4.10 NOISE

4.10.1 Introduction

This section discusses existing project area noise and analyzes the potential for implementation of the proposed 2014 LRDP to affect the ambient noise environment. Information and analysis in this section is based on existing project site documentation; the municipal code, general plans, and general plan CEQA documentation for the city of Richmond; a traffic study prepared by Fehr and Peers; noise and vibration guidance manuals; RBC site noise monitoring data; the CEQA statute and guidelines; and the *UC CEQA Handbook*.

The existing noise environment is described by identifying existing land uses especially sensitive to noise and vibration and existing noise sources. Noise environment changes would result from development under the 2014 LRDP implementation. Construction and demolition would result in short-term noise impacts from construction equipment and vehicle operation. Long-term noise impacts would result from on-site increases in traffic volumes, building mechanical system equipment, and site population. Mitigation measures are included to reduce construction and operational noise impacts.

Public and agency NOP comments related to noise are summarized below:

- Project construction and operational noise, including that from operational equipment such as ventilation fans and fume hood fans, should be reduced as much as possible and should be shielded from natural areas.
- RBC site noise increases could disturb marshland wildlife near the Bay Trail.

The first issue is addressed in the analysis that follows. Noise effects on wildlife are discussed in Section 4.3, Biological Resources.

4.10.2 Environmental Setting

Noise is defined as unwanted sound. Noise can disturb or annoy people, interfere with activities such as sleep or learning, or cause physical effects such as headaches and hearing loss. Noise may also disturb or drive away wildlife.

Sound is typically measured in decibels (dB). Because the human ear is not equally sensitive to all frequencies of sound, the A-weighted decibel (dBA) scale was developed to better approximate the human response to different sound levels. Typically, the human ear cannot perceive a difference in sound levels of less than 3 dB, an increase of 5 dB is the lowest readily apparent change in noise levels, and a 10 dB increase is perceived as twice as loud.

Several measurements are commonly used to describe sound levels over a period of time, including:

- Equivalent sound level (L_{eq}) is the average sound level over a given time period, typically 1 hour.
- Day-night average sound level is the average dBA over a 24-hour period, with 10 dBA added to sound levels between 10:00 p.m. and 7:00 a.m. This weighted result accounts for the typically greater receptor sensitivity for nighttime noises.
- Community noise equivalent level (CNEL) is similar to day-night average sound level with an additional 5 dBA added to sound levels between 7:00 and 10:00 p.m.
- L_n refers to sound level that is exceeded "n" percent of the time over a measurement period (e.g., L_{90} = sound level exceeded 90 percent of the time). The sound level

exceeded for a small percent of the time, L_{10}, closely corresponds to short-term, higher-level noise such as that of a passing vehicle. The sound level exceeded for a large percent of the time, L_{90}, closely corresponds to the background noise level. L_{50} is the level exceeded 50 percent of the time and is typically referred to the median sound level over a given period.

Noise levels attenuate, or decrease, as distance from a noise source increases. Noise from point sources, such as construction equipment, decreases approximately 6 dBA for every doubling of distance[35] and noise from line sources such as roadways decrease approximately 3 dBA for every doubling of distance. These attenuation factors are based on the inverse square law and assume no other factors are influencing the sound attenuation rate. Different frequency sounds attenuate at different rates. Under real world conditions, noise attenuation rates are influenced by factors such as intervening objects between the source and the receptor, vegetation, and atmospheric conditions such as wind, temperature, and humidity. This analysis uses the inverse square law sound attenuation factors that provide a conservative analysis of the rate of sound attenuation. Sound may attenuate at slightly different rates than those represented here due to influencing factors such as frequency, line of sight, and atmospheric conditions.

Buildings also reduce sound transmission from exterior sources to interior occupants. Typical buildings without specific sound-reducing construction provide approximately 25 dBA of noise attenuation (difference between outside noise levels and indoor noise levels) when the windows and doors are closed (American Industrial Hygiene Association 2003).

Because noise levels decrease relatively rapidly as distance increases, the region of influence for noise is relatively small. This area of effect for noise point sources is less than 0.5 mile and for line sources is less than 1,000 feet from the roadway centerline.

The ambient, non-construction noise environment at the RBC site is generated by vehicular traffic on roadways and building heating, ventilating, and air conditioning (HVAC) equipment. The area surrounding the RBC site includes I-580 to the north, undeveloped land and farther office and industrial areas to the east, open space and the San Francisco Bay Trail to the south, residential areas to the southwest, office and industrial areas to the west, and a railroad spur to the northwest.

Some land uses are more sensitive to ambient noise levels than others due to the types of activities involved. Residences, motels and hotels, schools, libraries, churches, hospitals, nursing homes, auditoriums, and parks and other outdoor recreation areas generally are more sensitive to noise than commercial and industrial land uses. These land uses are referred to as sensitive receptors. The nearest sensitive receptor to the RBC site is the Marina Bay residential neighborhood to the southwest. The distance to the nearest sensitive receptor is 150 feet from the boundary of the RBC development.

Other areas near the RBC site that may be sensitive to elevated noise levels are the EPA laboratory adjacent to the west, the NRLF and labs, and the San Francisco Bay Trail adjacent to the south and southwest.

Sound level measurements were taken at 10 locations on and around the RBC site in January 2013 (Tetra Tech 2013). The monitoring locations are shown in Figure 4-10. The duration of the monitoring period and the time of day (daytime or nighttime) are also shown on Figure 4-10. The monitoring results are presented in Table 4.10-1.

[35] This attenuation factor is based on the inverse square law.

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Noise Monitoring Locations

Richmond, California

- 24-Hour Measurement
- 30-Minute Daytime & Night Measurement
- 30-Minute Daytime Measurement Only
- RBC Site Boundary

TETRA TECH

Figure 4-10

Source: Esri, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, and the GIS User Community. Noise Monitoring Locations - Tetra Tech 2013

Table 4.10-1
Ambient Noise Levels at the RBC Site and its Vicinity

Map ID	Land Use	Location Description	Time Period	L_{eq}	L_{10}	L_{50}	L_{90}	CNEL*
MP-1	Residential	Residential Neighborhood at Point Isabel Shoreline	Day	53	54	51	50	58
			Night	51	53	47	46	
MP-2	Residential	Eastern Residences at Bayside Court	Day	53	53	52	51	58
			Night	51	52	49	48	
MP-3	Residential	Residences at Bayside Court	Day	53	55	51	50	56
			Night	48	50	46	45	
MP-4	Residential	Trade Winds Sailing School	Day	57	61	53	50	59
			Night	50	53	48	44	
MP-5	Civic/Public	Rosie the Riveter World War II Home Front	Day	50	52	48	46	NA
MP-6	Residential	The Anchorage at Marina Bay	Day	54	58	52	49	61
			Night	54	58	47	44	
MP-7	Residential	Neighborhood at 30th Street. and Hoffman Boulevard	Day	62	64	62	60	NA
MP-8	Residential	Neighborhood at 43rd Street and Carlson Boulevard	Day	70	71	60	56	NA
MP-9	Civic/Public	Booker T. Anderson, Jr. Park	Day	66	67	65	63	NA
LT-1	Commercial	Richmond Bay Campus	Day	54	54	50	48	57
			Night	51	51	47	45	

Source: Tetra Tech 2013

*CNEL calculated for only those measurement locations with both day and nighttime monitoring results.
L_{eq} = Equivalent noise level, or average sound level during the measurement period.
L_n = Noise level exceeded "n" percent of the time during the measurement period, either 10, 50, or 90 percent.
NA = not applicable

As shown in Table 4.10-1, a wide range of baseline noise levels is found in and around the RBC site. This variation is due in part to the surrounding land uses, population density, and proximity to transportation corridors. Higher baseline noise levels were generally found closer to major roadways and railway lines. I-580 is generally audible throughout the area at all hours (Tetra Tech 2013).

The Richmond General Plan Update Final EIR includes noise data for the city's busiest and likely noisiest roadways. As part of the General Plan EIR analysis, a model was used to calculate the existing 70 dBA, 65 dBA, and 60 dBA CNEL noise contours for the selected streets. None of the selected streets are at or adjacent to the RBC site. I-580 is one of the modeled roadways. The 60 dBA CNEL noise contour for I-580 is approximately 850 feet north of the RBC site (City of Richmond 2011).

Groundborne vibrations are produced by construction equipment and large vehicles traveling over roads. Groundborne vibrations can be a source of annoyance to people or, if amplitudes are high enough, can damage structures or disrupt sensitive scientific equipment. Like noise, vibrations attenuate with distance from the source. Groundborne vibrations attenuate at different rates in different soil types. Vibration magnitude is often measured using peak particle velocity (PPV) that is measured in inches per second (in/sec), with a larger value representing a vibration with more potential to cause damage.

Sources of vibration at the RBC site are the adjacent railroad tracks, I-580, and the seismic laboratory.

4.10.3 Regulatory Considerations

Federal

In the early 1970s, the EPA established the Office of Noise Abatement and Control under the authority of the Clean Air Act Title IV – Noise Pollution. In the early 1980s the EPA concluded that noise issues were best handled at the state and local level and the Office of Noise Abatement and Control was closed. Although noise regulation has since been primarily a state and local responsibility, the EPA retains certain authorities related to noise investigation and regulation (EPA 2013a, 2013b). The EPA's Noise Abatement Program regulations are found in 40 CFR, Chapter I, Subchapter G and contain federal noise regulations, including noise emission standards for construction equipment in Part 204.

The Noise Control Act of 1972 (42 USC § 7641) requires the all Federal agencies implement programs that promote an environment free from noise that jeopardizes health and welfare. The Quiet Communities Act of 1978 (42 USC § 4913) authorized the EPA to provide grants to state and local governments for noise abatement. The Federal Occupational Health and Safety Administration regulations for workplace noise exposure are found in 29 CFR § 1910.95, Occupational Noise Exposure. Other standards for occupational noise exposure are the American Conference of Governmental Industrial Hygienists' Threshold Limit Values and the National Institute for Occupational Safety and Health's recommended standards.

State

The California Noise Control Act of 1973 (California Health and Safety Code §§ 46000-46080) addresses unwanted and hazardous noise as a public health and welfare issue. The Act establishes criteria and guidelines for local governmental use in setting noise exposure standards.

California Government Code Section 65302[f] requires local jurisdictions to prepare general plans that address noise and identify goals, policies, and implementation measures that can be used to guide future land use development with regard to noise.

Cal/OSHA generally regulates workplace noise exposure in California. California Code of Regulations, Title 8, Article 105 established a time-weighted worker noise exposure limit of 90 dBA averaged over 8 hours.

Local

The RBC site is a University-owned property where work within the University's mission is performed on land 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 local noise ordinances and noise-related City of Richmond General Plan objectives and policies.

City of Richmond 2030 General Plan

The City of Richmond 2030 General Plan Public Safety and Noise Element (City of Richmond 2012) contains the following noise-related goal:

Goal SN4 – Acceptable Noise Levels. Achieve noise levels consistent with acceptable standards and reduce or eliminate objectionable noise sources. Prevent where possible, or mitigate noise impacts from industries, roadways, railroads and businesses in residential areas and sensitive uses in the community. In addition, apply new technology, buffers and other solutions to reduce excessive noise.

The following policies are related to this goal:

- **Policy SN4.1 – Noise Levels.** Work with regulatory agencies to monitor and enforce noise standards in the community. Reduce or mitigate objectionable noise sources and require new noise sources to comply with noise standards. Regulate both indoor and outdoor noise levels to protect health and safety. Use a combination of noise standards and existing noise levels to determine impacts and mitigation measures.
- **Policy SN4.2 – Land Use Compatibility (excerpt).** All new development must avoid or mitigate to the greatest extent feasible potential negative impacts such as noise, odors, and pollution.
- **Policy SN4.3 – Transportation-Related Noise.** Monitor changes in technology that will prevent and mitigate transportation related noise impacts on residential and sensitive uses in the community. Support traffic and freeway improvements that will reduce noise impacts of vehicles. Alternatives to sound walls should be considered where possible.

The following actions are intended to implement the stated goal and policies:

- **Action SN4.A – Noise Study Report Requirement.** Require proposed commercial and industrial uses with potential noise and vibration-producing activities or new noise-sensitive uses that locate in an area with day-night average sound level of 55 or greater to provide noise study reports. The report should identify noise mitigation measures that limit noise to an acceptable level compared to existing conditions.
- **Action SN4.B – Noise Study Guidelines.** Regularly review and update guidelines for the analysis of noise impacts and conflicts in the community. Ensure that the effect of brief loud noises such as locomotive horns are analyzed and that noise limitations include a maximum acceptable noise level for noises of short duration for interior sleeping areas of residential and other uses. Use the noise analysis to review development proposals to assure consistency with noise standards. Consider the following measures for mitigating noise impacts on adjacent properties:
    - Screen and control noise sources such as parking, outdoor activities and mechanical equipment.
    - Use technology to reduce noise impacts in instances where setbacks cannot be increased.
    - Use state of the art noise-abating materials technology and construction standards and double or triple glazed windows to meet noise standards.
    - Control hours of operation, including deliveries and trash pickup to minimize noise impacts.
    - Use the Future Noise Contours data and Municipal Codes on noise to determine if additional noise studies are needed.
- **Action SN4.C – Noise Ordinance.** Regularly review and update the noise ordinance to regulate noise-generating activities and proposed developments near noise generating activities based upon changes in state law. Where feasible, limit the impact of noise

sources on noise-sensitive uses and consider noise and vibration impacts in land use planning decisions. Require mitigation of potential noise impacts on adjacent properties. Enforce the Land Use Compatibility Standards presented in the State of California's General Plan Guidelines when siting new uses in existing noise environments. Require new residential development and other noise sensitive uses near railroad crossings or other sources of brief loud noise to be analyzed for noise compatibility using standards based on both 24-hour averages and maximum instantaneous interior noise levels to determine the noise effects on sleep disturbance and other essential human functions. Encourage projects to use site planning and building orientation principles and state-of-the-art noise-abating materials, technology and construction standards to minimize noise.

Reduce noise levels generated by roadways, railroads and other facilities by: encouraging Caltrans to institute noise reduction measures on existing and future freeways to lessen noise impacts on areas immediately adjacent to the freeway; encouraging public agencies to ensure that their programs are consistent with those of the City as they relate to noise control; and urging strict enforcement of current federal railroad noise emission standards by the DOT.

- **Action SN4.D – Quiet Zone Expansion.** Establish the entire City of Richmond as a railroad quiet zone and complete a study to determine the improvement costs for all of Richmond's at-grade railroad crossings.
- **Action SN4.E – Construction Traffic Plan Guidelines.** Maintain guidelines for preparing traffic plans to mitigate noise, traffic and dust during major construction activity. Continue to require construction traffic plans for all developments of 10 or more homes or commercial projects larger than 5 acres to regulate vehicle speeds, dust and noise mitigation, hours of operation, phased fencing plans and safety standards. The plan should ensure the safety of the public and employees during construction of major projects.

The General Plan defines acceptable noise levels for various types of land uses as shown in Table 4.10-2. These definitions are based on the California Governor's Office of Planning and Research General Plan Guidelines (State of California 2003).

The 2030 General Plan EIR determined that the noise effects from future development pursuant to the General Plan would be significant and unavoidable. Construction noise would cause temporary noise and vibration increases that would remain significant and unavoidable after implementing mitigation measures. Train and traffic noise would, in some cases, continue to remain significant and unavoidable even after mitigation. Operational activities associated with future development under the General Plan would result in less than significant impacts on noise and vibration. Cumulative impacts would be significant and unavoidable.

City of Richmond Municipal Code

City of Richmond Municipal Code Chapter 9.52 is known as the Community Noise Ordinance and provides City noise regulations. The ordinance is enforced by the Richmond Police Department. Key provisions of this ordinance are:

- Loading, unloading, and other handling of building materials, refuse, or similar items is prohibited between 9 p.m. and 6 a.m. if the noise creates a disturbance or violates the noise provisions of the City Planning Code (Section 9.52.050(g)).
- Operation of construction equipment is prohibited between 9 p.m. and 7 a.m. on weekdays and on weekends if the noise creates a disturbance or violates the noise provisions of the City Planning Code (Section 9.52.050(h)).

Table 4.10-2
Acceptable Noise Levels in the City of Richmond

Land Use Category	Normally Acceptable (dBA)	Conditionally Acceptable (dBA)	Normally Unacceptable (dBA)	Clearly Unacceptable (dBA)
Residential low density single family, duplexes, and mobile homes	Up to 60	55 to 70	70 to 75	75 or more
Residential multifamily	Up to 65	60 to 70	70 to 75	75 or more
Transient lodging (motels, hotels)	Up to 65	60 to 70	70 to 80	80 or more
Schools, libraries, churches, hospitals, and nursing homes	Up to 70	60 to 70	70 to 80	80 or more
Auditoriums, concert halls, and amphitheaters	Not specified	Up to 70	65 or more	Not specified
Sports arenas and outdoor spectator parks	Not specified	Up to 75	70 or more	Not specified
Playgrounds and neighborhood parks	Up to 70	67 to 75	72 or more	Not specified
Golf courses, riding stables, water sports, and cemeteries	Up to 75	Not specified	70 to 80	80 or more
Office buildings and business commercial and professional buildings	Up to 70	67 to 77	75 or more	Not specified
Industrial, manufacturing, utilities, and agriculture	Up to 75	70 to 80	75 or more	Not specified

Source: State of California 2003; City of Richmond 2012
dBA A-weighted decibel

- Temporary noise barriers must be constructed at construction sites adjacent to noise sensitive uses when the construction activity is projected to last for a year or more (Section 9.52.050(i)(1)).
- Noise from construction and demolition activities, ventilation and air conditioning systems, and similar equipment must comply with the noise regulations of the City Planning Code (Section 9.52.050(j)).
- Construction equipment must comply with the following (Section 9.52.060):
  - All construction equipment powered by internal combustion engines shall be properly muffled and maintained.
  - Unnecessary idling of internal combustion engines is prohibited.
  - All stationery noise-generating construction equipment such as tree grinders and air compressors are to be as far as is practical from existing residences.
  - Quiet construction equipment, particularly air compressors, are to be selected whenever possible.
  - Use of pile drivers, sources of impulsive sound and jack hammers shall be prohibited on Sundays and holidays, except for emergencies or as approved in advance by the Building Official.

The Community Noise Ordinance contains maximum noise levels of operational noise (Section 9.52.100) as shown in Table 4.10-3.

The Community Noise Ordinance contains maximum noise levels for construction equipment (Section 9.52.110) as shown in Table 4.10-4. The code states that "where technically and economically feasible," sound levels at the receiving properties should not exceed these noise limits.

Table 4.10-3
Maximum Noise Limits in Richmond Noise Ordinance

Zoning	Level not to be exceeded more than 30 minutes in any hour (dBA)		Level not to be exceeded more than 5 minutes in any hour (dBA)
	Measured at property line or district boundary	Measured at any boundary of a residential zone	From 10 p.m. to 7 a.m. measured at any boundary of a residential zone
Single Family Residential	60	60	50 or ambient noise level
Multifamily Residential	65	65	50 or ambient noise level
Commercial	70	60	50 or ambient noise level
Light industrial and office flex	70	60	50 or ambient noise level
Heavy and marine industrial	75	65	50 or ambient noise level
Public facilities and community use	65	60	50 or ambient noise level
Open space and recreational districts	65	60	50 or ambient noise level

Source: Richmond Municipal Code, Section 9.52.100
dBA A-weighted decibel

Table 4.10-4
Construction Noise Limits in Richmond Noise Ordinance

	Single Family Residential Zoning (dBA)	Multifamily Residential Zoning (dBA)	Commercial and Industrial Zoning (dBA)
Mobile Construction Equipment			
Weekdays, 7 a.m. to 7 p.m.	75	80	85
Weekends and holidays, 9 a.m. to 8 p.m.	60	65	70
Stationary Construction Equipment			
Weekdays, 7 a.m. to 7 p.m.	60	65	70
Weekends and holidays, 9 a.m. to 8 p.m.	55	60	65

Source: Richmond Municipal Code, Section 9.52.110

Note: The Community Noise Ordinance Section 9.52.110 states: "Where technically and economically feasible temporary construction activity shall be conducted in such a manner that the maximum sound levels at affected properties shall not exceed the following dBA levels." These levels are presented in Table 4.10-4. Mobile construction equipment is equipment that is used intermittently for less than 15 days. Stationary construction equipment is equipment that is used for 15 days or more.
dBA A-weighted decibel

4.10.4 Impacts and Mitigation Measures

Standards of Significance

The 2014 LRDP noise impacts 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:

- Exposure of persons to or generation of noise levels in excess of standards established in any applicable plan or noise ordinance, or applicable standards of other agencies
- Exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels

- A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project
- A substantial temporary or periodic increase in ambient noise levels in the project vicinity above existing levels existing without the project
- For a project located within an airport land use plan or, where such a plan has not been adopted, within 2 miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?
- For a project near a private airstrip, would the project expose people residing or working in the project area to excessive noise levels?

For construction and operational noise, this EIR analysis uses Richmond Community Noise Ordinance and Richmond Municipal Code Sections 9.52.100 and 9.52.110 to establish significance thresholds.

For vibration, the thresholds for structural damage and annoyance in the Transportation- and Construction-Induced Vibration Guidance Manual are the applicable significance thresholds (Caltrans 2004).

For traffic noise, no impact would occur if traffic volumes were to increase by less than 200 percent because the resulting change in noise level, less than 3 dBA, would not be readily perceptible. A significant noise impact would occur if traffic volumes were to increase more than 1,000 percent. This would result in an increase in traffic noise levels of approximately 10 dBA. Between these two thresholds, a less than significant impact would occur.

CEQA Checklist Items Adequately Addressed in the Initial Study

The Initial Study for the RBC circulated with the NOP concluded that further analysis of the following issues was not required in the EIR.

- For a project within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?
- For a project near a private airstrip, would the project expose people residing or working in the project area to excessive noise levels?

The RBC site is not in a current or proposed airport land use plan or Airport Influence Area, as defined by Assembly Bill 2776. The RBC site is not within 2 miles of a public airport or near a current or planned private airstrip. Therefore, no further analysis is required.

Analytical Methods

Construction and demolition noise was evaluated assuming that typical construction equipment would be used. Noise level ranges were calculated using the distance from the property boundary to the nearest sensitive receptor. Construction would not likely occur at the edge of the RBC site, but construction footprints have not yet been fully defined. Consequently, this EIR noise analysis conservatively calculates noise sources from the boundary edges of the RBC development area (not including Natural Open Space). The nearest sensitive receptor is 150 feet from the RBC development boundary. Calculated noise level ranges were compared to the Richmond Municipal Code Section 9.52.110 construction noise limits to evaluate impact significance. Noise level ranges were also calculated for other surrounding receptors which, although not defined as sensitive and therefore not factoring into significance determination, might be close enough to experience construction noise.

Vibration impacts were analyzed by comparing Caltrans vibration thresholds (Caltrans 2004) to typical construction equipment vibration ratings and then calculating nearby building distances. Potential vibration impacts on project laboratories and scientific instruments would be self-managed and are not analyzed in this EIR.

Traffic noise impacts were evaluated using EIR traffic study data (Fehr and Peers 2013). Existing and future traffic volumes were compared and the difference was used to determine the approximate noise level increases and evaluate significance.

Operational noise was analyzed by (1) determining approximate equipment noise levels such as from generators and cooling towers, (2) determining approximate equipment noise levels at the nearest sensitive receptor, and then (3) comparing noise levels at the nearest sensitive receptor to the Richmond Municipal Code Section 9.52.100 exterior noise limits to evaluate significance. Modern HVAC equipment that would not exceed the noise limits in the Richmond Noise Ordinance when installed and operated in accordance with the manufacturer's instructions would be used. Therefore, HVAC noise was evaluated qualitatively.

RBC 2014 LRDP Policies

The RBC 2014 LRDP does not contain any policies related to noise.

LRDP Impacts and Mitigation Measures

LRDP Impact NOISE-1: Construction activities associated with development under the 2014 LRDP could generate and expose people to noise levels exceeding Richmond Community Noise Ordinance standards. (*Potentially Significant; Less than Significant with Mitigation*)

Construction and demolition would occur intermittently throughout development under the 2014 LRDP. Construction would take place on most portions of the RBC during this period, except for on designated Natural Open Space areas. Although temporary, construction at an individual site could last several years.

