "high quality" as the result of a recent study (WRA and Jane Valerius Environmental Consulting 2013). This study found that, "Only four of the seven listed plant species were Rank A or B so this area did not meet the URS criteria for defining high quality grassland habitat. However, since 2007 the presence of California oatgrass and purple needlegrass has increased in this area making it a high quality grassland habitat based on the membership rules as defined by the Manual of California Vegetation (Sawyer et al. 2009)." The Northwest Meadow and the additional high quality grassland habitat acreage within the Research, Education and Support area may be developed as defined in the LRDP for the Research, Education and Support land use

designation. Campus researchers have noted that the coastal terrace prairie on the RFS site is today threatened by invasives (Sousa and Suding 2013). Invasive plants and Harding grass in particular have been spreading rapidly. In 1984 exotic annuals comprised 22 percent of the standing crop, and a 2007 report concluded that Harding grass covered over 40 percent of the grassland (RFS 2012 Restoration Report, ESPM 187). Implementation of the 2014 LRDP and the mitigation measures below would result in a net benefit to the quality and continuing preservation of the sensitive natural coastal terrace prairie community at the project site, over existing conditions.

LRDP ENVIRONMENTAL PROTECTION PRACTICE BIO-5

Currently, and continuing if the LRDP is adopted, the University would mow open space areas consistent with the 2008 report, Richmond Field Station Remediation and Restoration Project Habitat Restoration Progress Report 2003 – 2007, Appendix 2 "Guidelines for Mowing Harding Grass Within and Adjacent to Coastal Terrace Prairie Habitat at the University of California, Richmond Field Station."

With implementation of the LRDP, including the mitigation measures described below, indirect impacts from individual construction projects and operations on high quality grasslands would be less than significant. Direct impacts on high quality grasslands would also be less than significant.

LRDP MM BIO-5: Mitigation for LRDP-related impacts on grasslands will expand as the campus grows.

a) Any project proposed under the LRDP, whether in or outside of the Natural Open Space area, shall include a construction and operation management plan to minimize the threat of weeds to these grasslands.

b) As initial projects under the LRDP are implemented, proactive (not passive) measures to improve the quality of the native grasslands in the Natural Open Space area shall be funded and undertaken. This may take the form of support for research and education into effective restoration. Possible fund sources include the UC Berkeley Capital Renewal Program, which assesses a four percent fee on all capital budgets (UC Berkeley 2013).

c) Once a project that may alter high quality grassland within the Natural Open Space land use zone for minor access roads or structures or to construct boardwalks is proposed, the University shall prepare a grassland management plan to guide conservation and enhancement efforts, as well as the siting of boardwalks and minor access roads and structures in a resource-sensitive manner. The plan shall include weed management actions, annual monitoring and reporting, and adaptive management sufficient to maintain or improve the quality of the grasslands preserved in the designated Natural Open Space. The effectiveness of the plan shall be continually evaluated and the plan adjusted as needed.

d) Prior to any action to develop the Northwest Meadow or to develop other designated high quality grasslands outside of the Natural Open Space land use zone, the University shall plan and

implement a program to use the native plant stock from such area to aid enhancement and restoration in Natural Open Space grassland areas not currently designated high quality, and to develop or restore meadow acreage elsewhere. Possible locations include formal landscaped open areas of the RBC, roof tops of buildings at the RBC, demonstration meadows at UC Berkeley or in the city of Richmond that help explain the former extent of regional coastal terrace prairie grasslands.