Construction and demolition would result in short-term noise impacts from construction equipment and vehicle use. In some instances, construction activities that occur near the project boundary and near sensitive receptors (in the southwest portion of the project site) could expose people to noise levels in excess of Richmond's Noise Ordinance standards, resulting in a potentially significant impact.

Table 4.10-5 contains maximum measured noise level of typical construction phases at distance of 50 feet from the noise source.

Table 4.10-5
Maximum dBA at 50 feet for Typical Construction Phases

Construction Phase	Maximum dBA at 50 feet
Excavation	87
Foundations	85
Building Erection	88
Exterior Finishing	90

Source: Illingworth & Rodkin 2010
dBA = A-weighted decibel

Using the construction noise levels in Table 4.10-5 and the noise attenuation factor of 6 dBA for every doubling of distance, Table 4.10-6 has the noise level ranges that would be experienced at various distances from the noise sources.

Table 4.10-6
Maximum dBA at Various Distances for Typical Construction Phases

Construction Phase	Noise Level at Distance from Noise Source (dBA)			
	100 feet	150 feet	300 feet	600 feet
Excavation	81	78	72	66
Foundations	79	76	70	64
Building Erection	82	79	73	67
Exterior Finishing	84	81	75	69

dBA = A-weighted decibel

The distance from each construction site to sensitive receptors would vary. The nearest sensitive receptor to the RBC site is a residential area to the southwest. The residential area boundary is 150 feet from the RBC development boundary (that excludes RBC Natural Open Space areas). The next nearest sensitive receptor is a residential area 460 feet northeast across I-580. I-580 traffic noise is expected to eclipse any RBC site construction noise. Consequently, no project noise impacts would likely be experienced in this residential area, so it is not further considered in this analysis.

As a result of construction and demolition activities, noise levels at the nearest sensitive receptor and in other surrounding areas could exceed the Richmond Noise Ordinance noise limits for stationary construction equipment (i.e., equipment that is operated for more than 15 days). As shown in Table 4.10-4, the Richmond Community Noise Ordinance limits for construction noise are 60 dBA in areas zoned single-family residential, 65 dBA in areas zoned multifamily residential, and 70 dBA in areas with commercial and industrial zoning.

The following mitigation measures would reduce construction and demolition noise in accordance with the Richmond Community Noise Ordinance. By implementing these mitigation measures, construction noise impacts would be reduced to less than significant.

LRDP MM NOISE-1:

NOISE-1a: Where technically and economically feasible, construction activities shall be conducted in such a manner that the maximum sound levels at the surrounding properties shall not exceed the dBA levels set forth in the Richmond Municipal Code Section 9.52.110.

NOISE-1b: The following measures shall be implemented for all construction equipment in accordance with Richmond Municipal Code Section 9.52.060. Quiet construction equipment, particularly air compressors, shall be used whenever possible. Construction equipment powered by internal combustion engines shall be properly muffled and maintained. Stationery noise-generating construction equipment such as tree grinders and air compressors are to be as far as is practical from existing residences. Unnecessary idling of internal combustion engines shall be prohibited. Sources of impulsive sound and jack hammers shall not be used on Sundays and holidays, except for emergencies.

NOISE-1c: If after implementing NOISE-1a and -1b, construction noise creates a disturbance or results in noise complaints from adjacent property, additional noise reduction strategies shall be evaluated and the necessary practicable technically and economically feasible noise mitigating measures would be implemented, sufficiently to ensure meeting City Noise Ordinance requirements.

LRDP Impact NOISE-2: Development under the 2014 LRDP would not generate or expose people to excessive groundborne vibration. (*Less than Significant*)

Construction equipment would cause vibrations that would spread through the ground and could cause damage to nearby structures, annoy people, or disrupt scientific equipment. Table 4.10-7 has guidelines to assess the damage potential from ground vibration induced by construction equipment. Table 4.10-8 has guidelines for the likely annoyance caused by vibration-producing activities.[36]

Table 4.10-7
Guideline Vibration Damage Thresholds

Structure	PPV (in/sec)*
Extremely fragile historic buildings, ruins, ancient monuments	0.08
Fragile buildings	0.1
Historic and some old buildings	0.25
Older residential structures	0.3
Newer residential structures	0.5
Modern industrial and commercial buildings	0.5

* Threshold for frequent, intermittent, or continuous sources such as pile drivers and compactors.
Source: Caltrans 2004
in/sec = inches per second
PPV = peak particle velocity

Table 4.10-8
Vibration Annoyance Thresholds

Human Response	Continuous Vibration PPV (in/sec)*	Intermittent Vibration PPV (in/sec)*
Very disturbing/severe	3.6 (at 2 Hz)–0.4 (at 20 Hz)	2.0
Strongly perceptible	0.10	0.9
Distinctly perceptible	0.035	0.24
Slightly perceptible	0.012	0.035

Source: Caltrans 2004
in/sec = inches per second
PPV = peak particle velocity

[36] These guideline vibration damage thresholds were developed for Caltrans by synthesizing the results of multiple vibration studies.

Table 4.10-9 shows the vibration associated with several types of common construction equipment.

Table 4.10-9
Vibration Levels produced by Typical Construction Equipment

Equipment	PPV (in/sec) at a distance of 25 feet
Pile driver (impact, typical)	0.644
Pile driver (sonic, typical)	0.170
Vibratory roller	0.210
Large bulldozer	0.089
Loaded truck	0.076
Jackhammer	0.035
Small bulldozer	0.003

Source: Federal Highway Administration and Federal Transit Administration 2006; Caltrans 2004.
in/sec inches per second
PPV peak particle velocity

The distance from each construction site to structures that could be affected by vibration would vary but is not likely to be less than 25 feet. Only pile driving would exceed the vibration damage threshold for newer residential and modern commercial buildings and pile driving is not anticipated as part of the project. The nearest residential area is 150 feet southwest of the RBC development boundary and the residential buildings are of relatively newer construction. Project construction equipment would neither exceed the vibration damage threshold nor be perceptible at these neighborhoods. Since the vibration damage thresholds would not be exceeded and vibrations would not be an annoyance at the nearest sensitive receptor, vibration impacts would be less than significant.

If vibration-sensitive equipment is located at the RBC, appropriate vibration-dampening design would be included in laboratory construction.

Under the 2014 LRDP, campus operations would not induce substantial groundborne vibration so there would be no impact.

Mitigation Measure: No mitigation measure is required.

LRDP Impact NOISE-3: Development under the 2014 LRDP could generate and expose people to noise levels exceeding Richmond Community Noise Ordinance standards or result in a substantial permanent increase in ambient project vicinity noise levels. (*Less than Significant*)

Long-term noise impacts would occur from increasing the onsite population and traffic volumes on the RBC site and nearby roads and from installing new building cooling towers, emergency generators, and HVAC equipment. Noise would not increase sitewide, but rather near the noise source, with the increase in noise decreasing with distance from the source.

Traffic Volume and Average Daily Population Increases

Development under the 2014 LRDP would ultimately raise the RBC site adp to 10,000 by 2050 and therefore increase the amount of and noise from vehicle traffic.

Vehicle noise depends on a number of factors including the mode split, type of vehicle (for example, passenger car, bus, or truck) and the vehicle's speed. Vehicle noise also fluctuates depending on traffic volume. A doubling of traffic volume results in a 3 dBA increase in noise levels. A 3 dBA noise difference is too small to be perceived by the average person. Traffic volume would need to be tripled to result in a readily perceivable (5 dBA) increase in noise. When traffic volume increases 1,000 percent, it results in a 10 dBA increase in the sound level, which is perceived by the average person as twice as loud (Federal Highway Administration 2011).

Development under the 2014 LRDP would increase traffic volumes and therefore increase traffic noise levels. At most of the 14 intersections studied, traffic volumes would not double (Fehr and Peers 2013); therefore, the increase in traffic noise would be less than 3 dBA and would not be readily perceivable by the average person. Traffic volumes would more than triple at two intersections: Meade Street and Regatta Boulevard and Meade Street and Seaver Avenue. There would be a readily perceptible increase in traffic noise levels near these roadways. However, traffic volumes at these intersections would not increase by 1,000 percent, so the impact on traffic noise levels would be less than significant.

New Mechanical Equipment

Operation of the project would introduce new noise sources, including cooling towers, air compressors, emergency backup generators, electrical transformers, and HVAC systems.

The HVAC systems would include both indoor and outdoor noise-producing components such as fans, pumps, and compressors. Air compressors would be located indoors. HVAC systems would be installed and operated according to the manufacturer's instructions to minimize noise both indoors and outdoors. Although the HVAC systems would add an incremental amount of noise to the area, the resulting difference in ambient noise levels would likely not be perceptible (i.e., would be less than 3 dBA). Since sound levels decrease by 6 dBA with each doubling of distance, the HVAC systems would need to emit a very high noise level (e.g., akin to an operating jackhammer) to exceed the lowest Richmond Community Noise Ordinance threshold of 50 dBA at the nearest sensitive receptor (the residential area 150 feet from the nearest proposed building). The HVAC systems would operate well below this level of noise output. Thus, the HVAC systems would not violate the Richmond Community Noise Ordinance and the impact of HVAC operation would be less than significant.

The approximate noise output of operational equipment is presented in Table 4.10-10.

Table 4.10-10
Typical Noise Levels for Operational Equipment

Equipment	50 feet	Noise level at 150 feet, Distance from RBC boundary to nearest sensitive receptor
Air compressor	66	57
Electrical transformer	51	42
Generator (diesel engine)	71	62
Cooling tower	44	35

Source: EPA 1971; LBNL 2010

The backup generators would generally be outdoors next to each building at ground level and toward the perimeter of the site. The generators would operate a minimum of 100 hours per year to maintain them properly. They would be tested during the day and would typically operate for about 30 minutes; therefore, they would have a minimal effect on ambient noise levels. Any additional operation would be as needed to provide emergency backup power, so with only occasional exceptions, the generators would not be operating and would not produce any noise.

The cooling towers would generally be on building rooftops toward the site perimeter. Each cooling tower would rise approximately 20 feet above the roof. Cooling towers may also be placed adjacent to buildings.

The air compressors would be inside buildings. Being inside a building would provide approximately 25 dBA of sound attenuation, based on the sound dampening properties of buildings of average construction, so the air compressors would not exceed the Richmond Community Noise Ordinance threshold (American Industrial Hygiene Association 2003).

In addition to the air compressors, some of the other equipment could be housed inside the building or an enclosure, so it would not exceed the Richmond Community Noise Ordinance threshold.

As shown in Table 4.10-3, the Richmond Community Noise Ordinance limits equipment noise received at the nearest sensitive receptor. The Ordinance stipulates that such noise cannot exceed 60 dBA in the daytime and cannot exceed 50 dBA or the ambient noise level in the nighttime. The electrical transformers and cooling towers would not exceed these limits. The air compressors would not exceed these limits since they would be inside. The generators could exceed these limits; however, the generators would rarely be used. Therefore, operational noise impacts would be less than significant.

Mitigation Measure: No mitigation measure is required.

Cumulative Impacts and Mitigation Measures

The cumulative noise analysis evaluates whether the 2014 LRDP impacts, together with the cumulative development impacts in the region, would result in a significant impact based on the criteria presented at the beginning of this section. If so, this analysis determines whether the 2014 LRDP contributions would be considerable. Both conditions must apply in order for the project's cumulative impacts to be significant.

The cumulative noise impact region of influence is limited by the distance over which noise propagates. Off-site noise sources would not overlap substantially with proposed project noise at distances of more than 0.5 mile from the RBC site or 1,000 feet from the roadway centerline of affected roads.

LRDP Cumulative Impact NOISE-1: Development under the 2014 LRDP and regional cumulative development would not result in a cumulatively considerable temporary increase in ambient noise levels and groundborne vibration in the project vicinity. (*Less than Significant with Mitigation*)

Development under the 2014 LRDP and cumulative development in the region would intermittently generate short-term noise and vibration from construction and demolition activities. As described under LRDP Impacts NOISE-1 and NOISE-2, construction and demolition activities associated with the 2014 LRDP would not expose people to noise levels in excess of standards established in Richmond's Noise Ordinance or result in significant temporary or periodic increases in noise or vibration with the incorporation of mitigation measures LRDP MM NOISE-1a through 1c.

RBC project construction noise and vibration would cumulatively overlap with construction noise from only one cumulative project in the area: the proposed redevelopment at Bio-Rad Laboratories west of the RBC site. The Bio-Rad Laboratories project is required to comply with the Richmond Noise Ordinance for construction noise limits. The City of Richmond prepared CEQA documentation for the proposed Bio-Rad project that includes imposition of noise mitigation measures. These measures limit noisy Bio-Rad project construction activities, including on-road truck trips near the project, to 7:00 a.m. to 7:00 p.m. on weekdays and 8:30 a.m. to 6:00 p.m. on Saturdays and legal holidays. No construction is permitted on Sundays. There is no indication that the proposed construction would include any unusual vibration-generating activities or equipment that would exceed vibration damage thresholds (City of Richmond 2010). Therefore, temporary noise and vibration impacts from the proposed Bio-Rad Laboratories project in combination with LRDP implementation would be less than significant. Accordingly, with implementation of LRDP MM NOISE-1, there would not be a cumulatively considerable temporary increase in ambient noise levels and groundborne vibration in the project vicinity.

LRDP Cumulative Impact NOISE-2: Development under the 2014 LRDP and regional cumulative development would not result in a cumulatively considerable permanent increase in ambient noise levels in the project vicinity. (*Less than Significant*)

The proposed 2014 LRDP and regional cumulative development would permanently increase noise levels in the area by adding population and vehicle traffic and installing new mechanical equipment such as cooling towers and generators. As described under LRDP Impact NOISE-3, long-term noise impacts associated with the 2014 LRDP would not expose people to noise levels exceeding Richmond's Community Noise Ordinance standards under normal operating conditions.

Project operational noise could overlap with operational noise from only one cumulative project in the area: the proposed redevelopment at Bio-Rad Laboratories west of the RBC site. The Bio-Rad Laboratories project is required to comply with the Richmond Noise Ordinance for exterior noise limits. The City of Richmond prepared CEQA documentation for the proposed Bio-Rad project that requires installation of improved machinery sound insulation in the replacement building. There is no indication that the equipment would be considerable a source of vibration (City of Richmond 2010). Therefore long-term noise and vibration impacts from the proposed

Bio-Rad Laboratories project in combination with development under the proposed 2014 LRDP would be less than significant.

Under cumulative conditions, traffic volumes and therefore traffic noise levels would increase. At 13 of the 14 intersections studied, the project's contribution to traffic volume increases would not cause traffic volumes to double (Fehr and Peers 2013); therefore, the increase in traffic noise would be less than 3 dBA and would not be readily perceivable by the average person. Traffic volumes would more than triple at the intersection of Meade Street and Seaver Avenue, increasing by 315 percent during the a.m. peak hour and by 337 percent during the p.m. peak hour. There would be a readily perceptible increase in traffic noise levels near this location; however, because the traffic volumes at this intersection would not increase 1,000 percent, the impact on traffic noise levels would be less than significant. Accordingly, there would not be a cumulatively considerable permanent increase in ambient noise levels and groundborne vibration in the project vicinity.

4.10.5 References

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4.11 POPULATION AND HOUSING

4.11.1 Introduction

This section presents existing and projected population and housing at the project site and its vicinity and analyzes the potential for development under the proposed 2014 LRDP to affect those resources. The analysis is based on information in the City of Richmond General Plan 2030, the 2010 US Census, American Community Surveys, and ABAG projections data.

Public and agency NOP comments related to population and housing are summarized below:

- The EIR should analyze the fiscal impacts of RBC site construction, operation, and maintenance (including insurance) on residents of Richmond, Alameda County, and the State of California including financial costs of the project and funding mechanisms that will be used.
- Analyze and plan to minimize local housing impacts from the expected concentration of employment.

All scoping comments were taken into consideration in the EIR analysis. Because the analysis of fiscal impacts is outside the scope of CEQA analysis, those impacts are not discussed in the EIR.

4.11.2 Environmental Setting

This section discusses existing conditions and projections for employment, population, and housing and their relationship to existing and projected conditions for the city and region. The RBC site is in the city of Richmond in Contra Costa County, California. Contra Costa County is part of the larger 9-county Bay Region Economy. The 9-county Bay Region is made up of Alameda, Contra Costa, Marin, Napa, San Francisco, San Mateo, Santa Clara, Solano, and Sonoma Counties.

Employment and Income

The civilian labor force for the Bay Area was 3,676,415 in 2010 (see Table 4.11-1). Approximately 14 percent of the civilian labor force resides in Contra Costa County. The civilian labor force of the Bay Area decreased by nearly 2 percent between 2000 and 2010 and the unemployment rate increased from 3.4 percent in 2000 to 10.5 percent in 2010 (BLS 2013).

Table 4.11-1
Bay Area Civilian Labor Force

	2000	2010
Alameda	769,061	761,264
Contra Costa	500,940	523,315
Marin	141,809	133,128
Napa	66,625	75,734
San Francisco	472,759	456,589
San Mateo	398,171	374,909
Santa Clara	940,731	880,803
Solano	194,209	214,620
Sonoma	253,260	256,053
Bay Area	**3,737,565**	**3,676,415**

Source: BLS 2013

Richmond is in western Contra Costa County. In 2010, Contra Costa had 470,495 jobs, a decline of 4.5 percent from 2005. Health care and social assistance, retail trade, and government and government enterprises were Contra Costa's largest employers (BEA 2013a). Health care remains an important Contra Costa County employment source; health care accounted for 11.3 percent of employment and increased 16 percent between 2005 and 2010. The retail sector accounted for more than 10 percent of all jobs in 2010, a decrease of nearly 10 percent from 2005. Government accounted for 10.5 percent of employment in 2010, a slight decrease from 2005. The professional, scientific, and technical services industries are also a key economic sector for Contra Costa County. These account for more than 9 percent of all jobs in 2010, an increase of nearly 2 percent from 2005. The utilities industry had the largest growth in jobs from 2005 with a 59 percent job increase. The construction industry experienced the largest decline from 2005 with a decrease of 33 percent.

In 2010, the Bay Area had 4,312,112 jobs, an increase of 1.8 percent from 2005 (BEA 2013a). The Bay Area is expected to slowly recover the jobs lost during the recent recession and then experience moderate job growth to 2040. The Bay Area is projected to add more than 1.2 million jobs between 2010 and 2040 and is projected to grow slightly faster than California and the U.S. (Levy 2012).

The RBC site currently employs 300 workers. This represents a very small percentage of the total employment in the Bay Area, It is 0.03 percent of employment in Contra Costa County, and 0.3 percent of employment in Richmond.

The Bay Area unemployment rate increased from 3.4 percent in 2000 to 10.5 percent in 2010 (Table 4.11-2). In 2010, unemployment rates in the Bay Area ranged from a low of 8 percent in Marin County to a high of 12 percent in Solano (BLS 2013a). Contra Costa County had an unemployment rate of 11.1 percent and the City of Richmond a rate of 16.7 percent (BLS 2013).

Table 4.11-2
Bay Area Unemployment Rate

Area	2000	2010
Contra Costa	3.6	11.1
Richmond	6.0	16.7
Bay Area	3.4	10.5

Source: BLS 2013

The Bay Area economy has kept up with the state of California in generating income growth. As shown in Table 4.11-3, the Bay Area as a whole has a higher per-capita income than the state of California and the United States. Since 2005, all nine counties in the Bay Area increased in income growth. Marin County had the highest per-capita income in the Bay Area at $82,498 in 2010. Contra Costa County had a per-capita income of $54,817. The average salary per job in the Bay Area was $62,516 and $59,308 in Contra Costa County in 2010.

Population

According to the City of Richmond General Plan 2030, the City of Richmond grew from 87,425 in 1990 to 99,216 in 2000, The increase of 11,791 residents is an 11.9 percent growth. During this same time, the Bay Area population increased 11.2 percent. The 2005 population of the City of Richmond accounted for 10.1 percent of Contra Costa County's population (City of Richmond 2013).

Table 4.11-3
Bay Area Per Capita Income

County/Area	2005 Per Capita Income	2010 Per Capita Income
Alameda	$44,228	$47,603
Contra Costa	$51,585	$54,817
Marin	$81,567	$82,498
Napa	$45,494	$48,765
San Francisco	$64,330	$69,351
San Mateo	$63,115	$66,629
Santa Clara	$52,457	$57,433
Solano	$34,557	$36,929
Sonoma	$41,931	$43,274
Bay Region	$52,115	$55,812
California	$38,731	$41,893

Source: BEA 2013b

Note: All Per Capita Income dollar amounts presented are in nominal dollars (i.e., current dollars, not adjusted Inflation), as reported by BEA.

In 2010 the City of Richmond had a population of 103,701, an increase of 4.5 percent from 2000. The 2010 population for the Bay Area was 7,152,749, a 5 percent increase from 6,785,760 in 2000. Contra Costa and Napa Counties experienced the largest population growth in the Bay Area between 2000 and 2010 with an increase of 10.6 percent in Contra Costa County and 9.8 percent in Napa County. San Mateo County experienced the lowest growth with an increase of 1.6 percent in the same time (ABAG 2013).

Santa Clara County has the largest population in the Bay Area with a 2010 population of 1,781,642. Napa County is the smallest county with a population of 136,484 in 2010. Population forecasts by the California Department of Finance indicate continuous population growth for most of the Bay Area. As shown in Table 4.11-4, Contra Costa County is projected to have continuous strong growth through 2040 with a growth rate between 9 and 11 percent.

Table 4.11-4
Bay Area Historic and Projected Population

County/Area	2000	2010	2020	2030	2040	2050
Alameda	1,443,741	1,510,271	1,608,204	1,657,567	1,678,565	1,684,761
Contra Costa	948,816	1,049,025	1,147,399	1,254,205	1,392,509	1,489,068
Marin	247,289	252,409	251,361	253,026	259,549	264,810
Napa	124,279	136,484	145,660	158,649	172,927	185,238
San Francisco	776,733	805,235	852,788	877,847	891,607	907,443
San Mateo	707,161	718,451	747,563	803,288	850,112	895,603
Santa Clara	1,682,585	1,781,642	1,889,898	1,986,545	2,083,710	2,152,199
Solano	394,542	413,344	447,217	493,422	551,491	592,850
Sonoma	458,614	483,878	507,250	534,439	572,664	598,795
Bay Area	**6,785,760**	**7,150,739**	**7,599,360**	**8,021,018**	**8,455,174**	**8,772,817**

Source: ABAG 2013; DOF 2013

The population at the RBC site consists of UC Berkeley researchers and employees and guests who use the RBC facilities occasionally or work there on a temporary basis collaborating with other scientists and engineers. Guests are not LBNL employees; most are employed by other institutions, businesses, or government agencies. As of late 2012, the RBC site has a daily population of approximately 300.

Based on the places of residences presented in the 2004 UC Berkeley LRDP and the 2006 LBNL LRDP, it is assumed that RBC site employees reside throughout the Bay Area with a majority (90 percent) living in Alameda and Contra Costa counties. Applying that assumption to 2010 county population data, RBC site employees residing in Alameda and Contra Costa counties would constitute approximately 0.01 percent of the counties' populations. RBC site employees and their dependents (assuming an average household size of 2.77) would represent approximately 0.04 percent of the total population of Alameda and Contra Costa counties.

Housing

According to the City of Richmond General Plan 2030, the housing supply in the Bay Area region continues to grow. Between 1990 and 2000, Contra Costa County and the Bay Area had increases of 12.7 percent and 8.9 percent, respectively. Housing growth continued through 2005. Housing growth at a regional level slowed considerably, but Contra Costa County continues to build more homes (City of Richmond 2013).

In 2000, the City of Richmond had approximately 34,625 housing units, representing a 5.4 percent increase from the 32,749 units in 1990. Between 2000 and 2005, the City of Richmond's housing supply grew by 2.4 percent to 35,475 housing units (City of Richmond 2013).

The Bay Area housing characteristics are summarized in Table 4.11-5, which identifies owner-occupied and renter-occupied homes, along with median home values for each Bay Area county The housing units in Table 4.11-5 include all structure types (e.g., single-family homes, apartments, and mobile homes). Santa Clara accounts for 22.7 percent of the housing units in the Bay Area and Contra Costa County accounts for 14.4 percent. The City of Richmond accounts for 1.4 percent of the Bay Area housing units and 9.8 percent of the housing units in Contra Costa County. The median home value ranges from $32,100 in Solano County to $839,100 in Marin County. Contra Costa County had a median home value of $467,200 and the City of Richmond had a median home value of $339,200 (Census 2013b).

Table 4.11-5
Bay Area 2010 Housing Characteristics

County/Area	Total Housing Units	Occupied Housing Units	Owner Occupied Units	Renter Occupied Units	Vacant Units	Median Home Value
City of Richmond	39,328	36,093	18,659	17,434	3,235	$339,200
Alameda	582,549	545,138	291,242	253,896	37,411	$543,100
Contra Costa	400,263	375,364	251,904	123,460	24,899	$467,200
Marin	111,214	103,210	64,637	38,573	8,004	$839,100
Napa	54,759	48,876	30,597	18,279	5,883	$495,900
San Francisco	376,942	345,811	123,646	222,165	31,131	$773,600
San Mateo	271,031	257,837	153,110	104,727	13,194	$756,400
Santa Clara	631,920	604,204	348,298	255,906	27,716	$674,100
Solano	152,698	141,758	89,648	52,110	10,940	$32,100
Sonoma	204,572	185,825	112,280	73,545	18,747	$458,600
Bay Area	**2,785,948**	**2,608,023**	**1,465,362**	**1,142,661**	**177,925**	**$543,100**

Source: Census 2013a; Census 2013b

4.11.3 Regulatory Considerations

Federal

There are no federal laws or regulations regarding population and housing relevant to the proposed 2014 LRDP.

State

There are no state laws or regulations regarding population and housing relevant to the proposed 2014 LRDP.

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 reduce the 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 as they relate to population and housing.

City of Richmond General Plan

The City of Richmond 2030 General Plan – Economic Development, Land Use and Urban Design, Community Health and Wellness (City of Richmond 2012) has these goals, policies, and actions related to population and housing:

GOAL ED1: An Appealing Place to Live and Work. Foster neighborhoods, commercial and industrial areas and public spaces that are safe and welcoming environments to live, work and visit. Effective public safety services, neighborhood revitalization effort, opportunities for cultural and recreational activities, affordable housing, socially and environmentally responsible businesses and a diverse and expanded tax base will contribute to this environment.

The following policy is outlined in relation to Goal ED1:

- **Policy ED1.5 A Range of Housing Types**. Continue to require developers to provide a range of housing types and residential densities to meet the needs of all age groups, income levels, and household sizes.

GOAL ED2: Quality Jobs and Revenue. Create an attractive business environment that will support business recruitment, expansion and retention. Attract a variety of small and large firms, national and local establishments, and up-and-coming industries and employers across a variety of economic sectors. Offer a broad range of quality employment opportunities for current and future residents with varying degrees of experience, education and training.

The following policy is outlined in relation to Goal ED2:

- **Policy ED2.4 – Existing Employers:** Encourage established employers to remain and expand in Richmond in order to retain employers in key industries including green businesses, high-technology firms, food-related companies, port-related industries, medical services, manufacturing and distribution and retail/entertainment.

GOAL LU3: Expand Economic Opportunities. Expand economic opportunities in existing commercial and industrial areas and develop new opportunities to diversify the local economy. Create an attractive and socially-responsible business environment that will support business

recruitment, expansion and retention. Encourage innovative, high-growth and green business, and further support business and industries in providing a range of job and entrepreneurial opportunities while minimizing environmental and health impacts.

The following policy is outlined in relation to Goal LU3:

- **Policy LU3.2 – Local Employment Base.** Expand and diversify the local employment base to provide quality jobs for Richmond residents.

GOAL HW5: A Range of Quality and Affordable Housing. Promote stable and integrated communities and healthy living conditions for all residents by continuing to support projects that provide high quality, affordable housing. Well-designed, affordable and well-maintained housing contributes to: neighborhood stability; greater socioeconomic integration; reduced overcrowding; and improved living conditions for all.

The following policies are outlined in relation to Goal HW5:

- **Policy HW5.1 – Housing for All Income Levels.** Maintain the availability of an adequate supply of quality housing units to meet the needs of all income levels and continue to encourage development of additional quality and affordable housing units.

- **Policy HW5.2 – A Range of Housing Types.** Support and encourage development of a range of housing types that meet the needs of a broad range of population groups including seniors, large and small families, low and middle-income households and people of all abilities.

GOAL HW6: Expanded Economic Opportunity. Promote equitable access to economic opportunities that provide the material and social means for human development and upward mobility in the community.

The following policy is outlined in relation to Goal HW6:

- **Policy HW6.1 – Local Employment Base.** Expand and diversify the local employment base to provide quality jobs for Richmond residents.

The 2030 General Plan EIR states that population and job opportunities would increase, resulting in a need for more housing units. The General Plan assumes the addition of housing and jobs in Richmond. The increase in population and job opportunities are not considered physical environmental effects themselves, but environmental impacts of both are analyzed in the appropriate technical section of the City of Richmond General Plan EIR (City of Richmond 2011b). The City of Richmond General Plan EIR assumed that the City of Richmond would capture 13 percent of Contra Costa County's projected population growth of 231,900, resulting in an increase of 30,147 people in the City of Richmond by 2030. The EIR assumed an increase of 22,488 jobs in the City of Richmond by 2030 (City of Richmond 2011b). Growth projections in the General Plan EIR are "aggressive in that they far exceed the past growth in the City and also exceed the growth projected in the City by the Association of Bay Area Governments" (City of Richmond 2011b). The General Plan EIR notes that while growth is an intended consequence of the General Plan, it potentially impacts traffic, air quality, habitat and wildlife, utilities and services. The Final EIR states that the City of Richmond will track the number of new housing units and jobs in the city, to determine if either exceeds projected General Plan levels; if so, an update to the General Plan and EIR would be prepared.

4.11.4 Impacts and Mitigation Measures

Standards of Significance

The impacts on population and housing 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:

- Induce substantial population growth or concentration of population in an area, either directly (for example, by proposing new housing or businesses), or indirectly (for example, through extension of roads or other infrastructure);
- Displace substantial numbers of existing housing necessitating the construction of replacement housing elsewhere; or
- Displace substantial numbers of people, necessitating the construction of replacement housing elsewhere.

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 issues was not required in the EIR.

- Displace substantial numbers of existing housing necessitating the construction of replacement housing elsewhere.
- Displace substantial numbers of people, necessitating the construction of replacement housing elsewhere.

The RBC site does not include housing or any related residential uses, and no housing would be displaced, so no impact would occur, and no additional analysis is required.

Analytical Methods

City and regional baseline data on population, housing, and employment were obtained primarily from the 2000 Census, the 2010 Census, and ABAG's *Projections 2009*.

The section assesses the anticipated RBC-related employment increase in relation to the population and housing policies and projections for the City of Richmond and the Bay Area region. Project-related employment growth and housing demand would occur over several decades. A portion of future RBC-related site employees are assumed to be existing LBNL or UC Berkeley employees whose place of work would be moved to the new campus. Another portion of the employees would be new hires, most of whom are expected to be from within the Bay Area.

RBC 2014 LRDP Policies

The RBC 2014 LRDP policies related to population and housing include the following:

- SP1 – Safety and Preparedness Policy on Model Programs: Develop model environment, health, and safety programs for the RBC.
  - Develop comprehensive and effective physical safety, life safety, and emergency service plans to protect the environment, the public, employees, and guests at all times.
- SP2 – Safety and Preparedness Policy on Inclusion: Ensure that the RBC contributes to and serves as a resource for the Richmond Community.

- Expand partnerships with local agencies, including fire and police departments, as well as local neighborhoods to promote understanding and address safety and security concerns of neighbors as well as the campus workforce.

LRDP Impacts and Mitigation Measures

LRDP Impact POP-1: Development under the 2014 LRDP would incrementally increase the RBC site population over the LRDP's approximately 40-year planning period, but would not induce substantial population growth. (*Less than Significant)*

Under the proposed 2014 LRDP, RBC site population would increase as the RBC site is developed over the approximately 40-year planning period. At full implementation of the LRDP, it is estimated that the RBC site population would increase from 300 in 2012 to 10,000 in 2050, an increase of 9,700.

There would be beneficial economic impacts related to the RBC population growth including increased local commercial activity and sales taxes; a larger RBC population also would generate additional indirect income in supporting industries.

Many of the additional 9,700 RBC site employees are expected to be existing UC employees relocating from other sites. A substantial number would likely be hired from the Bay Area's labor force. Assuming future RBC employees would make the same residential location decisions as current RBC site employees, approximately 90 percent or 8,730 RBC employees would live in Contra Costa and Alameda counties by the year 2050. This population would represent less than 1 percent of the total number of people projected to be living in Contra Costa and Alameda counties in 2050. In all other counties of residence, RBC employees and their associated household population would account for less than 0.05 percent of the total projected population in 2050. Therefore the project-related increase in local population would cause a less than significant impact.

Conservatively assuming that all 9,700 employees are new to the Bay Area, the total population growth from full RBC 2014 LRDP development could add up to 26,869 new persons (RBC employees plus dependents, assuming an average household size of 2.77 for Contra Costa County). The addition of 26,869 to the Bay Area would not alter the regional population significantly. The regional population is projected to grow by about 1.6 million from 2010 to 2050. Growth directly resulting from the 2014 LRDP would amount to less than 1 percent of this increment, so the project-related increase in regional population would cause a less than significant impact.

The increase in permanent employees would add residential population to the City of Richmond, other nearby communities, and the region and could increase demand for permanent housing. Between 2010 and 2040, ABAG projects an increase of approximately 635,650 households in the Bay Area. Approximately 38 percent of the regional total is projected for Alameda and Contra Costa counties, where most RBC employees would likely live.

The housing demand associated with 2014 LRDP permanent employment growth likely would be satisfied by the housing that could be added in Contra Costa and Alameda counties and other nearby communities. The most recent draft forecast for 2010-2040 is the Jobs-Housing Connections Strategy (ABAG 2012) that projects the addition of 83,970 households in Contra Costa County between 2010 and 2040, 160,160 households in Alameda County, and 10,990 households in the City of Richmond. As noted above, the City of Richmond General Plan EIR

assumed an increase in households within the city of more than 30,000 people by 2030 (City of Richmond 2011b). Conservatively assuming that all 9,700 employees are new to the Bay Area and 90 percent of those would live in Contra Costa or Alameda counties, the 2014 LRDP would cause a 8,730-households increase in Contra Costa and Alameda counties by 2050. This would represent a small percentage of the total additional households projected for these counties. Similarly, a portion of those households would be established in the City of Richmond in Contra Costa County—this likely would also represent a small portion of total new households anticipated. Therefore, the project-related impact due to increased employee housing demand would be less than significant.

Mitigation Measure: No mitigation measure is required.

Cumulative Impacts and Mitigation Measures

LRDP Cumulative Impact POP-1: **Development under the 2014 LRDP together with cumulative regional development would induce population growth in the City of Richmond and the Bay Area, but the contribution of the 2014 LRDP to this impact would not be cumulatively considerable. (*Less than Significant*)**

The geographic context for cumulative population and housing impacts analysis includes the nine-county Bay Area. While the employment increase would be concentrated at the RBC site, this impact on residential population growth would be dispersed throughout the Bay Area and would be spread out over 40 years.

The 2014 LRDP is expected to add 9,700 employees to the RBC site by 2050. These new employees would induce additional population growth as they would generate new employee households. Conservatively assuming all these new employees would reside in the Bay Area, the 2014 LRDP could add 26,869 new persons (RBC employees plus dependents, assuming an average household size of 2.77 for Contra Costa County). The addition of 26,869 to the Bay Area would not alter regional population significantly. Regional population is projected to grow by about 1.6 million from 2010 to 2050. Growth directly resulting from the 2014 LRDP would amount to less than one percent of this increment.

The expected population growth from 2014 LRDP development would be a component of overall expected Bay Area growth. Altogether, this future population growth would add to existing population and housing totals. This future growth could be accommodated through new development and in occupancy changes in existing housing and other building space. While the projected growth of the Bay Area population through 2040 could have environmental impacts, particularly to the extent it induces new development at the fringes of urbanized areas, the contribution of the 2014 LRDP to these potential impacts would not be cumulatively considerable.

Mitigation Measure: No mitigation measure is required.

4.11.5 References

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4.12 PUBLIC SERVICES AND RECREATION

4.12.1 Introduction

This section discusses existing public services and recreation facilities serving the project site and its vicinity and analyzes the potential for development under the proposed 2014 LRDP to affect those resources. The analysis is based on information provided by the Richmond Fire Department (RFD) and the UCPD, and information in the City of Richmond General Plan 2030.

Public and agency NOP comments related to public services and recreation are summarized below:

- The EIR should evaluate the need for additional City fire apparatus or services required to support the RBC development.
- The EIR should address the need to establish new or modify existing partnerships between the UCPD and the Richmond Police Department (RPD) to promote RBC public safety. This could include a establishing a joint UCPD/RPD substation or work stop on the project site or an RPD police substation near the project site.
- The EIR should evaluate RBC development impacts on shoreline parks, including the Bay Trail between Central Avenue and Garrard Boulevard.

All of these comments were considered in the analysis presented below.

4.12.2 Environmental Setting

Fire Protection

RFD currently provides fire protection services to the project site. There are seven RFD stations in the City. Personnel assigned to the stations respond to approximately 11,000 emergency calls per year. Approximately 77 percent of the emergency calls are for medical service. All personnel are trained as Emergency Medical Technicians to the level of EMT-D and HazMat First Responder Operational. The RFD goal is to respond to 85 percent of emergency calls in 6 minutes or less. The average response time for emergency and non-emergency calls for the RFD is 5 minutes. The average response of 5 minutes is considered acceptable according to the RFD standards (City of Richmond 2011).

RFD has a staff of 96, which includes 89 sworn officers and 7 non-sworn personnel. RFD is organized into three platoons staffing the eight companies. There are seven engine companies and one truck company. All eight companies are supervised by a Battalion Chief responsible for the emergency and administrative activities (City of Richmond 2011).

The closest fire station to the project site is Fire Station No. 64 at 4801 Bayview Avenue, approximately 0.5 mile to the east. Station No. 64 has seven personnel, two captains, two engineers, two firefighters, and the Battalion Chief. The personnel at Station 64 are trained as a Hazardous Materials Response Team (Banks 2013). The equipment at Station No. 64 includes an engine and a ladder truck.

The City of Richmond has mutual aid agreements for fire, rescue, and emergency medical services with the Contra Costa County Fire Protection District, City of Pinole Fire Department, and City of Rodeo-Hercules Fire Department. Under the agreement, these neighboring departments respond to calls outside their jurisdictional boundaries if appropriate primary response is unavailable or located such that it would result in an extended response time (City of Richmond 2011).

Police Services

The UCPD currently provides police services to the project site. The UCPD handles all patrol, investigation, and related law enforcement duties for UC Berkeley, the LBNL site, and other University-owned properties in the area.

The UCPD includes 77 police officers, 45 full-time non-sworn personnel, and 60 student employees. UCPD, at 1 Sproul Hall on the UC Berkeley campus, is organized into four divisions: Administration, Community Outreach and Emergency Services, Investigative and Support Services, and Patrol. The department is empowered as a full-service state law enforcement agency pursuant to Section 830.2(b) of the California Penal Code and fully subscribes to the standards of the California Commission on Peace Officer Standards and Training. Officers receive the same basic training as city and county peace officers throughout the state, plus additional training to meet the unique needs of a campus environment (UC Berkeley 2004).

There is no current service ratio goal for the project site; when services are requested or required, UCPD sends the appropriate resources to the project site to address the situation.

Schools

The West Contra Costa Unified School District (WCCUSD) serves approximately 235,000 residents in the five cities of El Cerrito, Richmond, San Pablo, Pinole, and Hercules and the unincorporated areas of Bayview-Montalvin Manor, East Richmond Heights, El Sobrante, Kensington, North Richmond, and Tara Hills. The district covers an area of approximately 65 square miles and provides K-8, middle, high school, alternative school, and adult education services. District enrollment in 2011-12 was approximately 30,000 students (California Department of Education 2013).

Coronado Elementary, the closest elementary school to the project site, is at 2001 Virginia Avenue, approximately 1 mile away. Coronado Elementary enrollment in 2011-12 was 451 students. Lovonya DeJean Middle School, the closest middle school, is at 3400 Macdonald Avenue, approximately 1 mile away. 2011-12 enrollment at Lovonya DeJean Middle School was 635 students. Kennedy High, the closest high school, is at 4300 Cutting Boulevard, less than 0.5 miles away. Kennedy High's 2011-12 enrollment was 883 students (California Department of Education 2013).

Parks and Recreation

The City of Richmond has 4,312 acres of parklands and open space that accounts for 22 percent of the land area in the City. Of these parklands, 4,029 acres are owned and operated by regional agencies, and 283 acres are City-owned facilities or jointly used by the City and other public or private entities. The City of Richmond is home to the Rosie the Riveter National Historic Park (City of Richmond 2011).

City Parks and Facilities

The City of Richmond owns and operates 74 parks, consisting of compact parks that include pocket parks, overlooks, pathways, neighborhood parks, and community parks. Recreational facilities at these parks include play lots, play fields, eight community centers, two senior centers, the swim center, an indoor recreation complex, and a municipal natatorium (City of Richmond 2011). The parks closest to the RBC site are Booker T. Anderson Jr. Park & Community Center, a 22-acre facility less than 0.25 mile northeast; Crescent Park, a 3.1-acre facility less than 0.25 mile east; and Marina Park and Green, an 11-acre facility less than 0.25 mile southwest.

National, State, and Regional Parks

Within the Richmond city limits, there are approximately 4,029 acres of regional and state parklands managed by the East Bay Regional Park District. These range in character from large-scale hillside natural areas to shoreline parks. These lands feature trail systems and day use areas and are publicly open for hiking, horseback riding, mountain biking, bird watching, fishing, and picnicking. The closest regional parks to the project site are Point Isabel Regional Shoreline and Brooks Island Regional Preserve. Point Isabel Regional Shoreline is a 23-acre facility on a small promontory in southernmost Richmond less than one mile southeast of the project site. It is owned and operated by the East Bay Regional Park District. Brooks Island Regional Preserve is a 373-acre preserve in the San Francisco Bay just off the Richmond Inner Harbor approximately 1.5 miles southwest of the project site. It is owned and operated by the East Bay Regional Park District (City of Richmond 2011).

The City of Richmond is home to the Rosie the Riveter/World War II Home Front National Historical Park that preserves and interprets stories and historic properties from the World War II home front era. The Rosie the Riveter/World War II Home Front National Historical Park consists of the Rosie the Riveter Memorial (in Marina Park and Green), the Ford Assembly Plant (in Sheridan Point Park), and Kaiser Shipyard No. 3/ SS Red Oak Victory Ship along the waterfront.

San Francisco Bay Trail

The San Francisco Bay Trail links many of the City and regional parks in Richmond, including the Point Isabel Regional Shoreline and six City-owned parks in Marina Bay west of the project site. The San Francisco Bay Trail is a planned 500-mile hiking and biking trail encircling the San Francisco and the San Pablo Bays. Twenty-five miles of this trail have been completed in the City; it is ultimately planned to span the entire shoreline wherever feasible. A completed Bay Trail section follows the shoreline directly adjacent to the southern boundary of the project site.

Eastshore State Park

The Eastshore State Park is located along the shoreline adjacent to the RBC site. The park extends approximately 8.5 miles along the eastern San Francisco Bay shoreline from the Oakland Bay Bridge north to the Marina Bay neighborhood in the city of Richmond. The park includes approximately 2,262 acres of uplands and tidelands along the Oakland, Emeryville, Berkeley, Albany, and Richmond waterfronts. The portion of the state park near the project is called the South Richmond Shoreline; it consists of gravel beaches to the south and tidal marsh to the north behind the seawall. An upland strip of land arcing from Point Isabel to Marina Bay is the dike formerly used by the railroad (Eastshore State Park General Plan 2004). A Bay Trail segment is built on this dike. The East Bay Regional Park District manages the state park. The Eastshore State Park General Plan identifies the possibility of adding one or two new vista seating areas along the Bay Trail north of Point Isabel. The vista points could incorporate interpretive panels with information regarding the natural, cultural, and social history of the specific portion of the park.

4.12.3 Regulatory Considerations

Federal

DOE Order 420.1B

DOE Order 420.1B, Facility Safety, establishes facility and programmatic safety requirements for DOE, including the National Nuclear Security Administration, for nuclear and explosives safety design criteria, fire protection, criticality safety, natural phenomena hazards mitigation, and the System Engineer Program.

DOE Standard 1066-2012

DOE Standard 1066-2012, Fire Protection, facilitates implementation of DOE Order 420.1B by providing criteria and guidance for a standard and acceptable approach to meet the DOE requirements for fire protection programs. The standard was developed to address special or unique fire protection issues at DOE facilities that are not comprehensively or adequately addressed in national consensus standards or other design criteria.

State

Senate Bill 50

The Leroy F. Greene School Facilities Act of 1998, or Senate Bill 50 (SB 50) (Government Code Section 65995), restricts local agencies' ability to deny project approvals based on adequacy of public school facilities (classrooms, auditoriums, etc.). School impact fees are collected at the time building permits are issued. These fees are used by the local schools to accommodate the new students added by the project, thereby reducing potential impacts on schools. School impact fees payment is required by SB 50 for all new residential development projects and is considered full and complete mitigation of school impacts under state regulations.

Local

The RBC site is a University property where work within the University's mission is performed on land 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 following sections summarize objectives and policies from the City of Richmond General Plan and local ordinances as they relate to public services and recreation facilities.

City of Richmond General Plan 2030

Police and Fire Protection

Goal SN2 High Levels of Police and Fire Service

Policy SN2.2 Level of Service. Provide a high level of police and fire service in the community. Secure adequate facilities, equipment and personnel for police and fire and collaborate with neighboring jurisdiction and partner agencies to adequately respond to emergencies and incidents in all parts of the City.

Policy SN2.3 Fire Safety. Regularly update policies that will protect the community and its urban and natural areas from fire hazards. Emphasize prevention and awareness of fire safety guidelines to minimize risk and potential damage to life, property and the environment. In areas designated by the Richmond Fire Department as having a high fire hazard, ensure adequate fire equipment, personnel, firebreaks, facilities, water and access for a quick and efficient response in any area.

Community Facilities and Infrastructure

Goal CF 2 Efficient Use and Adequate Maintenance of Facilities and Infrastructure

Policy CF2.1 Joint-Use and Co-Location. Encourage joint use or co-location of public and private facilities to maximize educational, cultural and recreational opportunities.

Policy CF2.3 Continued Public Use of School Sites. Encourage the continued public use of property owned and operated by the WCCUSD, other educational institutions, and private facilities to maximize multiple functions.

Parks and Recreation

Goal PR1 An Integrated System of Parks, Green Streets and Trails

Policy PR1.1 Diverse Range of Park Types and Functions. Continue to provide a diverse range of park types, functions and recreational opportunities to meet the physical and social needs of the community.

Policy PR1.2 Multimodal Connections to Parks, Open Space and Recreational Facilities. Improve connections to parks, open space and recreational facilities through an interconnected network of pedestrian-friendly green streets, multimodal corridors and trails.

Policy PR1.3 Equitable Distribution of Park and Recreation Facilities. Expand park and recreation opportunities in all neighborhoods and ensure that they are offered within comfortable walking distance of homes, schools and businesses in order to encourage more physically and socially active lifestyles.

The 2030 General Plan EIR determined that the public services and recreation effects from future development pursuant to the General Plan would be less than significant. Future development would increase demand for police and fire protection and emergency medical services and could result in a need for new or expanded services; however, it would not decrease the existing level of protection or service so the impact would be less than significant. The need for new or expanded school or libraries would be mitigated by the collection of fees, so this impact would be less than significant. Future development would increase the use of recreational facilities and create demand for new or expanded facilities but would not substantially degrade them so the impact would be less than significant. No mitigation measures would be required. Cumulative impacts would also be less than significant.