LRDP Impact BIO-6: **Development under the 2014 LRDP could have a substantial adverse effect on federally protected wetlands.** ***(Potentially Significant; Less than Significant with Mitigation)***

Campus development under the 2014 LRDP could result in adverse impacts on potentially jurisdictional RBC site waters, including drainages and wetlands (Figure 4-8). Wetlands and potential wetlands are described in Section 4.3.2. Most development projected under the 2014 LRDP would have no potential to impact jurisdictional waters. However, some specific development could fill in or create a potential for accidental discharges to jurisdictional waters. Any campus development project resulting in permanent or temporary fill of jurisdictional waters would most likely be subject to provisions of Sections 401 and 404 of the Clean Water Act, Sections 1600 through 1616 of the California Fish and Game Code, and the Porter Cologne Act. Such projects may qualify for a nationwide permit (NWP) issued by the USACE. The most likely applicable NWP for RBC projects would be NWP 39, *Residential, Commercial, and Institutional Developments*. Although nationwide permit specifications vary, NWP 39 typically applies where jurisdictional waters are less than 0.5 acre in area and no more than 300 linear feet of intermittent or perennial stream are to be filled. Even if these limitations are met, the USACE has discretion under certain circumstances to require a more stringent individual permit.

Any project requiring USACE authorization also must obtain a Section 401 RWQCB certification or waiver of certification. These must be obtained prior to project implementation and would stipulate approval conditions designed to minimize adverse effects on wetland resources. Acquisition of these permits is a regulatory requirement and is not considered mitigation for loss of waters of the US. However, the processes for obtaining any state or federal wetlands permits involve the development of compensatory actions similar to CEQA-derived mitigation in scope and intent. In addition to the acquisition of necessary permits, implementation of the mitigation measure LRDP MM BIO-6 would reduce potential impacts on jurisdictional waters to less than significant levels.

With respect to other wetlands within or near the RBC site, including the Western Stege Marsh and Meeker Slough, no development is planned in the marsh or the slough, so there would be no direct impacts. Indirect impacts on wetlands in these areas would be minimized with measures described in LRDP MM BIO-6.

LRDP MM BIO-6: **BIO-6a:** 2014 LRDP development projects shall avoid, to the extent feasible, the filling of or discharging to potentially jurisdictional waters. Therefore, during the design phase of any future development project that may affect potentially jurisdictional waters, a preliminary evaluation of the project site shall be made by a qualified biologist to determine if the site is proximate to potentially jurisdictional waters and, if deemed necessary by the biologist, a wetlands delineation shall be prepared and submitted to the USACE for verification.

Because the USACE's preferred mitigation for impacts to jurisdictional waters is avoidance, 2014 LRDP development shall be located to avoid the filling of or discharging to jurisdictional waters to the extent practicable.

BIO-6b: Any unavoidable loss of jurisdictional waters shall be compensated for through the development and implementation of a project-specific wetland mitigation plan.

If a 2014 LRDP development project were to potentially impact jurisdictional waters, impact compensation would be based on the USACE-verified wetlands delineation identified in Mitigation Measure BIO-6a. During the permit application process for specific development projects that would impact jurisdictional waters, the University would consult with the USACE, CDFW, and San Francisco Bay RWQCB. The consultation would be to identify the most appropriate assessment and mitigation methods to adequately address losses to wetland function that could occur from the development projects. A project-specific wetland mitigation plan would be developed prior to project implementation and submitted to permitting agencies for their approval. The plan may include on-site or off-site restoration or creation or purchasing of credits from a wetland mitigation bank.

All mitigation work proposed in existing wetlands on- or off-site shall be authorized by applicable permits.

BIO-6c: To the extent feasible, construction projects that might affect jurisdictional drainages or wetlands shall be scheduled for dry-weather months. Avoiding ground-disturbing activities during the rainy season would further decrease the potential risk of construction-related discharges to jurisdictional waters.

LRDP Impact BIO-7: Development under the 2014 LRDP would not have a substantial adverse effect on fish and wildlife movement, migratory corridors, or nursery sites. (*Less than Significant*)

The primary RBC site wildlife movement corridors are the Western Stege Marsh to the south, Meeker Slough along the western border, and the grassy meadows on the western portion of the site (Figure 4-8). The eucalyptus stands also provide movement corridors for those species that require more cover, such as wild turkey, brown towhee, and raccoon. The existing developed areas provide less cover and fewer foraging opportunities, so they have limited value as wildlife movement corridors. Common species that frequent human-altered landscapes, such as raccoons, skunks, opossums, and some songbird species, may move through these areas.