4.12.4 Impacts and Mitigation Measures

Standards of Significance

Project impacts on public services and recreation facilities 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:

- Result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times, or other performance objectives for fire protection, police protection, schools, parks, or other facilities.
- Increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated.

- Include recreational facilities or require the construction or expansion of recreational facilities that might have an adverse physical effect on the environment.

CEQA Checklist Items Adequately Addressed in the Initial Study

The Initial Study deferred analysis of the project's public services and recreational facilities impacts to the EIR, so all of the CEQA checklist items listed above are addressed in the following analysis.

Analytical Methods

This section focuses on the potential for adverse physical impacts from the provision of new or altered public service facilities (police and fire service) under the 2014 LRDP. This includes new or expanded facilities needed to increase or maintain services, service personnel, or level of service standards. The analysis involves three steps: (1) assessing whether 2014 LRDP related growth would result in unmet public services demand. This is determined by comparing projected population growth with existing service ratios, response times, capacities, or other performance objectives identified for each service; (2) evaluating whether unmet services needs would require additional staff or equipment necessitating construction of new or expanded facilities; (3) if the project spurred construction of new or expanded facilities, determining whether the new or expanded facilities would result in a significant environmental impact.

The cumulative impacts analysis in this section evaluates the potential for development under the 2014 LRDP, in conjunction with regional growth, to generate a cumulative demand for new or expanded public services facilities that could result in significant environmental effects.

RBC 2014 LRDP Policies

The RBC 2014 LRDP policies related to public services and recreation include the following:

- SP1 – Safety and Preparedness Policy on Model Programs: Develop model environment, health, and safety programs for the Richmond Bay Campus.
    - Develop comprehensive and effective physical safety, life safety, and emergency service plans to protect the environment, the public, employees, and guests at all times.
    - Ensure clear and responsible management of environment, health, and safety programs and services.
    - Implement land use controls to prohibit unsafe exposure of workers, visitors, and the surrounding community to environmental contaminants.
    - Utilize transparent environment, health, and safety reporting practices.
- SP2 – Safety and Preparedness Policy on Inclusion: Ensure that the Richmond Bay Campus contributes to and serves as a resource for the Richmond community.
    - Encourage inclusion with an open campus where security boundaries occur at the building level rather than the campus level to advance the ideals of institutional transparency and mutual trust.
    - Enable community access to Richmond Bay Campus amenities such as outdoor spaces and meeting facilities to promote a better understanding of the University's mission.
    - Expand partnerships with local agencies, including fire and police departments, as well as local neighborhoods to promote understanding and address safety and security concerns of neighbors as well as the campus workforce.

LRDP Impacts and Mitigation Measures

LRDP Impact PS-1: Development under the 2014 LRDP would increase the demand for fire services and could result in the construction of new or expanded fire stations. The impacts from the construction of a fire station would be less than significant. (*Less than Significant*)

Campus development under the proposed 2014 LRDP would add to fire service demand due to increased population and facilities at the RBC site and increased population in the broader region. Direct and indirect effects on fire service are analyzed.

Direct Effect of RBC Development

Fire Station No. 64 provides fire service to the RBC site currently and would continue to do so if the proposed project were implemented until required fire safety and emergency assessments and plans indicate the need for additional services. This fire station has one fire engine and a fire truck. There are no General Plan proposed modifications or expansions for Fire Station No. 64 and no additional fire stations are planned in the vicinity. Currently the RFD is operating at an acceptable level of fire protection service by responding to city-wide emergency and non-emergency calls within 5 minutes. In the long run, it may become desirable or necessary for the University to house emergency service equipment and personnel on the campus. The LBNL Protective Services Department retains responsibility for all security, fire protection, and emergency service requirements for all DOE facilities, assets, and personnel.

Development under the 2014 LRDP would result in an additional 4.35 million gsf of building space on the RBC site (for a total of 5.4 million square feet of space) and up to an additional 9,700 people (for a total of 10,000 persons). The new buildings and personnel would require RFD fire protection and emergency services. The pace of 2014 LRDP development cannot be predicted at this time. As the space envisioned under the 2014 LRDP would be developed, the demand for fire service would increase accordingly.

The City monitors response times for fire and emergency medical calls to determine if there is a need for additional facilities, and identifies locations that may not be adequately served by existing facilities. According to the City's General Plan EIR, the RFD can determine whether additional fire services are required by preparing a "standards of coverage" plan (City of Richmond 2011). The standards of coverage plan would identify locations with high call volumes and high density and would indicate if additional fire services are required and where they would need to be located (Banks 2013). The RFD service goals are based on accepted service levels of distance and time as opposed to firefighters or stations per capita. Therefore, although the RBC site workforce would increase and the campus would be more densely developed, the response time would not be significantly affected.

If the City of Richmond's population grows beyond the General Plan's 2030 planning horizon, modifications or replacement of Fire Station No. 64 may be proposed to maintain adequate service levels. Any future fire station construction or modification is expected to comply with contemporaneous state, local, and City General Plan and zoning requirements. The RBC site also includes space for an on-site fire station once on-site demand (e.g., sufficient built space and population) warrants it. The potential environmental effects associated with constructing an on-site fire station as part of LRDP development are evaluated in Sections 4.1 through 4.11 and Sections 4.12 through 4.14 and are found to be less than significant or reduced to less than significant with mitigation. Although there would be significant and unavoidable impacts of LRDP development related to operational criteria pollutant and toxic air contaminant emissions, demolition of historic buildings, operational GHG emissions, and traffic, due to the nature of fire stations, the construction

and operation of the on-site fire station would not cause or contribute to these significant and unavoidable impacts.

Should RBC development in conjunction with other growth require an expansion of Fire Station No. 64 or a new fire station in this portion of the City, potential expansion or new construction of a fire station is not likely to result in significant environmental impacts. This is because fire stations are relatively small facilities in terms of building space, and fire stations are often sited on infill sites within developed urban areas. New fire station sites are generally small, ranging in size from 1/2 to 1 acre. To the extent that a fire station project might result in some potentially significant impacts, it is anticipated that those would be mitigated to a less than significant level. Furthermore, as stated in the City's General Plan EIR, the City will conduct an environmental review of expanding or building a new fire station and anticipates that the impact of development under the General Plan related to provision of fire service would be less than significant (City of Richmond 2011). Therefore, the impact related to fire service demand triggered by the RBC site development would be less than significant.

Indirect Effect of RBC Development

Approximately 10,000 employees would be on the project site at full development under the 2014 LRDP. A portion of them would be existing LBNL employees who would relocate from other facilities to the RBC; others may be existing UC Berkeley employees. Many of the new employees would likely be hired from the Bay Area. Most employees would likely not relocate and would continue to commute from their current residences; not impacting residential fire service demand. New employees who are hired from outside the Bay Area are likely to relocate as a result of RBC employment. As discussed in Section 4.11, Population and Housing, approximately 90 percent or 8,730 RBC employees would live in Contra Costa and Alameda counties by the year 2050. However, the RBC employees and their associated household population would account for a very small percentage of the projected population of Contra Costa and Alameda counties in 2050. The housing demand associated with 2014 LRDP permanent employment growth likely would be satisfied by the housing that could be added in the City of Richmond, Contra Costa and Alameda counties, and other nearby communities.

RBC personnel who do choose to move to the City of Richmond would indirectly contribute to the residentially-based need for new fire services or facilities. However, these employees would move into areas already served by fire stations, or into new residential developments subject to the dedication of land, development, or impact fees. If the new residential development necessitated a new fire station with subsequent environmental impacts, those impacts would be mitigated by the developer of that residential development.

In summary, the direct and indirect impacts of campus development under the 2014 LRDP related to demand for fire service would be less than significant.

Mitigation Measure: No mitigation measure is required.

LRDP Impact PS-2: Development under the 2014 LRDP would increase police services demand that could necessitate construction of new police facilities on the RBC site, but such construction would not result in significant environmental impacts. (*Less than Significant*)

Campus development under the 2014 LRDP would add to police services demand due to increased RBC site population and facilities and increased population in the broader region. The direct and indirect effects of RBC development on police services are analyzed below.

Direct Effect of RBC Development

Campus development under the 2014 LRDP would result in a RBC site workforce of approximately 10,000 people and on-site building space growth to approximately 5.4 million gsf. The UCPD currently maintains a presence on the RBC site at all times. 2014 LRDP implementation would result in the anticipated need for additional on-site police staff and equipment so as to provide adequate police services. The additional police service demand may not require construction of a new police station on- or off-site, but it may require that office space to be used as an on-site police outpost. The results of required emergency and security assessments and plans may indicate the need for additional services. Over time, the UCPD staff on-site would need to be increased, requiring expansion or replacement of the existing police station. The LBNL Protective Services Department retains responsibility for all security, fire protection, and emergency service requirements for all DOE facilities, assets, and personnel. Therefore, the impact related to the provision of police services would be less than significant.

Indirect Effect of RBC Development

As discussed in Section 4.11, Population and Housing, and LRDP Impact PS-1 above, campus development is not expected to result in the influx of a large number of employee households into Richmond. Those employees who do relocate in the City of Richmond as a result of RBC employment and research opportunities would move into areas already served by police stations, or into new residential developments subject to the dedication of land, development, or impact fees. If new residential development necessitated a new police station, that new station would be subject to local planning and any impacts would be mitigated by the residential developer.

In summary, the direct and indirect impacts of campus development under the 2014 LRDP related to police services demand would be less than significant.

Mitigation Measure: No mitigation measure is required.

LRDP Impact PS-3: Development under the 2014 LRDP would not result in the need for new or physically altered public school facilities. (*Less than Significant*)

Direct Effect of RBC Development

The 2014 LRDP proposes no residential uses on or off the RBC site, so no new school-age children would be directly associated with the proposed project. There would be no direct impact on schools.

Indirect Effect of RBC Development

As discussed in Section 4.11, Population and Housing, and LRDP Impact PS-1 above, campus development is not expected to result in the influx of a large number of employee households into Richmond. Children associated with employee households that do move to Richmond would attend WCCUSD, although the number is not expected to be large. The anticipated growth associated with the 2014 LRDP would occur over an approximately 37-year period, so the population and student enrollment increases would occur incrementally during that time. The WCCUSD anticipates enrollment increases in its overall resident student population over the next 10 years (WCCUSD 2013). The increase in student population from RBC development would conform to the anticipated increase in enrollment in the WCCUSD. The incremental student enrollment increase from families relocating due to RBC development would be distributed throughout the WCCUSD. This would spread and minimize enrollment impacts on any particular public school facilities. Therefore, the project would have a less than significant indirect impact on public school facilities.

Mitigation Measure: No mitigation measure is required.

LRDP Impact PS-4: Development under the 2014 LRDP would not trigger construction, substantially increase demand, or substantially degrade parks and recreational facilities. (*Less than Significant*)

Direct Effect of RBC Development

Currently, the RFS includes a gym and workout space, available to employees at the site. The RBC may include recreational facilities or field space, as outlined in the Research, Education, and Support land use description (see Section 3.6.6). The potential environmental effects associated with constructing new on-site recreational facilities are evaluated in Sections 4.1 through 4.11 and Sections 4.12 through 4.14 and are found to be less than significant or reduced to less than significant with mitigation. Although the analysis in LRDP Impact BIO-5 in Section 4.3, Biological Resources, concludes a significant and unavoidable impact, construction of future recreational facilities would not affect the area of the northwest meadow. Although there would be other significant and unavoidable impacts of LRDP development related to operational criteria pollutant emissions, historic buildings, operational GHG emissions, and traffic, due to the nature of recreational facilities, these improvements would not cause or contribute to these significant and unavoidable impacts.

The 2014 LRDP proposes neither on- nor off-site residential uses that would necessitate the development of recreational facilities. The campus population would consist of researchers, faculty, staff, and some students who would tend be on the campus during daytime hours. The RBC would be developed with open space areas available to the campus population for passive recreation, such as walking along the proposed interpretive boardwalks. It is anticipated that active recreational uses would be developed, such as a sports field, gym, and other athletic facilities. The RBC workforce could also use nearby parks, including the South Richmond Shoreline portion of the Eastshore State Park or Shimada Friendship Park located to the west off the San Francisco Bay Trail. The Eastshore State Park trail would include interpretive panels for recreational users. However, the entire RBC workforce would not be expected to use the parks and any park visits would be interspersed throughout the day due to differing RBC staff schedules. It is unlikely that the small portion of the RBC workforce present at night would use nearby parks after dark due to limited visibility and unfavorable nighttime temperatures and weather. For these reasons, it is not expected that RBC use of nearby parks would be great enough to cause substantial physical deterioration.

The San Francisco Bay Trail would be available for campus population commuting and recreation. As described in the Project Description, Bay Trail access is provided via underpasses and overpasses at Central Avenue, Buchanan Street, Gilman Street, University Avenue, and the Berkeley bicycle and pedestrian bridge. Access is also available along the entire southern gateway district. Some RBC staff and visitors could commute by bicycle using the San Francisco Bay Trail. According to the Bay Area Travel Survey 2000 conducted by the Metropolitan Transportation Commission, about 1.8 percent of home-based work trips in the Bay Area are made by bicycle. This rate ranges from 3.4 percent for City and County of San Francisco to a low of 0.3 percent for Contra Costa County (MTC 2004). If RBC were to follow the Bay Area average, approximately 175 of the full 10,000 employees would use the trail for daily commuting. In reality, bicycle commute rates would likely be much lower because of the RBC's distances and limited connectivity to a wide distribution of residential neighborhoods. The resulting small number of daily bicycle trips via the Bay Trail is unlikely to result in substantial trail deterioration. Therefore the proposed project would not substantially increase demand for park and recreational facilities in any direct manner. No substantial physical deterioration of such

amenities would result, so the direct impact on park and recreational facilities would be less than significant.

Indirect Effect of RBC Development

The City of Richmond has a policy that requires 3 acres of community or neighborhood parkland per 1,000 residents. This policy does not take into account regional and state parks. The City currently does not meet the required ratio; it has a ratio of 2.44 acres per 1,000 residents. Accordingly, the City of Richmond General Plan indicates that there is a deficit in local park space in relation to the current population. There are, however, over 4,000 acres of nearby regional and state parks that are used by the Richmond population to meet recreational demand.

For reasons presented in Section 4.11, Population and Housing, and LRDP Impact PS-1 above, only a relatively small portion of the future RBC workforce is likely to relocate to the City of Richmond. The population increase within the City of Richmond from 2014 LRDP campus development would result in a relatively small increase in local park demand. Employees who relocate to the City of Richmond would move into areas already served by parks and recreational facilities, or into new residential developments subject to the dedication of land, development, or impact fees. Therefore, the proposed project would not indirectly increase demand for parks and recreational facilities in a substantial manner. As a result, substantial physical deterioration of park and recreational facilities would not occur. The indirect impact from the RBC site workforce on park and recreational facilities would be less than significant.

Mitigation Measure: No mitigation measure is required.

Cumulative Impacts and Mitigation Measures

LRDP Cumulative Impact PS-1: **Development under the 2014 LRDP, in conjunction with other regional growth, could increase the demand for public service facilities but would not result in significant environmental impacts related to construction or expansion of such facilities. (*Less than Significant*)**

Demand for all public services in the City of Richmond and surrounding Bay Area region could increase with implementation of the 2014 LRDP in combination with other expected cumulative growth. The expected 2014 LRDP population growth is a component of the overall Bay Area regional growth, and a subset of growth anticipated in the City of Richmond General Plan 2030. As growth occurs in the Bay Area region, the City of Richmond and other cities and counties will undertake facilities planning processes to identify the appropriate size, location, and timing for new facilities.

The City of Richmond General Plan 2030 indicates that as growth occurs, police and fire services may need to be expanded and equipment upgraded. The City of Richmond will continue coordinating with other local and regional emergency service agencies to ensure that police and fire services demands are met. When future facilities are planned, the associated environmental impacts would be analyzed. New fire and police facility projects are expected to comply with the appropriate general plan and zoning requirements and CEQA. Campus development under the 2014 LRDP does not anticipate residential land uses on the RBC site and would not have a direct impact on the WCCUSD or other public school districts. To the extent that some RBC-related households relocate to Richmond, they would add some school-age children to the school district. As is current practice, the WCCUSD would coordinate with communities in its service area, including the City of Richmond, and would plan to provide adequate school facilities and services

to meet population-driven demand increases. Construction of new or expanded public school facilities would be subject to CEQA review and consideration by the WCCUSD. The construction of new or expanded school facilities is not expected to result in significant environmental impacts because, due to the nature of these facilities (i.e., infill sites, surrounded by existing development), potential impacts are expected to be less than significant.

Campus development under the 2014 LRDP does not anticipate residential land uses on the RBC site and therefore, would not have a direct impact on parks and recreational facilities. As described above, some of the campus workforce could use the nearby parks, including the South Richmond Shoreline portion of the Eastshore State Park or Shimada Friendship Park; resources would also be available on the new campus itself. Such use would tend to be limited and during daylight hours. In addition, there would be on-site open space and amenities for passive recreation. A small number of RBC staff or visitors may commute by bicycle or walking and contribute to use of the San Francisco Bay Trail. To the extent that some RBC-related households might relocate to Richmond, their migration would be part of the City's planned and analyzed population growth. Any new residential development in Richmond would dedicate land or pay in-lieu fees that would help the City maintain or create new parks and recreational facilities. The additional growth and subsequent demand on parks and recreational facilities in the City of Richmond from buildout of the 2014 LRDP is considered minimal. The General Plan anticipates growth and the need for parks and recreational facilities to serve the increased demand. The 2014 LRDP would not place an additional demand beyond what was anticipated in the General Plan. Therefore, the cumulative impact to parks and recreational facilities from campus development under the 2014 LRDP would be less than significant.

Mitigation Measure: No mitigation measure is required.

4.12.5 References

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4.13 TRANSPORTATION AND TRAFFIC

4.13.1 Introduction

This section evaluates potential impacts from development under the proposed 2014 LRDP on transportation facilities and existing transportation operating conditions at and near the RBC site, including vehicular traffic and circulation, parking, transit and shuttle services, and pedestrian and bicycle facilities. Information and analysis in this section is based on the transportation impact analysis prepared by Fehr and Peers, Inc. The transportation report is in Appendix F.

Public and agency NOP comments related to transportation and traffic are summarized below:

- The project site planning should be consistent with the Richmond 2030 General Plan, and particularly with the Plan's Circulation Element and the Congestion Management Agency's Congestion Management Plan.
- The EIR should identify mitigation measures for any roadway mainline section or intersection to maintain an acceptable LOS with the addition of project-related or cumulative traffic.
- The project's fair share contribution, financing, scheduling, implementation responsibilities, and lead agency monitoring should be fully discussed for all proposed mitigation measures.
- Potential mitigation measures should include Transportation Management Plan and transportation demand management (TDM) policies and programs, including vehicle trip reduction scenarios.
- The EIR should analyze impacts and mitigation measures concerning transit, bicycle, and pedestrian facilities.
- The EIR should assess the feasibility of new shuttle service from the RBC site to the El Cerrito del Norte Station instead of the El Cerrito Plaza station.
- The effect of sea-level rise on critical transportation infrastructure should be addressed.
- The proposed project should conform with the new Richmond Bicycle Master Plan and Pedestrian Plan, the Bay Trail Plan, and the Contra Costa Countywide Bicycle Plan.
- The EIR should assess potential bicycle safety implications of increased vehicle use and address bicycle access to the Bay Trail, BART, AC Transit Bus Service, and future ferry service.
- The EIR should identify Bay Trail connections along with issues concerning access for bicycles to the RBC site, the Bay Trail, and connecting trails.
- Mitigation measures should include a system of low emission, high occupancy buses to transport persons from major metropolitan areas to the RBC site, similar to the systems employed by Google and Genentech.

Comments relevant to reasonably foreseeable potential impacts of the 2014 LRDP are addressed in the analysis below.

4.13.2 Environmental Setting

The RBC site is in the City of Richmond, south and west of I-580, and west of I-80. Figure 4-11 shows the RBC site, the surrounding roadway system, and the intersections analyzed. The regional and local roadways serving the project site and the internal circulation in the site are described in the sections that follow.

Study Locations

Richmond, California

TETRA TECH

Figure 4-11

Regional Roadways

I-580 is a six-lane freeway connecting I-80 to US 101 near the Richmond-San Rafael Bridge in Marin County. Auxiliary lanes (lanes connecting adjacent on-ramps and off-ramps) provide a fourth travel lane in each direction near the project. Access between RBC and I-580 is by interchanges at Bayview Avenue/51st Street, Regatta Boulevard/Juliga Woods Street, and Marina Bay Parkway/South 23rd Street. I-580 has an average annual daily traffic volume of 91,000 vehicles (Caltrans 2011) between the Regatta Boulevard/Juliga Woods Street and Marina Bay Parkway/South 23rd Street interchanges.

I-80 connects the San Francisco Bay Area with the Sacramento region and continues east. One mile east of the RBC site, I-80 is oriented in a north-south direction, and it provides four lanes of travel in each direction. Access between I-80 and the RBC is provided by I-580 to and from the south and by the Carlson Boulevard interchange to and from the north. I-80 has an average annual daily traffic volume of 171,000 vehicles (Caltrans 2011) north of I-580.

Regatta Boulevard is an east-west roadway that connects Marina Way South to Meade Street, forming the primary east-west connection in the South Shoreline area. Regatta Boulevard provides two travel lanes in each direction with a median and turn lanes at intersections between Marina Way South and Marina Bay Parkway. East of Marina Bay Parkway, the roadway narrows to three lanes with one travel lane in each direction and a center two-way left-turn lane; farther east, the roadway narrows further to a two-lane cross section, terminating at Meade Street. The recently completed extension of Regatta Boulevard provides a direct connection to Meade Street, allowing for another access/egress route for the South Shoreline area when trains block the Marina Bay Parkway just north of Regatta Boulevard. The speed limit on Regatta Boulevard is 25 miles per hour (mph).

Marina Bay Parkway/South 23rd Street is a north-south roadway connecting downtown Richmond to the south shoreline area. In the study area, the roadway generally provides two travel lanes in each direction, with turn lanes at intersections. The speed limit is 30 mph.

Cutting Boulevard is an east-west arterial roadway connecting San Pablo Avenue and I-580 to the east with South Garrard Boulevard to the west. In the study area, Cutting Boulevard generally provides two travel lanes in each direction, with turn lanes at intersections. The speed limit is 35 mph.

Carlson Boulevard is a four-lane roadway that runs generally northwest-southeast through the study area, connecting 23rd Street to I-80 with an interchange, and terminating at San Pablo Avenue in El Cerrito. The roadway generally provides two travel lanes in each direction and turn lanes at major intersections. The speed limit is 35 mph.

Meade Street is a two-lane roadway that runs northwest from the I-580/Bayview Avenue interchange to the I-580/Regatta Boulevard interchange and provides access to the RBC site. The speed limit is 30 mph.

Pedestrian and Bicycle Facilities

Pedestrian facilities in the study area include sidewalks, crosswalks, and multi-use trails. Most roadways in the study area provide sidewalks; exceptions include Regatta Boulevard east of Marina Bay Parkway and along Meade Street, where sidewalks are provided only where there are fronting uses, and Marina Bay Parkway south of Meeker Avenue, where sidewalks are provided only on the west side of the street. The Richmond Bay Trail runs along the bay shoreline south of the project site, connecting by Marina Bay Parkway to Regatta Boulevard and continuing west. There is currently no direct connection between the Bay Trail and the RBC site.

Bicycle facilities in the study area can be classified into three types, including:

- ***Bicycle Paths (Class 1)*** – These facilities are off-street and can serve bicyclists and pedestrians.
- ***Bicycle Lanes (Class 2)*** – These facilities provide a dedicated area for bicyclists in the paved street right-of-way through the use of striping and appropriate signs.
- ***Bicycle Routes (Class 3)*** – These facilities are designated on-street bicycle routes where bicyclists and vehicles share a travel lane. Typically, these facilities are along streets that do not provide sufficient width for dedicated bicycle lane (Class 2) facilities. The street is designated as a bicycle route through signs informing drivers to expect bicyclists or with shared-lane pavement markings (i.e., "sharrows").