In the short-term, wildlife movement at the RBC site, may be affected by noise, dust, and the presence of people and machinery during construction. Most of these types of impacts would occur in the site's already developed areas and would affect species that are the least sensitive to human activity, such as raccoons, skunks, opossums, and some common songbird species. These effects would primarily be changes in movement patterns. Birds might flush due to noises and movements and temporarily avoid using the area.

More sensitive species and habitats occur in the marsh and slough and in the high quality coastal-terrace grasslands that are outside the development footprint, and in areas that would be designated as Natural Open Space. Thus, in the short-term, these areas would not be directly affected during construction. Noise, dust, and movement associated with construction activities adjacent to the Natural Open Space, could have minor short-term effects by altering behavior during construction.

In the long-term, there would be minor adverse effects on wildlife movement corridors due to the presence of additional people and vehicles on the RBC site. Common wildlife species that frequent human-altered habitats would continue to use the developed portions of the site for movement, potentially in fewer numbers due to increased density of buildings. Wildlife movement through the grasslands and marsh that would be part of the Natural Open Space would continue. The frequency of wildlife being disturbed from human presence in these areas would likely increase slightly due to more people being present. Measures described previously, including lighting aimed away from Natural Open Space and interpretative signs, would help minimize disturbance of wildlife movements.

Effects on wildlife movement at the RBC site would not be substantial because the primary corridors would remain intact, although narrowed due to the potential development of the Northwest Meadow, and be protected via the Natural Open Space designation. Most of the construction and activity from operations would occur in areas that would primarily affect species adapted to human landscapes. For these reasons, impacts on wildlife movement would be less than significant.

Mitigation Measure: No mitigation measure is required.

LRDP Impact BIO-8: Development under the 2014 LRDP would not conflict with any local applicable policies protecting biological resources. (*Less than Significant*)

2014 LRDP campus development projects would not conflict with Richmond 2030 General Plan policies related to biological resources protection. While not specifically implementing these General Plan measures, the LRDP is consistent with GOAL CN1: Preserved and Restored Natural Habitat and Biodiversity and the following policies and actions:

- Policy CN1.1 – Habitat and Biological Resources Protection and Restoration. Natural habitat is essential to ensuring biodiversity and protecting sensitive biological resources.
- Policy CN1.2 – Local Native Plant Species. Promote the use of locally propagated native plant and tree species and remove and control the spread of invasive exotic plant species.
- Action CN1.B – Priority Conservation Areas. The City will identify areas of the City with significant natural habitat, open space and recreation resources and promote conservation, preservation and environmental rehabilitation.

The LRDP is also consistent with Richmond 2030 General Plan GOAL CN2: Conserved Open Space and the following policy:

- Policy CN2.1 – Open Space and Conservation Areas. Preserve open space areas along the shoreline, creeks, and in the hills to protect natural habitat and maintain the integrity of hillsides, creeks and wetlands.

The impact would be less than significant.

Mitigation Measure: No mitigation measure is required.

Cumulative Impacts and Mitigation Measures

LRDP Cumulative Impact BIO-1: Development under the 2014 LRDP together with cumulative development in the region would not result in significant cumulative impacts on biological resources. (*Less than Significant*)

This section evaluates whether development under the 2014 LRDP, in combination with other past, present, and reasonably foreseeable future LBNL, UC Berkeley, and non-UC projects, would result in significant cumulative biological resources impacts. In addition, this analysis includes cumulative growth impacts potentially resulting from City of Richmond General Plan 2030 implementation. Future plans and projects include the South Shoreline Specific Plan, Bio Rad Laboratories Office/R&D Lab Upgrade Project, Marina Bay Ferry Terminal, Marina Bay/Trails Landscaping, Officer Bradley A. Moody Memorial Underpass, Fort Building Rehabilitation Project, and the Terminal One Development Project.

The cumulative setting, or region of influence, for biological resource analysis, includes the 134-acre RBC site and the City of Richmond Southern Shoreline Planning Area.