Figure 4-12 identifies existing and proposed bicycle facilities in the study area. Existing bicycle facilities near the project site include the Class 1 Bay Trail along the bay shoreline and Class 3 routes on Marina Bay Parkway and on Regatta Boulevard west of Marina Bay Parkway.

The Richmond Bicycle Master Plan and City of Richmond Pedestrian Plan propose several bicycle and pedestrian improvements in the study area, including:

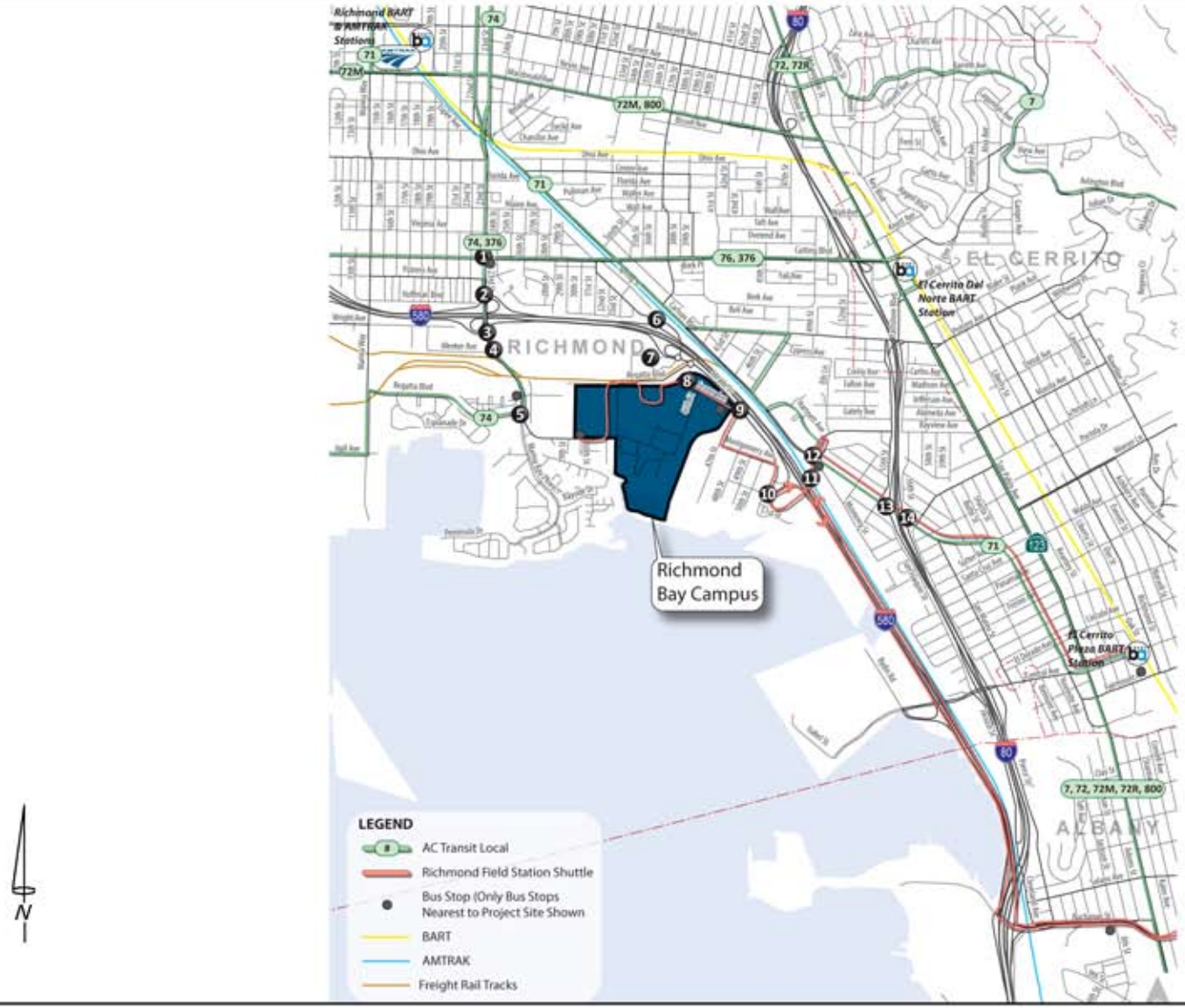
- Class 1 pedestrian path connecting Regatta Boulevard west of Marina Bay Parkway, extending farther east to connect to the I-580 and Bayview Avenue interchange just south of the I-580 interchange.
- Class 1 pedestrian path adjacent to the east-west railroad tracks connecting Meade Street at Seaver Street to Regatta Boulevard.
- Class 1 pedestrian path along south 46th Street connecting the Bay Trail and Meade Street.
- Class 2 bicycle lanes on a segment of Regatta Boulevard between Marina Way and Meade Street.
- Class 2 bicycle lanes on South 23rd Street/Marina Bay Parkway, including potential improvements at the I-580 overpass such as widening sidewalks, and realigning the freeway ramps to square the intersection and shorten pedestrian crossings.
- Class 2 bicycle lanes on Meade Street/South 51st Street between Regatta Boulevard and Seaport Avenue.
- Class 2 bicycle lanes on Bayview Avenue between Seaport Avenue and Carlson Boulevard connecting the two Class 1 paths.
- Class 2 bicycle lanes on Carlson Boulevard between El Cerrito City Limit and Broadway.

These potential improvements are not fully funded, designed, or approved, nor is it known when they would be implemented.

At-Grade Railroad Crossings

There are two at-grade railroad crossings in the study area, on Marina Bay Parkway between Meeker Avenue and Regatta Boulevard, and on Meade Street between Regatta Boulevard and the recently completed Regatta Boulevard extension as shown on Figure 4-12. The public crossings are operated by Richmond Pacific and Union Pacific Railroad Corporations.

On average, daily, about nine trains use the Marina Bay Parkway railroad crossing travelling at speeds from about 1 to 10 mph. Gate controls with bells and pavement markings are on the vehicular approaches. Advanced warning signs are provided. Six years (2007-2012) of collision data was collected from the Federal Railroad Administration for the crossings. One collision related to the Marina Bay Parkway railroad crossing was reported in 2007. It involved



Existing Transit Service

Richmond, California

TETRA TECH

Figure 4-12

an automobile that drove around or through the safety gates and struck rail equipment. No injuries were reported. The Marina Bay Parkway crossing is anticipated to be replaced with a grade-separated crossing; this project is fully funded, and construction is expected to start in 2013.

On average, daily, about four trains use the Meade Street railroad crossing travelling at speeds from about 5 to 10 mph. Gate controls with bells, pavement markings, and advanced warning signs are on the vehicular approaches. There are no recorded collisions related to the Meade Street railroad crossing from 2007 to 2012.

Intersection Operations

Study Intersections

This analysis includes these 14 intersections:

1. Cutting Boulevard/23rd Street
2. I-580 Westbound Ramps/23rd Street
3. I-580 Eastbound Ramps/23rd Street
4. Meeker Avenue/23rd Street/Marin Bay Parkway
5. Regatta Boulevard/Marina Bay Parkway
6. I-580 Westbound Ramps/Juliga Woods Street
7. I-580 Eastbound Ramps/Regatta Boulevard/ Meade Street
8. Meade Street/Regatta Boulevard
9. Meade Street/Seaver Avenue
10. Seaport Avenue/I-580 Eastbound Ramps/South 51st Street/Bayview Avenue
11. I-580 Westbound Ramps/Bayview Avenue
12. Carlson Boulevard/Bayview Avenue
13. Carlson Boulevard/I-80 Eastbound Ramps
14. Carlson Boulevard/I-80 Westbound Ramps

These intersections were selected for analysis because they are most likely to be affected by traffic from 2014 LRDP campus development.

Intersection Counts

The intersection operations analyses are based on the peak hour of traffic occurring during the a.m. and p.m. peak hours (7:00 to 9:00 a.m. and 4:00 to 6:00 p.m.). The peak hours were determined using intersection turning movement, vehicle, pedestrian, and bicycle counts collected December 12 and 13, 2012. These periods were selected because trips from the proposed project, in combination with background traffic, are expected to represent typical worst traffic conditions. During these periods, the peak hour (i.e., the hour with the highest traffic volumes observed in the study area) is from 7:30 a.m. to 8:30 a.m. (a.m. peak hour) and 5:00 p.m. to 6:00 p.m. (p.m. peak hour).

Two comparison counts were taken the week of January 28, 2013. They were compared to the December 2012 counts, in terms of total intersection volumes and certain critical movements, and the intersection volumes at the study intersections were adjusted to reflect typical non-holiday conditions. The adjustments included increasing the northbound through movement at Marina

Bay Parkway/Meeker Street and corresponding upstream movements, and increasing the truck percentages at all the intersections.

Intersection Level of Service Definitions

Intersection operations are described using the performance measure LOS. LOS is a qualitative description of traffic operations from the vehicle driver's perspective, ranging from LOS A. with no congestion and little delay, to LOS F, with excessive congestion and delays. LOS calculations represent the delay experienced by the driver at an intersection or while driving on a freeway or other roadway segment. Different methods are used to evaluate the LOS of signalized and un-signalized intersections, roadway segments, and freeway segments.

Signalized Intersections

Signalized intersection operations are determined using methods in the 2000 Highway Capacity Manual. They use intersection characteristics to estimate average control delay and then assign an LOS. Control delay is defined as the delay associated with deceleration, stopping, moving up in the queue, and acceleration experienced by drivers at an intersection. Table 4.13-1 has descriptions of various LOSs and the corresponding ranges of delays for signalized intersections.

Un-signalized Intersections

Un-signalized intersection (four-way stop-controlled and side-street stop-controlled) LOS is analyzed using the 2000 Highway Capacity Manual. Delay is calculated for movements controlled by a stop sign or that must yield the right-of-way. This method defines operations by average control delay per vehicle (measured in seconds) for each stop-controlled movement. This incorporates delay associated with deceleration, acceleration, stopping, and moving up in the queue. For side-street stop-controlled intersections, the movement or approach with the highest delay is reported.

Table 4.13-1 summarizes the LOS ranges for un-signalized intersections. They are lower than the delay ranges for signalized intersections because drivers will generally tolerate more delay at signals.

Study Intersection Level of Service under Existing Conditions

Table 4.13-2 summarizes existing weekday peak hour intersection LOS analysis results for the study intersections. All currently operate at LOS D or better during the a.m. peak hour; and all but one operates at LOS D or better during the p.m. peak hour. The City of Richmond considers intersections operating at LOS E or LOS F as substandard conditions. The one sub-standard intersection is Meeker Avenue/23rd Street/Marina Bay Parkway that operates at LOS F in the p.m. peak hour.

Table 4.13-1
Intersection Level of Service Definitions

Un-signalized Intersections			Signalized Intersections	
Description	**Average Total Vehicle Delay (Seconds)**	**Level of Service Grade**	**Average Control Vehicle Delay (Seconds)**	**Description**
No delay for stop-controlled approaches.	≤10.0	A	≤10.0	Free flow or Insignificant delays: Operations with very low delay, when signal progression is extremely favorable and most vehicles arrive during the green light phase. Most vehicles do not stop at all.
Operations with minor delay.	>10.0 and ≤15.0	B	>10.0 and ≤20.0	Stable operation or minimal delays: Generally occurs with good signal progression or short cycle lengths. More vehicles stop than with LOS A, causing higher levels of average delay.
Operations with moderate delays.	>15.0 and ≤25.0	C	>20.0 and ≤35.0	Stable operation or acceptable delays: Higher delays from fair signal progression or longer cycle lengths. Drivers begin having to wait through more than one red light. Most drivers feel somewhat restricted.
Operations with increasingly unacceptable delays.	>25.0 and ≤35.0	D	>35.0 and ≤55.0	Approaching unstable or tolerable delays: Influence of congestion becomes more noticeable. Longer delays from unfavorable signal progression, long cycle lengths, or high volume to capacity ratios. Many vehicles stop. Drivers may have to wait through more than one red light. Queues may develop, but dissipate rapidly, without excessive delays.
Operations with high delays, and long queues.	>35.0 and ≤50.0	E	>55.0 and ≤80.0	Unstable operation or significant delays: Considered to be the limit of acceptable delay. High delays indicate poor signal progression, long cycle lengths and high volume to capacity ratios. Individual cycle failures are frequent occurrences. Vehicles may wait through several signal cycles. Long queues form upstream from intersection.
Operations with extreme congestion, and with very high delays and long queues unacceptable to most drivers.	>50.0	F	>80.0	Forced flow or excessive delays: Occurs with oversaturation when flows exceed the intersection capacity. Represents jammed conditions. Many cycle failures. Queues may block upstream intersections.

≤ = Less than or equal to

> = Greater than

Source: Transportation Research Board 2000.

Table 4.13-2
Existing Conditions – Study Intersection LOS Summary

Intersection	Control	AM Peak Hour		PM Peak Hour	
		Delay (Seconds)[1]	LOS [1]	Delay (Seconds) [1]	LOS [1]
1. Cutting Boulevard/23rd Street	Signal	22.9	C	23.0	C
2. I-580 Westbound Ramps/23rd Street	Signal	6.9	A	6.8	A
3. I-580 Eastbound Ramps/23rd Street	Signal	3.6	A	6.3	A
4. Meeker Avenue/23rd Street/Marina Bay Pkwy	Signal	37.1	C	**115.8**	**F**
5. Regatta Boulevard/ Marina Bay Pkwy	Signal	30.0	C	43.6	D
6. I-580 Westbound Ramps/Juliga Woods Street	Side Street Stop	2.5 (10.0)	A (B)	4.4 (10.9)	A (B)
7. I-580 Eastbound Ramps/Regatta Boulevard/ Meade Street	Signal	9.7	A	9.1	A
8. Meade Street/Regatta Boulevard	Side Street Stop	6.4 (10.6)	A (B)	5.6 (10.0)	A (B)
9. Meade Street/Seaver Avenue	Side Street Stop	1.3 (9.7)	A (A)	3.0 (9.0)	A (A)
10. Seaport Avenue/I-580 Eastbound Ramps/ South 51st Street/Bayview Avenue	All-way Stop	27.6	D	20.0	C
11. I-580 Westbound Ramps/Bayview Ave	Signal	5.4	A	6.7	A
12. Carlson Boulevard/ Bayview Ave	Signal	27.0	C	21.6	C
13. Carlson Boulevard/I-80 Westbound Ramps	Signal	19.3	B	20.0	B
14. Carlson Boulevard/I-80 Eastbound Ramps	Signal	10.7	B	9.8	A

Notes: **Bold** indicates an intersection operating at unacceptable LOS E or LOS F.

1. For signalized and all-way stop-controlled intersections, average intersection delay and LOS based on the 2000 HCM method is shown. For side-street stop-controlled intersections, delays for worst movement and average intersection delay are shown: intersection average (worst movement).

LOS Level of Service

v/c Volume-to-capacity ratio

Source: Fehr & Peers 2013.

Freeway Operations

Study Freeway Segments

The seven freeway segments closest to the project site and likely to experience the greatest traffic increases associated with the proposed project were selected for impact analysis in this EIR:

1. I-580 between Harbor Way and Marina Bay Parkway
2. I-580 between Marina Bay Parkway and Regatta Boulevard
3. I-580 between Regatta Boulevard and Bayview Avenue
4. I-580 between Bayview Avenue and Central Avenue
5. I-580 between Central Avenue and I-80
6. I-80 between Carlson Boulevard and Potrero Avenue
7. I-80 at Gilman Street Overpass

Freeway Volumes

Existing highway volumes were primarily derived from two sources of data: (1) October 2012 highway volumes published by Caltrans through their California Freeway Performance Measurement System; and (2) ramp terminal intersection turning movement counts collected on December 12 and 13, 2012, and previously described.

Freeway LOS Definitions

The level of service for a freeway section is based on measures of density (passenger cars per lane per mile). Freeway LOS is a qualitative description of traffic flow based on speed, travel time, delay, and freedom to maneuver. There are six levels, ranging from LOS A (the best operating conditions) to LOS F (the worst operating conditions). LOS E represents "at-capacity" operation. When volumes exceed capacity, stop-and-go conditions result, and operations are designated as LOS F. Table 4.13-3 summarizes the relationship between LOS and density for freeway sections.

Table 4.13-3
Freeway Segment Level of Service Criteria

Level of Service	Freeway Maximum Density (Passenger cars / mile / lane)
A	11
B	18
C	26
D	35
E	45
F	> 45

Study Freeway Segment Level of Service under Existing Conditions

The Leisch Method was used to analyze all freeway segments where an auxiliary lane is present (i.e., weaving segments); the Leisch Method assigns the LOS for the weave section based on volumes, traffic service flow, and capacity using nomographs. All other segments were analyzed as basic segments using the method described in the 2000 Highway Capacity Manual.

Table 4.13-4 summarizes existing weekday peak hour freeway LOS analysis results. All freeway segments operate at LOS D or better during the a.m. and p.m. peak hour.

Parking Conditions

There are currently 760 vehicle parking spaces at the proposed RBC site. These spaces are in surface lots at several locations throughout the site. Parking is currently free and adequately serves employee and visitors.

Transit and Shuttle Services

The RBC site is served indirectly by BART, AC Transit, Amtrak, and the RFS shuttle. Figure 4-13 shows the transit routes near the site. Each transit service is described below.

BART

BART provides regional commuter rail transit in Alameda, Contra Costa, San Francisco, and San Mateo counties. Currently, BART trains operate on weekdays from 4:00 a.m. to midnight, on Saturdays from 6:00 a.m. to midnight, and on Sundays from 8:00 a.m. to midnight. The nearest

Table 4.13-4
Existing Conditions – Freeway Segment LOS Summary

Freeway Segment	Type[2]	Dir	AM Peak Hour		PM Peak Hour	
			Density[1]	LOS	Density[1]	LOS
I-580 between Harbor Way and Marina Bay Pkwy	Weaving	EB	N/A	A	N/A	A
	Weaving	WB	N/A	A	N/A	A
I-580 between Marina Bay Pkwy and Regatta Blvd	Weaving	EB	N/A	A	N/A	A
	Weaving	WB	N/A	A	N/A	A
I-580 between Regatta Blvd and Bayview Ave	Weaving	EB	N/A	A	N/A	A
	Weaving	WB	N/A	A	N/A	A
I-580 between Bayview Ave and Central Ave	Basic	EB	15.4	B	14.0	B
	Basic	WB	14.3	B	16.9	B
I-580 between Central Ave and I-80	Basic	EB	23.5	C	28.7	D
	Basic	WB	25.0	C	22.6	C
I-80 between Carlson Blvd and Potrero Ave	Basic	EB	21.3	C	27.3	D
	Basic	WB	29.5	D	24.0	C
I-80 at Gilman St Overpass	Basic	EB	21.7	C	27.3	D
	Basic	WB	30.9	D	25.6	C

1. Density is expressed in passenger cars per lane per mile (pc/ln/mi).
2. Segments with auxiliary lanes are classified as weaving segments, and were analyzed based on the Leisch Method. Other segments were analyzed as basic segments using methodologies described in the Highway Capacity Manual 2000.

Dir Direction
EB Eastbound
LOS Level of Service
N/A Not applicable
WB Westbound

Source: Fehr & Peers 2013.

BART stations to the RBC site are the Richmond Station (about 2 miles northwest of the RBC site), the El Cerrito del Norte Stations (about 2 miles northeast of the RBC site), and the El Cerrito Plaza Station (about 3 miles east of the RBC site). The average weekday daily riderships for the Richmond, El Cerrito del Norte, and El Cerrito Plaza Stations were about 3,755, 7,620 and 4,468 riders in January 2013, respectively.

AC Transit

Local bus service in Richmond is provided by AC Transit. Figure 4-13 shows the existing AC Transit routes near the RBC. Table 4.13-5 describes the service provided on these routes and the stops nearest to the RBC site.

Amtrak

The Richmond Transit Station, adjacent to the Richmond BART station, provides Amtrak service on three routes—the Capital Corridor (15 trains per day in each direction), the San Joaquin (four trains per day in each direction), and the California Zephyr (one train per day in each direction).

Richmond Field Station Shuttle

UC Berkeley currently operates a shuttle connecting the LBNL and University campuses with El Cerrito Plaza BART Station and the Richmond Field Station. The shuttle runs approximately hourly between 7 a.m. and 6 p.m.

Existing and Future Bicycle Network

Richmond, California

TETRA TECH

Figure 4-13

Table 4.13-5
AC Transit Service Summary

			Weekday		Weekend	
Line	**Route**	**Nearest Stop**	**Hours**	**Frequency**	**Hours**	**Frequency**
Local Routes						
71	Richmond Parkway Transit Center – El Cerrito BART	Carlson/Cutting (approx. 1 mile)	5:00 a.m. – 8:00 p.m.	30 minutes	6:30 a.m. – 9:30 p.m.	60 minutes
74	Castro Ranch – Richmond BART – Harbor Way South/ Ford Point	Marina Bay Parkway/Regatta Boulevard (approx. 1.3 mile)	7:00 a.m. – 10:00 p.m.	30-40 minutes	7:00 a.m. – 8:00 p.m.	30-40 minutes
76	El Cerrito Del Norte BART – Hilltop Mall	Carlson/Cutting (approx. 1 mile)	6:00 a.m. – 7:40 p.m.	30-40 minutes	6:30 a.m. – 8:20 p.m.	30 minutes
376	El Cerrito Del Norte BART – Pinole Vista Center	Carlson/Cutting (approx. 1 mile)	8:00 p.m. – 3:45 a.m.	30 minutes	8:00 p.m. – 3:45 a.m.	30 minutes

Distance shown is measured from S. 46th Street and Seaver Avenue.

Source: AC Transit 2013

4.13.3 Regulatory Considerations

Federal

There are two federally-designated interstate highways near the RBC site, I-80 and I-580. They are managed by Caltrans as part of its California Freeway and Expressway system. The site is not subject to any federal action concerning highways or transportation, nor is the site included in the right-of-way for a future federal highway or federally-funded transportation facility. Even though a portion of the site would be occupied by LBNL, the land would be under the jurisdiction of the Regents and subject to applicable regulations under their management.

State

The State of California established the Congestion Management Program in 1990 with passage of Proposition 111. As a requirement of this program, designated county or equivalent local transportation agencies prepare and maintain Congestion Management Plans that include:

- Traffic level-of-service standards for State highways and principal arterials
- Multi-modal performance measures to evaluate current and future system
- A seven-year capital program of projects to maintain or improve the performance of the system or mitigate the regional impacts of land use projects
- A program to analyze the impacts of land use decisions
- A travel demand element that promotes transportation alternatives to the single-occupant vehicle.

The Congestion Management Plan that applies to the project area is maintained by the Contra Costa Transportation Authority. The 2011 Contra Costa Congestion Management Program identifies I-80, I-580, and Cutting Boulevard as Routes of Regional Significance in the study area. The Congestion Management Plan adopted an LOS standard of E for I-580 in both directions, based on peak hour travel speeds, and an LOS standard of F on I-80 in both

directions near the project. For the study intersections on Cutting Boulevard, the Congestion Management Plan standard is LOS E.

Local

The proposed RBC site is a University property that conducts work within the University's mission on land 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. RBC is in the City of Richmond. The following sections summarize objectives and policies from the City of Richmond General Plan and local ordinances as they relate to traffic and transportation.

City of Richmond 2030 General Plan

The Circulation Element (Element 4) of the City of Richmond 2030 General Plan discusses current and projected traffic and transportation patterns and facilities throughout the City, and identifies goals and policies to achieve a balance in transportation modes that support a sustainable circulation framework throughout the City. The transportation goals and policies relevant to the 2014 LRDP are:

Goal CR1 – An Expanded Multimodal Circulation System. Make conditions safer and more attractive for all modes of transportation including travel by foot and bicycle, public transit and automobiles. Evaluate streets and potential enhancements based on surrounding land uses, street function and desired character and by relying on the place-based approach to circulation planning articulated in the General Plan. Take potential improvement measures ranging from physical design treatment of the street environment to social and programmatic responses appropriate to the particular street context.

- **Policy CR1.1 – Balanced Modes of Travel and Equitable Access.** Encourage multiple circulation options in the City and work with transit operators to ensure equitable access for all members of the community. Create streets and corridors that support a variety of travel modes including transit, pedestrians, bicycles and goods movement, and automobiles. Provide affordable circulation options that meet the needs of low-income populations, seniors, youth, and persons with disabilities to ensure equitable access.
- **Policy CR2.1 – Neighborhood Connectivity.** Improve access and connectivity within neighborhoods and to major destinations in the City. Improved connectivity will enhance linkages to local and regional amenities such as neighborhood parks, schools, libraries, community centers, retail, public transit, bicycle paths, historic resources, the shoreline, open space, and medical facilities.
- **Policy CR2.2 – Complete Streets.** Promote mixed-use urban streets that balance public transit, walking and bicycling with other modes of travel. Support pedestrian and bicycle connectivity by restoring and reinforcing Richmond's grid-based network of streets with landscaping and amenities for transit, bicycles, pedestrians, and people with disabilities. Establish a process for modifying streets to support various modes of travel.

- **Policy CR1.6 – Comprehensive Network of Multi-Use Trails.** Develop a comprehensive network of multi-use trails including enhancing bicycle and pedestrian connectivity throughout the City and the region. Completion of the Bay Trail will enhance access to the Richmond shoreline and adjacent open space. The proposed San Francisco Bay Water Trail will provide enhanced access and recreational opportunities to the Bay. Connecting the Richmond Greenway with the Ohlone Greenway and the Bay Trail, and linking Richmond with Marin County with a bicycle trail across the Richmond-San Rafael Bridge will help create a comprehensive network of multi-use trails.

- **Policy CR1.9 – Place-Based Circulation Classification System and Multi-Modal Level of Service Standards.** Classify all streets in the City to conform to the Place-Based Circulation Classification System discussed in the Circulation Element of the General Plan and adopt multi-modal level of service standards that are consistent with each street type's intended function and character.

- **Policy CR1.10 – Vehicular Level of Service Standards for West County Routes of Regional Significance.** Maintain vehicular LOS standards for signalized intersections consistent with the Contra Costa Transportation Authority's West County Action Plan for Routes of Regional Significance. Require a traffic impact study for projects that would generate more than 100 net new peak-hour vehicular trips. Require traffic impact studies to be prepared by professional transportation consultants selected and hired by the City and require the studies to be fully paid for by the project applicant.

  Traffic impact studies shall be prepared according to the Contra Costa Transportation Authority's travel demand model and technical procedures. Approve projects only if they are found to be consistent with the Contra Costa Transportation Authority's West County Action Plan for Routes of Regional Significance. Projects found to be inconsistent with the Contra Costa Transportation Authority's West County Action Plan for Routes of Regional Significance may be approved if findings of special circumstances, including appropriate mitigation measures, are adopted by the City.

- **Action CR1.B – Public Transit and Paratransit Service Improvements.** Continue to collaborate with AC transit, BART, West Contra Costa Transit Agency, Amtrak and major employers in Richmond that provide shuttle service to explore the potential for expanding transit in the evenings and late nights, and for people with special needs. Explore the potential to enhance Richmond's paratransit service. Collaborate with major employers to provide employer-based "open-door" shuttles to BART, the planned ferry terminal and other transit hubs. Collaborate with regional and Contra Costa County transportation agencies to re-establish, maintain and enhance service within the City and region. Explore strategies to address affordability, access and safety. Expand outreach and information programs to promote transit use.

Goal CR2 – Walkable Neighborhoods and Complete Streets. Activate the public right-of-way and improve the experience of moving people between key destinations at the pedestrian level. To make walking and bicycling a more attractive options, enhance connectivity between neighborhoods, schools, the workplace, and daily goods and services so that reaching key destinations is safer and more convenient. Contribute to walkability and livability by promoting mixed-use and complete streets, high-quality pedestrian environments, context-based street design, and efficient public transit.

- **Policy CR2.3 – Integrated Bicycle and Pedestrian System.** Plan, construct and maintain a safe, comprehensive and integrated bicycle and pedestrian system. Walking and bicycling to work, to schools and for recreation can be encouraged by providing amenities and facilities for pedestrians and bicycles, enhancing pedestrian and bicycle connectivity in neighborhoods, promoting multimodal trails and pathways accessible to all, and addressing major barriers in the community such as freeways, railroads, and steep terrain. Pedestrian improvements at parks, community centers, open space areas, schools, transit stops and commercial nodes will further enhance the bicycle and pedestrian system.

Goal CR5 – Sustainable and Green Practices. To create sustainable and clean circulation options, encourage the use of low-impact alternative fuels and new technologies and implement transportation demand management programs. Encourage measures to treat and retain storm water in the design of pedestrian and parking amenities.

- **Policy CR5.1 – Transportation Demand Management.** Promote TDM strategies among residents and businesses to reduce reliance on automobiles. Encouraging major employers to develop and implement TDM for employees will address peak commute traffic, congestion and air quality.
- **Policy CR5.3 – Green Streets.** Promote the development of street design elements that incorporate natural stormwater drainage and landscaping in new and retrofitted streets.

The 2030 General Plan EIR determined that future development associated with the plan would result in traffic congestion that exceeds the Richmond traffic standard of LOS D, as well as local transit agency standards. The EIR further identified that since it was not certain that project-specific mitigation measures would reduce impacts to a less-than-significant level, the impact would be significant and unavoidable. Implementation of enhanced facilities to serve pedestrians and bicyclists as well as reduce conflicts at rail/roadway crossings, thereby increasing connectivity and safety for these modes, would result in no impact. Cumulative impacts to traffic congestion and transit usage would be significant and unavoidable.

4.13.4 Impacts and Mitigation Measures

Standards of Significance

The impacts on transportation and traffic from 2014 LRDP campus development 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:

- Conflict with an applicable plan, ordinance or policy establishing measures of effectiveness for the performance of the circulation system, taking into account all modes of transportation including mass transit and relevant components of the circulation system, including, but not limited to intersections, streets, highways and freeways, pedestrian and bicycle paths, and mass transit;
- Exceed, either individually or cumulatively, a level of service standard established by the county congestion management agency for designated roads or highways;
- Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks;
- Conflict with adopted policies, plans, or programs regarding public transit, bicycle or pedestrian facilities, or otherwise decrease the performance or safety of such facilities;

- Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment); or
- Result in inadequate emergency access.

The local jurisdictions and congestion management programs (CMPs) have established specific thresholds of significance for intersections and freeways that are used in this analysis. The local jurisdictions do not have specific thresholds for assessing impacts on other aspects of the transportation network, so the thresholds from the CEQA Guidelines Appendix G Checklist are used to determine significant impacts.

Significance Criteria for City of Richmond Intersections

As the lead agency for this project, the University has the authority to establish its own set of significance criteria. To maintain consistency with the City of Richmond, the City's significance criteria were used to evaluate impacts to intersections in the City's jurisdiction. The project's impact on study intersections in the City of Richmond would be significant if it caused:

- A signalized intersection to deteriorate from LOS D or better to LOS E or LOS F;
- The average control delay to increase by more than 5 seconds or deteriorate to LOS F (for a signalized intersection already at LOS E);
- The overall volume-to-capacity (v/c) ratio to increase by 0.01 or more (for a signalized intersection already at LOS F); or
- The intersection to operate at LOS F and to satisfy the Caltrans peak hour traffic volume signal warrant (for an unsignalized intersection).

Significance Criteria for Congestion Management Program Facilities/Freeways

The 2011 Contra Costa Congestion Management Program is the applicable CMP for the RBC. Based on the CMP requirements, the following significance criteria are used to determine if the project impacts on a freeway segment would be significant:

- I-580: Cause a segment to degrade from LOS E or better to LOS F or increase peak hour volume by five percent or more for a segment already operating at LOS F.
- I-80: Increase peak hour volume by five percent or more for a segment already operating at LOS F.

CEQA Checklist Items Adequately Addressed in the Initial Study

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

- Change air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks

Development of the RBC would not alter existing air traffic patterns, so this issue does not require further study in this EIR.

Analytical Methods

Trip Generation

Table 4.13-6 shows the estimated vehicle trip generation for full development of the campus under the 2014 LRDP. The trip generation estimates are derived from trip generation rates developed for the LBNL site in Berkeley. The LBNL rates were developed based on vehicle counts at the LBNL gates and the corresponding population on-site. For the RBC site, these trip

Table 4.13-6
2014 LRDP Trip Generation Summary

	Average Daily Population	Daily	AM Peak Hour			PM Peak Hour		
			In	Out	Total	In	Out	Total
2014 LRDP	**10,000**	20,226	1,770	283	2,053	259	1,678	1,937

Based on trip rates derived from existing LBNL gate counts in April 2011, adjusted as described in the text.

LRDP trip generation based on the following rates: Daily = 2.02 trips per average daily population (adp); AM Peak Hour = 0.20 trip per adp (86 percent in, 14 percent out); PM Peak Hour = 0.19 trip per adp (13 percent in, 87 percent out).

rates were adjusted to reflect the differences between the two sites, most notably, differences in transit availability, pedestrian and bicycle facilities, and proximity to residential and non-residential areas. The Contra Costa Travel Demand Model and Alameda County Travel Demand Models were used to evaluate the effects of these differences, by comparing employment trip generation for the LBNL zone with employment trip generation in the RBC zone. The resulting trip estimates for the RBC site are 30 percent higher than the LBNL site. The trip generation conservatively assumes that the TDM program implemented at RBC would be similar to LBNL, and that parking at RBC would be free, similar to LBNL. The RBC trip generations would be reduced if RBC implements more robust TDM strategies or charges for parking.

Trip Distribution and Assignment

The trip distribution is based on a select-zone assignment using the Contra Costa Countywide Travel Demand Model. Figure 4-14 shows the resulting trip distribution that was used to distribute the traffic from the full development of the RBC.

2035 No Project Conditions

Full development of the RBC under the 2014 LRDP is not anticipated to occur until 2050. The furthest year for which the Countywide Travel Demand Model provides projections is 2035, so the 2035 No Project conditions were estimated for evaluating the traffic impacts of the full development of the RBC.

Traffic forecasts to the year 2035 were developed using the Contra Costa Countywide Travel Demand Model. The model was checked to ensure the land use growth in Richmond was consistent with the recently adopted General Plan 2030. The forecasting process involved running the 2010 and 2035 models and extracting the growth in turning movements at each study intersection, then adding that growth to the existing traffic volumes. The 2035 model run did not include any growth on the project site.

Signal timings were optimized under 2035 conditions with and without the 2014 LRDP growth to reflect typical signal updates due to changing traffic flow over several years. No other roadway modifications are assumed at any of the study intersections under the 2035 No Project scenario. Table 4.13-7 shows the 2035 No Project intersection service levels. All intersections are projected to operate at LOS D or better, with the exception of Meeker Avenue/23rd Street/Marina Bay Parkway that would operate at LOS E in the a.m. peak hour and at LOS F with additional delay in the p.m. peak hour, and Seaport Avenue/I-580 Eastbound Ramps/South 51st Street/Bayview Avenue and Carlson Boulevard/I-80 Westbound Ramps that would operate at LOS E in the p.m. peak hour.

Trip Distribution

Richmond, California

TETRA TECH

Figure 4-14

Table 4.13-7
2035 No Project Conditions – Study Intersection LOS Summary

Intersection	Control	AM Peak Hour		PM Peak Hour	
		Delay (Seconds)[1]	LOS[1]	Delay (Seconds)[1]	LOS[1]
1. Cutting Boulevard/23rd Street	Signal	32.8	C	43.3	D
2. I-580 Westbound Ramps/23rd Street	Signal	8.4	A	9.4	A
3. I-580 Eastbound Ramps/23rd Street	Signal	4.8	A	7.8	A
4. Meeker Avenue/23rd Street/Marina Bay Pkwy	Signal	**61.4**	**E**	**>120 (v/c=0.65)**	**F**
5. Regatta Boulevard/ Marina Bay Parkway	Signal	28.2	C	17.4	B
6. I-580 Westbound Ramps/Juliga Woods Street	Side Street Stop	4.5 (17.0)	A (C)	9.5 (18.0)	A (C)
7. I-580 Eastbound Ramps/Regatta Boulevard/ Meade Street	Signal	17.8	B	13.8	B
8. Meade Street/Regatta Boulevard	Side Street Stop	7.5 (13.5)	A (B)	7.2 (14.3)	A (B)
9. Meade Street/Seaver Avenue	Side Street Stop	1.5 (11.2)	A (B)	2.1 (10.2)	A (A)
10. Seaport Avenue/I-580 Eastbound Ramps/ South 51st Street/Bayview Avenue	All-way Stop	30.9	D	**39.3**	**E**
11. I-580 Westbound Ramps/Bayview Avenue	Signal	6.6	A	10.7	B
12. Carlson Boulevard/ Bayview Avenue	Signal	33.6	C	30.6	C
13. Carlson Boulevard/I-80 Westbound Ramps	Signal	43.6	D	**58.1**	**E**
14. Carlson Boulevard/I-80 Eastbound Ramps	Signal	13.3	B	14.6	B

Notes: **Bold** indicates an intersection operating at unacceptable LOS E or LOS F.

1. For signalized and all-way stop-controlled intersections, average intersection delay and LOS based on the 2000 HCM method is shown. For side-street stop-controlled intersections, delays for worst movement and average intersection delay are shown: intersection average (worst movement).

> Greater than
LOS Level of service
v/c Volume-to-capacity

Source: Fehr & Peers 2013.

Table 4.13-8 shows the 2035 No Project freeway volumes and service levels. All freeway segments are projected to operate at LOS E and better with the exception of I-580 between Central Avenue and I-80 that is expected to degrade to unacceptable LOS F in the a.m. peak hour for the westbound direction and LOS F in the p.m. peak hour for the eastbound direction.

Table 4.13-8
2035 No Project Conditions – Freeway Segment LOS Summary

Freeway Segment	Type[2]	Dir	AM Peak Hour		PM Peak Hour	
			Density[1]	LOS	Density[1]	LOS
I-580 between Harbor Way and Marina Bay Pkwy	Weaving	EB	N/A	A	N/A	C
	Weaving	WB	N/A	C	N/A	A
I-580 between Marina Bay Pkwy and Regatta Blvd	Weaving	EB	N/A	B	N/A	C
	Weaving	WB	N/A	C	N/A	B
I-580 between Regatta Blvd and Bayview Ave	Weaving	EB	N/A	C	N/A	C
	Weaving	WB	N/A	C	N/A	B
I-580 between Bayview Ave and Central Ave	Basic	EB	24.5	C	25.8	C
	Basic	WB	25.9	C	23.5	C
I-580 between Central Ave and I-80	Basic	EB	36.1	E	**>45.0**	**F**
	Basic	WB	40.5	E	26.5	D
I-80 between Carlson Blvd and Potrero Ave	Basic	EB	27.2	D	31.5	D
	Basic	WB	37.6	E	28.8	D
I-80 at Gilman St Overpass	Basic	EB	26.2	D	32.2	D
	Basic	WB	35.1	E	28.3	D

Notes: **Bold** indicates a freeway segment operating at unacceptable levels (LOS F for I-580, and LOS F plus 5 percent added traffic for I-80).

1. Density is in passenger cars per lane per mile.
2. Segments with auxiliary lanes are classified as weaving segments, and were analyzed based on the Leisch Method. Other segments are analyzed as basic segments using methodologies described in the Highway Capacity Manual 2000.

Dir Direction
EB Eastbound
LOS Level of Service
N/A Not available
WB Westbound

Source: Fehr & Peers 2013.

RBC 2014 LRDP Policies

The RBC 2014 LRDP policies related to transportation and traffic include the following:

- ACP1 – Access and Circulation Policy on Connectivity: Ensure that the RBC is readily accessible through a variety of transportation modes, including transit (BART, Amtrak, AC Transit, and ferry), shuttle services, and bicycle and pedestrian routes.
    - Coordinate connectivity plans with City of Richmond transportation plans for the South Shoreline Area and provide convenient connections to City neighborhoods, one or more BART stations, and commercial areas.
    - Work with city, regional, and state authorities to facilitate bicycle and shuttle transportation network improvements between the RBC and the Berkeley campuses.
    - Implement campus shuttle service improvements with the first phase of development and additional improvements as needed for each project implementing the LRDP.
    - Provide robust electronic infrastructure to promote virtual connectivity, telecommuting, and remote teleconferencing.

  - Facilitate the improvement of connections to transit service, ferry service, and bicycle and pedestrian pathways and provide convenient access between the RBC and nearby amenities.

- ACP2 – Access and Circulation Policy on Sustainable Access: The RBC will feature and prioritize access to, from and around the site by sustainable means.
  - Develop a TDM plan to identify strategies for reducing single vehicle trips and encourage travel by other modes. Prioritize convenient access and entries for transit vehicles. Make shuttle use appealing for employees and visitors through frequent scheduling; display real time arrival information at key stops, building lobbies, and over the network; integrate closed-circuit television or emergency phones into shuttle stops; and provide network access in shuttle vehicles.
  - Target less than 50 percent of all trips being made to the campus in single occupant vehicles by supporting alternative modes of transit.
  - Maximize convenient access for employees and visitors, particularly in early stages of campus development. Manage parking to facilitate travel between the campuses.
  - Encourage bicycle use through provision of convenient and secure bicycle parking and maintenance facilities, including showering facilities and changing rooms. Provide bicycle parking for a minimum of 20 percent of anticipated peak period occupants of new buildings.
  - Implement a bicycle sharing program, with bikes to "borrow" at convenient locations in each campus neighborhood, to encourage biking among campus and nearby destinations.
  - Ensure shuttles and other modes serving the campus are equipped with racks to carry bicycles and maximize the capacity of the racks.
  - Capitalize on sustainable transportation research conducted at the RBC and elsewhere, implementing new practices and technologies on the site. Support alternative energy and hybrid vehicle use in shuttles, service, and personal vehicles.
  - Improve the pedestrian and bicycle connection between the RBC and the Bay Trail, construct the proposed staging areas for Bay Trail access, and provide appropriate access to open space areas.
  - Provide infrastructure to improve sustainability of vehicle-related travel, such as electric charging stations.
- ACP3 – Access and Circulation Policy on Pedestrian Priority: Create a pleasant, safe and convenient pedestrian environment that encourages pedestrian circulation on and around the campus.
  - Design site circulation to separate vehicular traffic from walking areas except on shared service roads.
  - Provide safe, attractive, efficient walking connections between shuttle stops, facilities, and parking.
  - Design pedestrian routes to be attractive, interesting, and educational.
- ACP4 – Access and Circulation Policy on Parking: Implement convenient parking in a phased, cost-effective manner.
  - Provide accessible and service vehicle parking adjacent to buildings.

- Locate visitor parking to be convenient and easily accessible from primary campus entrances.
- Provide parking in surface lots in the early years of development in the areas of future development sites.
- Provide parking structures as the campus is developed over time to minimize the amount of land devoted to parking.
- Provide limited-time street parking on the segments of Lark Drive and Regatta Boulevard where retail and other amenities are located.

LRDP Impacts and Mitigation Measures

LRDP Impact TRA-1: **Development under the 2014 LRDP would conflict with an applicable plan, ordinance, or policy establishing effectiveness measures for circulation system performance and would cause an exceedance of a level of service standard established for the study intersections under 2035 conditions. (*Potentially Significant; Significant and Unavoidable*)**

2014 LRDP implementation would result in 5.4 million square feet of space accommodating up to 10,000 employees. The plan would reroute Regatta Boulevard to the west and provide multiple access points on Meade Street, Regatta Boulevard, and South 46th Street. The RBC is estimated to provide about 6,000 parking spaces mostly in parking structures.

Regional access to and from the RBC would continue to be provided through the existing interchanges on I-580. In the near-term, direct access to and from the RBC site would continue to be through the existing entry on Meade Street at Seaver Street. As the RBC is developed, additional entries on Meade Street to the north, Regatta Boulevard to the west, and South 46th Street to the east would be provided. Currently, the LRDP envisions up to seven access points from Regatta Boulevard and Meade Street. These access points would provide direct access to parking facilities for employees and visitors or provide service access for buildings throughout the campus.

Full 2014 LRDP campus development is anticipated to occur by 2050. The furthest year for which the regional travel demand model provides projections is 2035, so traffic impacts of the full RBC development are evaluated relative to 2035 conditions.

Campus development would increase traffic volumes on the local street network. Table 4.13-9 shows the intersection LOSs under 2035 plus 2014 LRDP conditions. Appendix F provides the detailed calculation work sheets. The addition of project traffic would causes five intersections to fall from acceptable (LOS D or better) to unacceptable (LOS E or LOS F) conditions in one or both peak hours. These are:

- Intersection 6 – I-580 WB Ramps/Juliga Woods Street (LOS F, p.m. peak hour)
- Intersection 8 – Meade Street/Regatta Boulevard (LOS F, a.m. and p.m. peak hours)
- Intersection 9 – Meade Avenue/Seaver Street (LOS F, a.m and p.m. peak hours)
- Intersection 10 – Seaport Avenue/I-580 Eastbound Ramps/South 51st Street/Bayview Avenue (LOS F, a.m. and p.m. peak hours)
- Intersection 13 – 80 Westbound Ramps/South 51st Street (LOS F, a.m. and p.m. peak hours)

Table 4.13-9
2035 plus 2014 LRDP Conditions – Study Intersection LOS Summary

Intersection	Traffic Control	Peak Hour	2035 No Project		2035 Plus 2014 LRDP Project		Significant Impact?
			Delay[1] (seconds)	LOS[1]	Delay[1] (seconds)	LOS[1]	
1. Cutting Boulevard/ 23rd Street	Signal	AM	32.8	C	36.6	D	No
		PM	43.3	D	46.1	D	No
2. I-580 Westbound Ramps/ 23rd Street	Signal	AM	8.4	A	8.6	A	No
		PM	9.4	A	9.8	A	No
3. I-580 Eastbound Ramps/ 23rd Street	Signal	AM	4.8	A	7.7	A	No
		PM	7.8	A	8.8	A	No
4. Meeker Avenue/23rd Street/ Marina Bay Pkwy	Signal	AM	**61.4**	**E**	**61.4**	**E**	No
		PM	**>120 (v/c=0.65)**	**F**	**>120 (v/c=0.75)**	**F**	**Yes**
5. Regatta Boulevard/ Marina Bay Parkway	Signal	AM	28.2	C	35.0	C	No
		PM	17.4	B	20.9	C	No
6. I-580 Westbound Ramps/ Juliga Woods Street	Side Street Stop	AM	4.5 (17.0)	A (C)	8.3 (27.1)	A (D)	No
		PM	9.5 (18.0)	A (C)	**>120 (>120)**	**F (F)**	**Yes**
7. I-580 Eastbound Ramps/ Regatta Boulevard/ Meade Street	Signal	AM	17.8	B	54.9	D	No
		PM	13.8	B	41.9	D	No
8. Meade Street/ Regatta Boulevard	Side Street Stop	AM	7.5 (13.5)	A (B)	**46.3 (>120)**	**E (F)**	**Yes**
		PM	7.2 (14.3)	A (B)	47.6 **(>120)**	E **(F)**	**Yes**
9. Meade Street/ Seaver Avenue	Side Street Stop	AM	1.5 (11.2)	A (B)	**>120 (>120)**	**F (F)**	**Yes**
		PM	2.1 (10.2)	A (B)	**>120 (>120)**	**F (F)**	**Yes**
10. Seaport Avenue/I-580 Eastbound Ramps/South 51st Street/Bayview Avenue	All-way Stop	AM	30.9	D	**59.8**	**F**	**Yes**
		PM	**39.3**	**E**	**50.2**	**F**	**Yes**
11. I-580 Westbound Ramps/ Bayview Avenue	Signal	AM	6.6	A	25.7	C	No
		PM	10.7	B	13.6	B	No
12. Carlson Boulevard/ Bayview Avenue	Signal	AM	33.6	C	43.2	D	No
		PM	30.6	C	49.1	D	No
13. Carlson Boulevard/ I-80 Westbound Ramps	Signal	AM	43.6	D	**97.9 (v/c=1.21)**	**F**	**Yes**
		PM	**58.1**	**E**	**79.4**	**E**	**Yes**
14. Carlson Boulevard/ I-80 Eastbound Ramps	Signal	AM	13.3	B	23.7	C	No
		PM	14.6	B	49.0	D	No

Notes: **Bold** indicates an intersection operating at unacceptable LOS E or LOS F.