This analysis evaluates whether the proposed LRDP impacts, together with cumulative development impacts, would be significant (based on the significance criteria at the beginning of the biological resources section). For any significant cumulative impacts identified, the analysis assesses whether the LRDP contribution would be considerable. Both conditions—significant cumulative impact and considerable LRDP contribution—must apply for the project's cumulative impacts to be considered significant (Title 14, CCR, Article 5, Section 15064).

Development of projects under the 2014 LRDP and Richmond 2030 General Plan residential development in the region of influence outlined above would collectively reduce open space and available habitat for both common and special-status wildlife and plants. However, open space currently comprises a large portion of the region of influence. Future projects would combine new development with some created open space. Most of the RBC site's ecologically sensitive habitats would be retained and protected as open space. Loss of any high quality grassland areas under the LRDP would represent a loss of a sensitive community; however, loss of the community is occurring with existing passive management strategies and may be inevitable without proactive management techniques.

Cumulative effects of development on biological resources are measured largely against the extent to which those resources are protected in plans and during specific project implementation. The City of Richmond 2030 General Plan and other plans listed above (not including the LRDP), contain policies and guidelines for protecting natural resources, including special-status species, sensitive natural communities, and jurisdictional waters. Development would be subject to federal, state, and local laws that require avoiding and minimizing impacts to special-status species, sensitive natural communities, jurisdictional waters, and wildlife migratory corridors and nurseries through a variety of means including resource-specific management planning and mitigation requirements. Mitigation measures and BMPs applied to specific projects would minimize the potential for substantial adverse impacts on biological resources from other projects. Therefore, cumulative impacts on biological resources resulting from the proposed LRDP and the other projects considered in this section would be less than significant.

4.3.5 References

Amme, D. 1993. Richmond Research Center Master Plan. Environmental Impact Report: Existing Conditions of Grassland Resources.

_____. 2005. UC Richmond Field Station's Remnant Coastal Terrace Prairie. Article Prepared for the California Native Plant Society.

Blasland, Bouck and Lee, Inc. 2003. Richmond Field Station Remediation Project Biological Assessment Report. Prepared for the University of California Berkeley, Richmond Field Station, July.

CDFG (California Department of Fish and Game). 2003. The Vegetation Classification and Mapping Program: List of California Terrestrial Natural Communities Recognized by the California Natural Diversity Database.

_____. 2009. Protocols for Surveying and Evaluating Impacts to Special Status Native Plant Populations and Natural Communities. 7 pp.

City of Richmond. 2012. Richmond General Plan 2030. Planning and Building Services Department. Internet website: http://www.cityofrichmondgeneralplan.org/. Adopted April 24, 2012.

_____. 2013. City of Richmond General Plan EIR, February 2013.

CNDDB (California Natural Diversity Database). 2012. Occurrence reports via database searches. September 2012 – January 2013. Internet website: http://www.dfg.ca.gov/biogeodata/cnddb/.

CNPS (California Native Plant Society). Undated. Position Statement: Rare Natural Communities Initiative. 3 pp.

EBCNPS (East Bay Chapter, California Native Plant Society). 2004. Rare, Unusual and Significant Plants of Alameda and Contra Costa Counties (Seventh Edition). Editor, Lake, D. March 1.

Goals Project. 1999. Baylands Ecosystem Habitat Goals. A report of habitat recommendations prepared by the San Francisco Bay Area Wetlands Ecosystem Goals Project. U.S. Environmental Protection Agency, San Francisco, Calif./S.F. Bay Regional Water Quality Control Board, Oakland, Calif.

Immel-Jeffery, D., C. Luke, K. Kraft. 2013. California's Coastal Prairie. A Project of the Sonoma Marin Coastal Grasslands Working Group. Sonoma State University Field Stations & Nature Preserves, Rohnert Park, California. Internet Website: www.sonoma.edu/preserves/prairie/ecology/index.shtml.