1. For signalized and all-way stop-controlled intersections, average intersection delay and LOS based on the 2000 HCM method is shown. For side-street stop-controlled intersections, delays for worst movement and average intersection delay are shown: intersection average (worst movement).

> greater than
LOS Level of service
v/c Volume-to-capacity

Source: Fehr & Peers 2013.

A sixth intersection, Meeker Avenue/23rd Street/Marina Bay Parkway (Intersection 4), is projected to operate at LOS F under 2035 No Project conditions. The intersection would continue to operate at LOS F, with a significant increase in delay from the proposed project. More information on the impacts at the six affected intersections is presented below along with improvements that can be implemented to restore intersection operations to acceptable levels.

A. Meeker Avenue/23rd Street/Marina Bay Parkway (Intersection 4; City of Richmond): The project would cause a significant impact at this signalized intersection because it would increase v/c ratio by more than 0.01 during the p.m. peak hour at an intersection operating at LOS F under background conditions. The impact at this intersection can be addressed by:

- Converting the eastbound approach to provide one left-turn lane and one through-right lane
- Converting signal operations for the eastbound and westbound approaches from split phasing to protected left-turn phasing
- Optimizing traffic signal timing parameters (i.e., the amount of green signal time allocated to each intersection approach)

The intersection would improve to LOS C during the a.m. peak hour and LOS D during the p.m. peak hour after implementation of these improvements. These improvements would reduce the impact to less than significant.

B. **I-580 Westbound Ramps/Juliga Woods Street (Intersection 6; City of Richmond and Caltrans):** The project would significantly impact the intersection by reducing the side-street, stop-controlled, p.m. peak hour approach from LOS C to LOS F. The intersection would satisfy the Caltrans peak hour traffic volume signal warrant. The impact at this intersection could be addressed by:

- Installing an actuated signal at the intersection

Even with the proposed project, this intersection would improve to LOS A during both a.m. and p.m. peak hours with the above improvement. The improvement would reduce the impact to less than significant.

C. **Meade Street/Regatta Boulevard (Intersection 8; City of Richmond):** The proposed project would significantly impact the side-street stop-controlled Meade Street/Regatta Boulevard intersection. The side-street stop-controlled approach would deteriorate from LOS B to LOS F during a.m. and p.m. peak hours, and this intersection would satisfy the Caltrans peak hour traffic volume signal warrant. The impact at this intersection could be addressed by:

- Installing an actuated signal at the intersection. The new signal would be coordinated with the existing controls for the at-grade railroad crossing on Meade Street and the I-580 Eastbound Ramps/Regatta Boulevard/Meade Street traffic signal (Intersection 7). This coordination would minimize potential traffic queuing on the railroad tracks.

With this mitigation, this intersection under project conditions would improve to LOS B during both a.m. and p.m. peak hours. The improvement would reduce the impact to less than significant.

D. **Meade Street/Seaver Avenue (Intersection 9; City of Richmond):** The project would cause a significant a.m. and p.m. peak-hour impact at the Meade Street/Seaver Avenue intersection, because the side-street stop-controlled approach would diminish from LOS B to LOS F, and the intersection would satisfy the Caltrans peak hour traffic volume signal warrant. The impact at this intersection can be addressed by:

- Installing an actuated signal at the intersection with protected/permitted phasing for the westbound left-turn movement
- Converting the northbound approach to provide one left-turn lane and one right-turn lane

With the above measures, the intersection would improve to LOS D during the a.m. peak hour and LOS B during the p.m. peak hour. The improvements would reduce the impact to less than significant.

E. **Seaport Avenue/I-580 Eastbound Ramps/Bayview Avenue (Intersection 10; City of Richmond and Caltrans):** The project would significantly impact the all-way stop-controlled Seaport Avenue/I-580 Eastbound Ramps/South 51st Street/Bayview Avenue. Intersection operations would diminish from LOS D during the a.m. peak hour and LOS E during the p.m. peak hour to LOS F during a.m. and p.m. peak hours. The intersection would satisfy the Caltrans peak hour traffic volume signal warrant. The impact at this intersection can be addressed by:

- Installing an actuated signal at the intersection with protected phasing for the northbound and southbound left-turn movements
- Converting the southbound approach to provide two left-turn lanes and one shared right-turn/through lane

After mitigation, the intersection would improve to LOS C during both a.m. and p.m. peak hours. The improvements would reduce the impact to less than significant.

F. **Carlson Boulevard/I-80 Westbound Ramps (Intersection 13; City of Richmond and Caltrans):** The project would cause a significant impact at the signalized Carlson Boulevard/I-80 Westbound Ramps intersection because it would diminish intersection service from LOS D to LOS F during the a.m. peak hour and LOS E to LOS F during the p.m. peak hour. The impact at this intersection can be addressed by:

- Converting the southbound approach to provide one left-turn lane and one right-turn lane

With the above improvement, the intersection would perform at LOS C during both a.m. and p.m. peak hours. The improvement would reduce the impact to less than significant.

Implementing LRDP MM TRA-1 would minimize 2014 LRDP campus development impacts. LRDP MM TRA-1 would reduce new project-related vehicle trips associated with the new RBC facilities and contribute on a proportional share basis to specific improvements at the affected intersections. However, all of the improvements would fall under City of Richmond or Caltrans jurisdiction, neither of which has programmed any improvements to these intersections. The completion of these improvements cannot be assured, as it depends on City and Caltrans discretionary decision making. For these reasons, this impact remains significant and unavoidable. If the City or Caltrans were to make improvements to the affected facilities, University implementation of LRDP MM TRA-1 would reduce the project's impact to a less than significant level at all intersections.

LRDP MM TRA-1: The University shall develop and implement a campus traffic mitigation program, a multi-component program to monitor trip generation, reduce peak-hour trips to the extent feasible, or participate in intersection improvements to mitigate off-site impacts at the intersections affected by the proposed project. Each component of this program is described below.

Travel Demand Management. To reduce on- and off-campus vehicle trips and resulting impacts, the University shall develop and implement a TDM program in consultation with the City of Richmond. The program is proposed to be adopted by the University following The Regents' approval of the RBC LRDP. The TDM program will include measures to increase transit and shuttle use, encourage alternative transportation modes including bicycle transportation, implement parking policies that reduce demand, and other mechanisms that reduce vehicle trips to and from the campus. The University shall monitor the performance of RBC TDM strategies through annual surveys.

Transit Enhancement. To enhance transit systems serving the campus, the University shall work cooperatively with AC Transit and other local agencies to coordinate service routes with existing and proposed shuttle and transit programs.

Sustainability and Monitoring. The University shall review individual projects proposed under the 2014 LRDP for consistency with UC sustainable transportation policy and the RBC TDM program to ensure that bicycle and pedestrian improvements, alternative fuel infrastructure, transit stops, and other project features that promote alternative transportation are incorporated into each project to the extent feasible.

Campus Traffic Impact Monitoring. The University shall conduct traffic counts at key RBC gateway locations every 5 years to determine campus-generated traffic.

Mitigation Payments. The University shall contribute funding on a fair-share basis, to be determined in consultation with the City of Richmond and Caltrans, for periodic (annually or less frequently, as agreed among consulting agencies) signal warrant analyses at the unsignalized intersections significantly impacted by the project. These signal warrant analyses would be used by the City to determine when a signal is needed.

When these signal warrant analyses show that a signal is warranted and the City determines that the required intersection improvements are needed, the University shall reimburse the City on a fair-share basis for the design and construction of the required mitigation, including new traffic signals and related improvements at the intersection impacted by the project. Should the City determine that alternative mitigation strategies may reduce or avoid the significant impact, the University shall work with the City and Caltrans to

identify and implement such alternative feasible measures on a fair-share basis.

LRDP Impact TRA-2: Development under the 2014 LRDP would conflict with an applicable plan, ordinance. or policy establishing effectiveness measures for circulation system performance and would cause an exceedance of a level of service standard established for the study intersections under existing conditions. (*Potentially Significant; Significant and Unavoidable*)

LRDP Impact TRA-1 presents the effects on study intersections from campus traffic at full 2014 LRDP development, which for this EIR is assumed to occur by 2050. Occupancy of the RBC would gradually increase over the life span of the 2014 LRDP. Not all of the additional vehicle trips generated under the 2014 LRDP are expected to be added to the study area transportation network immediately following approval of the proposed LRDP. Thus, an analysis of the project's traffic impacts on study intersections under existing plus 100 percent occupancy of the RBC (i.e., existing plus project conditions) does not represent a realistic condition. An existing plus project analysis is included for information only.

Table 4.13-10 summarizes intersection operations at the study intersections under the existing plus project conditions. Appendix F provides the detailed calculation work sheets. The addition of 2014 LRDP traffic to existing conditions would degrade six intersections from acceptable (LOS D or better) to unacceptable (LOS E or LOS F) during one or both peak hours and would contribute traffic to one intersection that currently operates at LOS F.

The 2014 LRDP traffic would cause the side-street stop-controlled approach at the I-580 Westbound Ramps/Juliga Woods Street (Intersection 6) to degrade from LOS B to LOS E during the p.m. peak hour, and the side-street stop-controlled approach at the Meade Street/Regatta Boulevard (Intersection 8) to degrade from LOS B to LOS F during the a.m. peak hour. These are not considered significant impacts because neither intersection would satisfy the Caltrans peak hour traffic volume signal warrant. The impacts at the seven affected intersections are described below:

A. Meeker Avenue/23rd Street/Marina Bay Parkway (Intersection 4; City of Richmond): The project would significantly impact the signalized Meeker Avenue/23rd Street/Marina Bay Parkway intersection because it would increase v/c ratio by more than 0.01 during the p.m. peak hour at an intersection operating at LOS F regardless of the project. The impact at this intersection can be addressed by:

- Converting the eastbound approach to provide one left-turn lane and one through-right lane
- Converting signal operations for the eastbound and westbound approaches from split phasing to protected left-turn phasing
- Optimizing traffic signal timing parameters (i.e., the amount of green signal time allocated to each intersection approach).

The intersection operations would improve to LOS C during a.m. and p.m. peak hours after implementation of these improvements. These improvements would reduce the impact to less than significant.

Table 4.13-10
Existing Plus 2014 LRDP Conditions – Study Intersection LOS Summary

Intersection	Traffic Control	Peak Hour	Existing		Existing Plus LRDP Project		Significant Impact?
			Delay[1] (seconds)	LOS[1]	Delay[1] (seconds)	LOS[1]	
1. Cutting Boulevard/ 23rd Street	Signal	AM	22.9	C	25.3	C	No
		PM	23.0	C	24.4	C	No
2. I-580 Westbound Ramps/ 23rd Street	Signal	AM	6.9	A	7.1	A	No
		PM	6.8	A	6.8	A	No
3. I-580 Eastbound Ramps/ 23rd Street	Signal	AM	3.6	A	5.6	A	No
		PM	6.3	A	6.7	A	No
4. Meeker Avenue/23rd Street/ Marina Bay Pkwy	Signal	AM	37.1	D	37.1	D	No
		PM	**115.8 (v/c=0.50)**	**F**	**>120 (v/c=0.59)**	**F**	**Yes**
5. Regatta Boulevard/ Marina Bay Pkwy	Signal	AM	30.0	C	**>120 (v/c=0.64)**	**F**	**Yes**
		PM	43.6	D	**69.3**	**E**	**Yes**
6. I-580 Westbound Ramps/ Juliga Woods Street	Side Street Stop	AM	2.5 (10.0)	A (B)	4.7 (13.1)	A (B)	No
		PM	4.4 (10.9)	A (B)	12.3 (**46.2**)	B (**E**)	No
7. I-580 Eastbound Ramps/ Regatta Boulevard/ Meade St	Signal	AM	9.7	A	**>120 (v/c=1.03)**	**F**	**Yes**
		PM	9.1	A	19.5	B	No
8. Meade Street/Regatta Blvd	Side Street Stop	AM	6.4 (10.6)	A (B)	18.2 (82.9)	C (**F**)	No
		PM	5.6 (10.0)	A (B)	4.4 (21.4)	A (C)	No
9. Meade Street/Seaver Avenue	Side Street Stop	AM	1.3 (9.7)	A (A)	**>120 (>120)**	**F (F)**	**Yes**
		PM	3.0 (9.0)	A (A)	**>120 (>120)**	**F (F)**	**Yes**
10. Seaport Avenue/I-580 Eastbound Ramps/South 51st Street/Bayview Ave	All-way Stop	AM	27.6	D	**60.2**	**F**	**Yes**
		PM	20.0	C	**49.4**	**E**	**Yes**
11. I-580 Westbound Ramps/ Bayview Ave	Signal	AM	5.4	A	**>120 (v/c=1.02)**	**F**	**Yes**
		PM	6.7	A	**109.1 (v/c=0.52)**	**F**	**Yes**
12. Carlson Boulevard/ Bayview Ave	Signal	AM	27.0	C	34.7	C	No
		PM	21.6	C	22.5	C	No
13. Carlson Boulevard/ I-80 Westbound Ramps	Signal	AM	19.3	B	**77.7**	**E**	**Yes**
		PM	20.0	B	20.0	B	No
14. Carlson Boulevard/ I-80 Eastbound Ramps	Signal	AM	10.7	B	14.6	B	No
		PM	9.8	A	14.1	B	No

Notes: **Bold** indicates an intersection operating at unacceptable LOS E or LOS F.

1. For signalized and all-way stop-controlled intersections, average intersection delay and LOS based on the 2000 HCM method is shown. For side-street stop-controlled intersections, delays for worst movement and average intersection delay are shown: intersection average (worst movement).

> Greater than
LOS Level of service
v/c Volume-to-capacity

Source: Fehr & Peers 2013.

B. Regatta Boulevard/Marina Bay Parkway (Intersection 5; City of Richmond): The project would cause a significant impact at the signalized Regatta Boulevard/Marina Bay Parkway (Intersection 5) because it would degrade intersection operations from LOS C to LOS F during the a.m. peak hour and from LOS D to LOS E during the p.m. peak hour. The impact at this intersection can be addressed by:

- Optimizing traffic signal timing parameters (i.e., the amount of green signal time allocated to each intersection approach)

The intersection operations would improve to LOS D during the a.m. peak hour after implementation of this improvement. This improvement would reduce the impact to less than significant.

C. I-580 Eastbound Ramps/Regatta Boulevard/Meade Street (Intersection 7; City of Richmond and Caltrans): The project would cause a significant impact at the signalized I-580 Eastbound Ramps/Regatta Boulevard/Meade Street intersection because it would degrade intersection operations from LOS A to LOS F during the a.m. peak hour. The impact at this intersection can be addressed by:

- Optimizing traffic signal timing parameters (i.e., the amount of green signal time allocated to each intersection approach)

The intersection operations would improve to LOS D during the a.m. peak hour after implementation of this improvement. This improvement would reduce the impact to less than significant.

D. Meade Street/Seaver Avenue (Intersection 9; City of Richmond): The project would cause a significant impact at the side-street stop-controlled Meade Street/Seaver Avenue intersection because it would degrade operations for the side-street stop-controlled approach from LOS A to LOS F during both a.m. and p.m. peak hours, and the intersection would satisfy the Caltrans peak hour traffic volume signal warrant. The impact at this intersection can be addressed by:

- Installing an actuated signal at the intersection with protected/permitted phasing for the westbound left-turn movement
- Converting the northbound approach to provide one left-turn lane and one right-turn lane

The intersection operations would improve to LOS C during the a.m. peak hour and LOS B during the p.m. peak hour after implementation of these improvements. These improvements would reduce the impact to less than significant.

E. Seaport Avenue/I-580 Eastbound Ramps/Bayview Avenue (Intersection 10; City of Richmond and Caltrans): The project would cause a significant impact at the all-way stop-controlled Seaport Avenue/I-580 Eastbound Ramps/South 51st Street/Bayview Avenue intersection because it would degrade intersection operations from LOS D to LOS F during the a.m. peak hour and from LOS C to LOS E during the p.m. peak hour. The intersection would satisfy the Caltrans peak hour traffic volume signal warrant. The impact at this intersection can be addressed by:

- Installing an actuated signal at the intersection with protected phasing for the northbound and southbound left-turn movements
- Converting the southbound approach to provide two left-turn lanes and one shared right-turn/through lane

The intersection would improve to LOS C during both a.m. and p.m. peak hours after implementation of these improvements. These measures would reduce the impact to less than significant.

F. I-580 Westbound Ramps/Bayview Avenue (Intersection 11; City of Richmond and Caltrans): The project would cause a significant impact at the signalized I-580 Westbound Ramps/ Bayview Avenue (Intersection 11) because it would degrade intersection operations from LOS A to LOS F during both a.m. and p.m. peak hours. The impact at this intersection can be addressed by:

- Optimizing traffic signal timing parameters (i.e., the amount of green signal time allocated to each intersection approach).

The intersection would improve to LOS C during the a.m. peak hour and LOS B during the p.m. peak hour after implementation of this improvement. This measure would reduce the impact to less than significant.

G. Carlson Boulevard/I-80 Westbound Ramps (Intersection 13; City of Richmond and Caltrans): The project would cause a significant impact at the signalized Carlson Boulevard/I-80 Westbound Ramps (Intersection 13) because it would degrade intersection operations from LOS B to LOS E during the a.m. peak hour. The impact at this intersection can be addressed by:

- Optimizing traffic signal timing parameters (i.e., the amount of green signal time allocated to each intersection approach)

The intersection would improve to LOS D during the a.m. peak hour after implementation of this improvement. This measure would reduce the impact to less than significant.

2014 LRDP campus growth would occur over approximately 40 years, and incrementally add traffic to the road network. Thus, these impacts would not occur under existing conditions. Implementing LRDP MM TRA-2 would reduce the proposed LRDP traffic impacts. For the same reasons as presented under LRDP Impact TRA-1, this impact would remain significant and unavoidable.

LRDP MM TRA-2: Implement LRDP MM TRA-1.

LRDP Impact TRA-3: **Development under the 2014 LRDP would conflict with an applicable plan, ordinance, or policy establishing effectiveness measures for circulation system performance and would cause an exceedance of a level of service standard established for CMP facilities (freeways) under 2035 conditions. (*Potentially Significant; Significant and Unavoidable*)**

I-580 and I-80 are the two CMP facilities in the project area. 2014 LRDP campus development would increase traffic volumes on segments of both freeways that serve the RBC site. Table 4.13-11 shows the 2035 plus 2014 LRDP implementation freeway volumes and service levels. With the addition of project traffic, all freeway segments are projected to continue to operate at LOS E and better, with the exception of I-580 between Central Avenue and I-80, which is expected to degrade to unacceptable LOS F in the a.m. for the westbound direction and LOS F in the p.m. for the eastbound direction.

Table 4.13-11
2035 Plus 2014 LRDP Conditions – Freeway Segment LOS Summary

Freeway Segment	Type[2]	Dir	AM Peak Hour		PM Peak Hour	
			Density[1]	LOS	Density[1]	LOS
I-580 between Harbor Way and Marina Bay Pkwy	Weaving	EB	N/A	B	N/A	C
	Weaving	WB	N/A	C	N/A	A
I-580 between Marina Bay Pkwy and Regatta Blvd	Weaving	EB	N/A	B	N/A	C
	Weaving	WB	N/A	C	N/A	C
I-580 between Regatta Blvd and Bayview Ave	Weaving	EB	N/A	C	N/A	C
	Weaving	WB	N/A	C	N/A	B
I-580 between Bayview Ave and Central Ave	Basic	EB	25.1	C	29.9	D
	Basic	WB	30.3	D	24.0	C
I-580 between Central Ave and I-80	Basic	EB	37.9	E	--	**F**
	Basic	WB	--	**F**	27.4	D
I-80 between Carlson Blvd and Potrero Ave	Basic	EB	27.5	D	34.3	D
	Basic	WB	42.2	E	29.2	D
I-80 at Gilman St Overpass	Basic	EB	29.5	D	32.8	D
	Basic	WB	36.0	E	31.8	D

Notes: **Bold** indicates a freeway segment operating at unacceptable levels. Unacceptable levels for I-580 would be LOS F and for I-80 would be LOS F plus 5 percent or more added traffic.

1. Density is in passenger cars per lane per mile (pc/ln/mi).
2. Segments with auxiliary lanes are classified as weaving segments, and were analyzed based on the Leisch Method. Other segments are analyzed as basic segments using methodologies described in the Highway Capacity Manual 2000.

Dir Direction
EB Eastbound
LOS Level of Service
N/A Not available
WB Westbound

Source: Fehr & Peers 2013.

2014 LRDP implementation would cause a significant impact under 2035 conditions on I-580 between Central Avenue and I-80 in the westbound direction during the a.m. peak hour and in the eastbound direction during the p.m. peak hour. This impact would result because the project would degrade the westbound segment from LOS E to LOS F during the a.m. peak hour and would increase the p.m. peak hour volume on the eastbound freeway segment by more than 5 percent on a freeway segment that would operate at LOS F without the addition of the project's traffic.

No freeway capacity projects are currently planned by Caltrans for this section of I-580, and the cost and scale of freeway expansion is not within the University's jurisdiction or mission. As the feasibility of freeway widening is not known, this impact is considered to be significant and unavoidable.

LRDP Impact TRA-4: Development under the 2014 LRDP would not conflict with an applicable plan, ordinance, or policy establishing effectiveness measures circulation system performance and would not cause an exceedance of a level of service standard established for CMP facilities (freeways) under existing conditions. (*Less than Significant*)

LRDP Impact TRA-4 describes effects on freeways of full 2014 LRDP development, which is assumed to occur by 2050. As all the projected 2014 LRDP vehicle trips would not be immediately added to the study area transportation network upon LRDP approval, an existing plus project trips scenario is an unrealistic condition. An analysis was conducted to measure the project's traffic impacts on freeway segments under existing plus project conditions, but as this is an unrealistic scenario, this analysis is informational only and not a basis for determining impacts.

Table 4.13-12 shows the freeway segment LOS results for the existing plus 2014 LRDP conditions. The addition of 2014 LRDP traffic would not cause any study freeway segment to operate at an unacceptable LOS F; therefore, the 2014 LRDP would not cause a significant impact at the study freeway segments under existing conditions.

Mitigation Measures: No mitigation measure is required.

LRDP Impact TRA-5: Development under the 2014 LRDP would not conflict with adopted policies, plans, or programs regarding public transit, bicycle, or pedestrian facilities, or otherwise decrease the performance or safety of such facilities. (*Less than Significant*)

Under the proposed 2014 LRDP, UC Berkeley/LBNL would provide frequent shuttle service to BART, UC Berkeley, and LBNL, consistent with Goal 4 of the City of Richmond Bicycle Master Plan and Goal CR3 of the Circulation Element of the General Plan 2030. The LBNL-UC Berkeley-RBC Shuttle would provide a no-transfer 20-minute ride from LBNL to the RBC with a single stop at the main UC Berkeley campus en route. The BART-RBC Shuttle would run continuously between the El Cerrito Plaza or El Cerrito del Norte BART station and the RBC, providing a nonstop nine-minute ride from BART to the RBC. The El Cerrito Plaza and El Cerrito del Norte BART station would be a connection point to the AC Transit system. Hours of operations and frequency of service would be increased gradually as the RBC expands and the number of employees increases.

Currently, local transit (e.g., AC Transit, WestCAT) does not serve the RBC directly. The University would work with local transit operators, including AC Transit to improve transit access and service to the RBC as the number of employees and transit demand increases. The exact modifications needed to accommodate the demand are not known at this time; however, they may involve modifying routes 71, 74, 76, and 376, or new route(s). Modifications would be coordinated with other on-going transit planning activities performed by the transit operators, such that the modifications would not adversely affect service in other areas. Thus, the project would not cause adverse impacts to transit or require modifications that would reduce transit access elsewhere in the area, and the impacts would be less than significant.

The proposed project would gradually increase the number of vehicle trips on roadway segments with bicycle and pedestrian facilities; however, the increase would not substantially decrease the performance or safety of the existing or planned bicycle or pedestrian facilities. The project would not preclude development of planned bicycle or pedestrian facilities. Therefore, impacts to bicycle and pedestrian facilities would be less than significant.