Kraft, K., C. Luke, K. Harrison, L. Esposito, and J.L. Sones. 2007. Conservation Priorities for Coastal Prairie in Sonoma and Marin Counties. Proceedings of the Sonoma–Marin Coastal Prairie Workshop, November 6, 2006, UC Davis Bodega Marine Laboratory, Bodega Bay, California. Ocean Song Farm and Wilderness Center, Occidental, California.

Lidicker, W.Z., B. Ertter, and B.G. Baldwin. 2003. Flowering Plants of the Richmond Field Station University of California, Berkeley. Taken from J.A. Powell's compilation in 1992, and updated February 2003.

McCullough, D. 1996. Metapopulations and Wildlife Conservation. Island press. 429pp.

Sawyer, J.O., T. Keeler-Wolf and J.M. Evens. 2009. A Manual of California Vegetation. Second Edition. California Native Plant Society, Sacramento. 1,300 pp.

Stromberg, M.R., C. D'Antonio, T. Young, J. Wirka, and P. Kephart. 2007. California Grassland Restoration. *in* California Grasslands: Ecology and Management. Eds Stromberg, M., J. Corbin, and C. D'Antonio. University of California Press. 390 pp.

Tetra Tech. 2010. Year 5 Monitoring Report for the Western Stege Marsh Restoration Project. University of California, Berkeley, Richmond Field Station, Richmond, California. September 30, 2010. Prepared for Office of Environment, Health & Safety, University of California, Berkeley.

_____. 2013a. Richmond Bay Campus biological survey findings. January 11, 2013.

_____. 2013b. Draft Wetland Delineation Report for Portions of the Richmond Field Station, Richmond, California. Prepared for Lawrence Berkeley National Laboratory. March 2013.

UC Berkeley. 2013. Capital Investment Overview. Internet Website: http://scr.berkeley.edu/capitalprograms/capitalhighlights-fy2009-2010.

URS. 2003. Richmond Field Station Remediation Project. Initial Study California Environmental Quality Act. Prepared for Capital Projects. May 28, 2003.

_____. 2007. Botanical Survey Report. Final. Prepared for University of California, Berkeley Richmond Field Station. August 10, 2007.

USACE (US Army Corps of Engineers). 2008. Clean Water Act Jurisdiction Following the US Supreme Court's Decision in Rapanos v. United States & Carabell v. United States. Internet website: http://www.usace.army.mil/Portals/2/docs/civilworks/regulatory/cwa_guide/cwa_juris_2dec08.pdf.

_____. 2012. 2012 Nationwide Permits, Conditions, District Engineer's Decision, Further Information, and Definitions (with corrections). Internet website: http://www.usace.army.mil/Portals/2/docs/civilworks/nwp/2012/NWP2012_corrections_21-sep-2012.pdf.

USFWS (US Fish and Wildlife Service). 2012. Critical Habitat Portal. Internet website: http://criticalhabitat.fws.gov/crithab/.

Watershed Project. 2007. Final Report for the University of California, Berkeley Richmond Field Station Remediation and Restoration Project Habitat Restoration Progress Report 2003-2007. Written by Sharon Farrell under contract to the Watershed Project with contributions by Monica Stafford & Martha Berthelsen, the Watershed Project and Stacy Haines, Tetra Tech EM Inc.

Williams, T. 2002. America's Largest Weed. National Audubon Society. Internet website: http://archive.audubonmagazine.org/incite/incite0201.html.

WRA (Wildlife Research Associates) and Jane Valerius Environmental Consulting. 2011a. Richmond Field Station Habitat Assessment. Second Campus Sites, Lawrence Berkeley National Laboratory, University of California. August 31, 2011. 32 pp.

_____. 2011b. Alameda Point Habitat Assessment. Second Campus Sites, Lawrence Berkeley National Laboratory, University of California. August 31, 2011. 28 pp.

_____. 2013. Richmond Field Station Grasslands Constraints Analysis. Lawrence Berkeley National Laboratory, University of California. April 17, 2013. 31 pp.