Table 4.13-12
Existing Plus 2014 LRDP Conditions – Freeway Segment LOS Summary

Freeway Segment	Type[2]	Dir	AM Peak Hour		PM Peak Hour	
			Density[1]	LOS	Density[1]	LOS
I-580 between Harbor Way and Marina Bay Pkwy	Weaving	EB	N/A	A	N/A	A
	Weaving	WB	N/A	A	N/A	A
I-580 between Marina Bay Pkwy and Regatta Blvd	Weaving	EB	N/A	B	N/A	A
	Weaving	WB	N/A	A	N/A	B
I-580 between Regatta Blvd and Bayview Ave	Weaving	EB	N/A	A	N/A	A
	Weaving	WB	N/A	A	N/A	A
I-580 between Bayview Ave and Central Ave	Basic	EB	16.0	B	17.4	B
	Basic	WB	17.9	B	17.4	B
I-580 between Central Ave and I-80	Basic	EB	24.4	C	37.0	E
	Basic	WB	31.7	D	23.4	C
I-80 between Carlson Blvd and Potrero Ave	Basic	EB	21.6	C	29.4	D
	Basic	WB	32.2	D	24.3	C
I-80 at Gilman St Overpass	Basic	EB	24.4	C	27.7	D
	Basic	WB	31.6	D	28.6	D

Notes: **Bold** indicates a freeway segment operating at unacceptable levels (LOS F for I-580 and LOS F plus 5% or more added traffic for I-80).

1. Density is in passenger cars per lane per mile.
2. Segments with auxiliary lanes are classified as weaving segments, and were analyzed based on the Leisch Method. Other segments are analyzed as basic segments using methodologies described in the Highway Capacity Manual 2000.

Dir Direction
EB Eastbound
LOS Level of Service
N/A Not available
WB Westbound

Source: Fehr & Peers 2013.

Mitigation Measures: No mitigation measure is required.

LRDP Impact TRA-6: The 2014 LRDP would not increase hazards due to a design feature or incompatible use, create unsafe conditions for pedestrians or bicycles, or result in inadequate emergency access. (*Less than Significant*)

Traffic Hazards and Emergency Access

2014 LRDP implementation would not create any transportation and traffic-related hazards due to circulation or access design features. The 2014 LRDP would not result in inadequate emergency access, on- or off-site. Emergency responders would have full access to the site and the internal traffic circulation system of the project would incorporate parking and signs for emergency vehicles and personnel.

Bicycle and Pedestrian Circulation

RBC bicycle access would be by existing overpasses at Bayview Avenue, Regatta Boulevard/Juliga Woods Street, Marina Bay Parkway/S. 23rd Street, Marina Way, Harbor Way,

and others farther west. The Richmond Bicycle Master Plan identifies Bayview Avenue, Marina Bay Parkway/S. 23rd Street, Marina Way, and Harbor Way as providing future Class 2 bicycle lanes. Additional RBC bicycle access on the Bay Trail would be by existing underpasses or overpasses at Central Avenue, Buchanan Street, Gilman Street, University Avenue, the Berkeley bicycle and pedestrian bridge, and others farther south. Bicycle lanes and pedestrian paths would be provided on new streets on the RBC site. A bike sharing system may also be implemented for RBC site circulation and for travel to retail and other points nearby during the day. Sidewalks would be provided on all internal streets, and internal pedestrian pathways would connect buildings on the RBC. Sea level rise may eventually impact the Bay Trail; however, other bicycle and pedestrian improvements would likely be in place before such time. See also discussion of sea level rise and the Bay Trail in the Long Range Development Plan.

The facilities and improvements are consistent with the Bicycle Master Plan and the Pedestrian Plan policies and planned facilities. Consistent with Bicycle Master Plan Goals 1 and 4 and the Pedestrian Plan Increased Connectivity goal, the 2014 LRDP would provide on-site bicycle and pedestrian facilities that connect to the Bay Trail and other planned bicycle facilities in the City. The 2014 LRDP would include a TDM program that provides incentives for walking and bicycle use. This is consistent with Policy CR5.1 of the City of Richmond General Plan 2030 Circulation Element.

Although the proposed project would gradually increase the number of vehicle trips on roadway segments with bicyclists and pedestrian facilities, the increase would not create unsafe conditions for bicyclists and pedestrians. Therefore, 2014 LRDP implementation would not result in adverse impacts to bicycle trails near the site or elsewhere in the City of Richmond, including the Bay Trail.

Mitigation Measures: No mitigation measure is required.

LRDP Impact TRA-7: Traffic associated with the 2014 LRDP campus facilities construction would temporarily and intermittently adversely affect the road network near the RBC site. (*Potentially Significant; Less than Significant with Mitigation*)

RBC site construction activity is estimated to continue intermittently until 2050. During facility demolition and construction, there may be temporary and intermittent transportation impacts from truck movements and construction worker vehicles. The construction-related traffic may temporarily reduce area roadway capacities because of the slower movements and larger turning radii of construction trucks compared with passenger vehicles.

Peak-hour (7:00 to 9:00 a.m. and 4:00 to 6:00 p.m. on weekdays) construction worker and truck trips may result in short term adverse effects on local traffic during construction periods.

The temporary closure of streets and paths for construction staging may affect automobile, pedestrian, and bicycle access and circulation; this also may cause a significant temporary impact by increasing traffic hazards or impeding emergency access.

Implementing LRDP MM TRA-7 would reduce any construction-related impact to a less than significant level.

LRDP MM TRA-7: Prepare a construction traffic management plan for each RBC construction project to reduce construction impacts on traffic and parking. RBC shall work with City of Richmond in preparing the plan, which will address:

- Proposed truck routes
- Hours of construction and limits on number of truck trips during peak commute periods (7:00 to 9:00 a.m. and 4:00 to 6:00 p.m.) if traffic conditions demonstrate the need to reduce construction traffic so as to avoid causing significant delays.
- Parking management plan for construction workers;
- Tools to provide safe access for pedestrians, bicyclists, automobiles, and emergency access vehicles.
- Identification of alternative routes for temporary closure of streets or paths during construction.

Cumulative Impacts and Mitigation Measures

The preceding discussion addresses the potential impacts of project-related traffic on nearby roadways and intersections. To address the cumulative 2014 LRDP campus development impacts, this section also analyzes full 2014 LRDP RBC campus development in concert with anticipated development in the area in the analysis year 2035.

LRDP Impacts TRA-1 and TRA-3 evaluate the transportation impacts that would result from regional traffic growth through 2035 combined with the 2014 LRDP RBC growth. That analysis presents the cumulative traffic impacts determined to be significant at certain intersections and one freeway segment. Mitigation measures are included to address the proposed project's contribution to the significant cumulative traffic impacts. Because implementation of the intersection improvements determined necessary to reduce the project's impacts on off-campus intersections is outside the control of the University, LRDP Impact TRA-1 is found to be significant and unavoidable for seven intersections. Because improvements to the freeway segment are not feasible, LRDP Impact TRA-3 is also found to be a significant and unavoidable impact.

4.13.5 References

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4.14 UTILITIES, SERVICE SYSTEMS, AND ENERGY

4.14.1 Introduction

This section describes existing utilities, service systems, and energy resources serving the RBC site and evaluates the potential for development under the 2014 LRDP to affect these systems.

Public and agency NOP comments related to utilities, service systems, and energy are summarized below:

- The EIR should analyze RBC dry and wet weather flows on the City of Richmond's wastewater collection and treatment systems.
- The EIR should analyze RBC development demand impacts on the City of Richmond's water, natural gas, and telecommunications infrastructure.
- The EIR should analyze the impacts of the RBC development on stormwater runoff.
- The EIR should determine if stormwater runoff would be discharged into the City of Richmond's drainage system and whether the RBC site would need to comply with State Water Resources Control Board requirements.
- For potentially significant impacts, the EIR should identify mitigation measures that promote sustainability and conservation of resources.
- The EIR should describe all project waste streams associated and identify how waste would be handled.
- The project sponsor should submit a written request to EBMUD to prepare an RBC development Water Supply Assessment (WSA).
- Off-site water pipeline improvements, including existing water main replacements, may be necessary to provide RBC site water.
- The RBC development should use non-potable water, including recycled water, for non-domestic purposes. The nearest EBMUD recycled water transmission pipeline terminates approximately 3 miles from the project site.
- The RBC development should incorporate WaterSmart technology and design standards in landscape and building design.

All these comments were considered in the analysis.

4.14.2 Environmental Setting

Water

EBMUD provides the RBC site with water service for potable, firefighting, central plant, and irrigation uses. The District's water supply system consists of a network of reservoirs, aqueducts, treatment plants, and distribution facilities. The water supply system originates at the Mokelumne River in the Sierra Nevada mountain range; that water is delivered to treatment plants or to District reservoirs, and ultimately to East Bay residences and businesses. On average, 90 percent of the water delivered by EBMUD comes from the Mokelumne River watershed, with the remaining 10 percent originating as runoff from local service area watersheds. EBMUD is entitled to 325 million gallons per day (mgd) of Mokelumne watershed water, of which 200 mgd is diverted from the Pardee Reservoir and 125 mgd is diverted from the Camanche Reservoir (EBMUD 2012).

EBMUD Water supplied to the City of Richmond is treated at the Sobrante Water Treatment Plant (WTP) or the Orinda WTP. The Sobrante WTP can treat and deliver up to 60 mgd and the Orinda WTP can treat and deliver up to 200 mgd (City of Richmond 2011).

The RBC site is currently served by three 8-inch laterals, each connected to 12-inch EBMUD water mains in South 46th Street, Regatta Boulevard and South 32nd Street, and Regatta Boulevard and South 34th Street. Currently, land uses on the RBC site consume approximately 11 million gallons per year (mgy), with an estimated maximum flow rate of 50 gpm (City of Richmond 2011).

Wastewater

The Richmond Municipal Sewer District (RMSD) provides wastewater services to the RBC site. Wastewater is treated at the RSMD's WWTP on the Point Richmond Peninsula. The RMSD WWTP has a dry-weather secondary treatment capacity of 24 mgd, and wet weather capacity of 24 mgd primary/secondary treatment and 40 mgd of primary treatment. The RMSD WWTP receives approximately 7 mgd dry weather influent flows. Wet weather flows peak at 56 mgd due to infiltration and inflow, approximately 16 mgd more than the RMSD WWTP's primary treatment capacity (US DOI and City of Richmond 2009).

The RBC site currently connects to a City of Richmond sanitary sewer main in several locations in the north portion of the developed area and to a southern City of Richmond sewer main that traverses the southern end of the meadow to the west of the EPA Lab and then exits the site to South 32nd Street. Currently, land uses on the RBC site discharge approximately 9.3 mgy into the City's sewer system for treatment at the RMSD WWTP.

Stormwater

Stormwater currently flows from north to south on the RBC upland area through open swales, culverts, and sheet flow into drainages. Building and other impervious surface runoff is directed into storm drains. There are two main RBC site storm drain lines: the Western and Eastern Storm Drains. Stormwater in the western RBC uplands drains through the Western Storm Drain's open swales and an underground pipe to a trapezoidal storm drain channel called Meeker Ditch. This drain channel runs north-south on the western edge of the uplands; it also carries City of Richmond stormwater collected north of the RBC site. The Eastern Storm Drain also discharges its surface waters into Meeker Ditch. Runoff from the buildings and other impervious surfaces on the Regatta property is directed into storm drains in the adjacent streets.

Solid Waste

The West Contra Costa Integrated Waste Management Authority (WCCIWMA) is the joint powers agency that manages solid waste for the cities of El Cerrito, Hercules, Pinole, Richmond, and San Pablo—an area of approximately 74 square miles. The WCCIWMA is governed by a board of Directors made up of seven city council members. The WCCIWMA was created in response to Assembly Bill 939, which mandated California cities to reduce solid waste by 50 percent by the year 2000. West Contra Costa County met the 50 percent waste diversion goal in 2006 (WCCIWMA 2012).

The project site is in the Richmond Sanitary Service collection district. Refuse is collected and taken to the Golden Bear Transfer Station, from where it is transported to the Potrero Hills Landfill in Solano County (Contra Costa County 2003). The WCCIWMA uses other landfills such as those listed in Table 4.14-1.

Table 4.14-1
Disposal Facilities Used by WCCIWMA in 2008

Facility	Address	Expected Closure Date	Permitted Maximum Disposal (Tons/Day)	Remaining Estimated Capacity (cubic yards)
Acme Landfill	950 Waterbird Way, Martinez CA 94553	6/1/2021	1,500	175,000 (65.1%)
Altamont Landfill and Resources Recovery	10840 Altamont Pass Road Livermore CA 94550	1/1/2029	11,500	45,720,000 (73.7%)
Bakersfield Metropolitan (Bena) SLF	2951 Neumarkel Road Caliente CA 93518	12/31/2038	4,500	34,994,127 (66.0%)
Corinda Los Trancos (Ox Mountain) Landfill	2 miles NE Half Moon Bay off Hwy 92, Half Moon Bay CA 94019	1/1/2018	3,598	44,646,148 (117.8%)*
Forward Landfill, Inc.	9999 S. Austin Road Manteca CA 95336	1/1/2020	8,668	23,700,000 (46.4%)
Guadalupe Sanitary Landfill	15999 Guadalupe Mines Road San Jose CA 95120	1/1/2048	1,300	11,055,000 (38.7%)
John Smith Road Class III Landfill	2650 John Smith Road Hollister CA 94123	1/1/2024	500	3,594,899 (77.7%)
Keller Canyon Landfill	901 Bailey Road Pittsburg CA 94565	12/31/2030	3,500	63,408,410 (84.5%)
Newby Island Sanitary Landfill	1601 Dixon Landing Road Milpitas CA 95035	6/1/2025	4,000	18,274,953 (36%)
Potrero Hills Landfill	3675 Potrero Land Suisun City CA 94585	2/14/2048	4,330	13,872,000 (16.7%)
Recology Hay Road Landfill, Inc.	6426 Hay Road; 1/4 Mi W Hwy 113, Vacaville CA 95687	1/1/2077	2,400	30,433,000 (82.3%)
Recology Ostrom Road Landfill	5900 Ostrom Road Wheatland CA 95692	12/31/2066	3,000	39,223,000 (90.2%)
Redwood Sanitary Landfill	4 miles NE Novato Btwn Santonio and RR Novato, CA 94945	1/1/2039	2,300	12,900,000 (67.5%)
Vasco Road Sanitary Landfill	4001 North Vasco Road Livermore CA 94550	8/31/2019	2,250	9,870,704 (30.0%)
Zanker Material Processing Facility	675 Los Esteros Road San Jose CA 95134	12/31/2018	350	540,100 (100%)

* Calrecycle website shows -6,746,148 cubic yards used, which results in a remaining capacity greater than 100%.
% Percent
SLF Sanitary Landfill

Source: CIWMB, 2009. http://www.calrecycle.ca.gov/SWFacilities/Directory/search.aspx. Accessed January 31, 2013

Potrero Hills Landfill receives the majority of the transfer station solid waste. It is at 3675 Potrero Hills Lane in Suisun City, approximately 28 miles northeast of the RBC site. According to CalRecycle, the landfill currently has a permitted capacity of 83.1 million cubic yards and a permitted daily intake limit of 4,330 tons. The landfill is permitted by the Local Enforcement Agency to continue operating till 2048 (CalRecycle 2012a). To do so, a landfill expansion is required. BCDC issued the required permit for this expansion, but it was overturned by Solano County Superior Court. As a result, it currently is uncertain whether the landfill will realize its full permitted capacity and continue to accept wastes until 2048.

Energy

Electricity
PG&E provides electricity to the RBC site. The company provides electric service to 5.1 million customers in a 70,000-square-mile service area in northern and central California. Electricity is generated from fossil fuels (natural gas and fuel oil), hydroelectric, nuclear, and solar (City of Richmond 2011).

Currently, the RBC site has an estimated peak power demand of about 500 kW and consumes approximately 3.7 million kWh annually. RBC site electricity is provided through multiple overhead 12-kv electrical lines. Aerial and underground power lines comprise the site's electrical service infrastructure.

Natural Gas
PG&E provides natural gas to the site. The company provides natural gas service to 4.2 million customers throughout its service area. The majority of PG&E's gas supply comes from northern California and other sources outside the service area (City of Richmond 2011).

Currently, the RBC site has an estimated peak gas demand of about 2,700 kBtu/h and consumes approximately 73,600 therms annually. RBC site natural gas is supplied through multiple high-pressure gas mains, with underground gas lines serving the larger site facilities.

4.14.3 Regulatory Considerations

Federal

Appropriate LBNL policies and procedures regarding utility use and consumption will be followed.

Energy Independence and Security Act
In 2007, EISA was signed into law. EISA aims to increase building, product, and vehicle efficiency; accelerate clean renewable fuel production; and institute other measures aimed at increasing U.S. energy independence and security.

Federal Facilities Compliance Act (Public Law 102-386)
This act generally waives sovereign immunity for Federal facilities, including the LBNL, from RCRA. It also requires development of plans and agreements with States for the management of mixed waste streams.

State

California Safe Drinking Water Act
This act established a state program and standards for public drinking water contaminant levels, regulates underground injection well use, and prescribes sole source aquifer standards. A public water system is defined as a system that regularly serves at least 25 persons and includes federal facilities that own or operate a public water system.

SB 610 and SB 221 – Water Supply Assessments
In 2001, the California Legislature passed Senate Bill 610 (Water Code Section 10910 et seq.) and Senate Bill 221 (Water Code Section 66473.7) to improve the link between information on water supply availability and certain land use decisions made by cities and counties. SB 610 and SB 221 were companion measures that sought to promote more collaborative planning between

local water suppliers and cities and counties. SB 610 and SB 221 are not applicable to University of California projects.

Assembly Bill 939

In 1989, Assembly Bill (AB 939) established the current organization, structure, and mission of the California Integrated Waste Management Board; directed attention to the increasing waste stream and decreasing landfill capacity; and mandated a reduction in disposed waste. It required jurisdictions to meet diversion goals of 25 percent by 1995 and 50 percent by 2000. Each city and county was required to submit a plan (Source Reduction and Recycling Element) describing how they would meet the waste reduction mandates. The University of California is not subject to this Act. The waste diversion goals were set at 75 percent by June 2012 and 100 percent by 2020.

California Universal Waste Law

This California Universal Waste Law went into effect in February 2006. Universal wastes include a wide variety of hazardous wastes such as batteries, fluorescent tubes, mercury-containing articles, aerosol cans, cathode ray tubes, and electronic devices that can be harmful to human and environmental health. Universal waste may not be discarded in solid waste landfills. Instead, it is recyclable and (to encourage recycling and recovery of valuable metals) can be managed under less stringent requirements than those that apply to other hazardous wastes.

California Government Code Section 54999

California Government Code Section 54999 provides for the University to pay fees to utility companies, under very limited circumstances, to defray the cost of utility capital improvements specifically intended to serve the University. An imposed capital facilities fee must be nondiscriminatory and must not exceed the actual amount necessary to provide utility benefits to the University.

California Building Code

Buildings constructed after June 30, 1977 must comply with the most recent California Code of Regulations Title 24 standards. Current Title 24 regulations are in the 2008 Building Energy Efficiency Standards. New 2013 Building Energy Efficiency Standards will become effective January 1, 2014. Title 24 requires state-of-the-art energy conservation features in building design and construction, use of non-depletable energy resources, or a demonstration that buildings would comply with a designated energy budget. Sustainability is a central 2014 LRDP element and the UC Sustainable Practices Policy requires that building renovations outperform by 20 percent the Title 24, Part 6 Building Energy Efficiency Standards.

Construction General Permit

Construction activity disturbing more than 1 acre of land is currently subject to an NPDES General Permit issued under Water Quality Order No. 2009-0009-DWQ. Permittees enrolled under this permit are required to file a notice of intent with the RWQCB and to develop and implement a SWPPP that includes BMPs. Permittees must perform seasonal monitoring of storm water discharges and submit annual reports until construction is completed. The intent of the General Permit program is to minimize erosion and sediment runoff as well as to prohibit the discharge of any pollutants in storm water runoff through the use of BMPs. Upon completion of construction, the General Permit is cancelled by filing a notice of termination.

California Model Water Efficient Landscape Ordinance

The Department of Water Resources prepared the model landscape ordinance, Title 23 Section 490. The model ordinance was adopted pursuant to AB 1881 Section 65597, the Water Conservation in Landscaping Act of 2006. Specific standards regarding water allowances as

well as methods to achieve water efficiency are detailed in the model ordinance. Local agencies were required to adopt the model ordinance or a local water efficient landscape ordinance by January 1, 2010.

Local

UC Sustainable Practices Policy

The UC Sustainable Practices Policy establishes goals in eight areas of sustainable practices: green building, clean energy, transportation, climate protection, sustainable operations, waste reduction and recycling, environmentally preferable purchasing, and sustainable foodservice. LBNL has its own sustainability policy and also follows the UC policy. The UC Sustainable Practices Policy is updated periodically. The most recent update, located at http://sustainability.universityofcalifornia.edu/policy.html, is from August 2011. The policy goals relevant to utilities and energy are:

Green Building Design

New Buildings

- All new building projects, other than acute care facilities, shall be designed, constructed, and commissioned to outperform the CBC energy-efficiency standards by at least 20 percent. The University will strive to design, construct, and commission buildings that outperform CBC energy efficiency standards by 30 percent or more, whenever possible within the constraints of program needs and standard budget parameters.
- All new buildings (except acute care facilities) will achieve a LEED Silver certification at a minimum. All new buildings (except acute care facilities) will strive to achieve certification at a LEED Gold rating or higher, whenever possible within the constraints of program needs and standard budget parameters.
- The University of California will design, construct, and commission new laboratory buildings to achieve a minimum of LEED Silver certification and meet at least the prerequisites of the Labs21 EPC. Design, construction, and commissioning processes shall strive to optimize the energy efficiency of systems not addressed by the CBC energy efficiency standards.
- All new building projects will achieve at least two points of the available credits in LEED-NC's Water Efficiency category.

Building Renovations

- Renovation of buildings that require 100 percent replacement of mechanical, electrical and plumbing systems and replacement of over 50 percent of all non-shell areas (interior walls, doors, floor coverings and ceiling systems) shall at a minimum comply with III.A.3 or III.A.4. Such projects shall outperform CBC Title 24, Part 6, currently in effect, by 20 percent.
- Renovation projects with a project cost of $5 million or greater (CCCI 5000) that do not fall under item III.A.6 shall at a minimum achieve a LEED-CI Certified rating and register with the utilities' Savings by Design program, if eligible.

Clean Energy

- The University will reduce consumption of non-renewable energy by using a portfolio approach that includes a combination of energy efficiency projects, the incorporation of local renewable power measures for existing and new facilities, green power purchases from the electrical grid, and other energy measures with equivalent demonstrable effect on the environment and reduction in fossil fuel use.

Recycling and Waste Management

- The University prioritizes waste reduction in the following order: reduce, reuse, and recycle.
- The University adopts the following goals for diverting municipal solid waste from landfills:
  - 50 percent by June 30, 2008
  - 75 percent by June 30, 2012
  - Ultimate goal of zero waste by 2020

City of Richmond General Plan 2030

The RBC site is a University property where work within the University's mission is performed. 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 is in the City of Richmond. The following sections summarize objectives and policies from the City of Richmond General Plan and local ordinances as they relate to water supply and distribution, wastewater treatment and conveyance, solid waste disposal, and energy demand and conveyance.

Community Facilities and Infrastructure

Goal CF1 Facilities that Serve a Diverse Range of Community Needs

Policy CF1.1 A Range of High-Quality Community Facilities and Infrastructure. Maintain high-quality facilities and infrastructure to serve diverse community needs.

P**olicy CF1.4** Concurrent Infrastructure Development. Require new development to provide proportionate facilities and infrastructure improvements as it occurs.

The 2030 General Plan EIR determined that the effects of the future development in the City under the General Plan on utilities, service systems, and energy would be significant and unavoidable. Wastewater systems impacts would be significant and unavoidable. Potable water system, solid waste, and energy (including electricity and natural gas) impacts would be less than significant. Cumulative impacts would be the same as project-level impacts.

4.14.4 Impacts and Mitigation Measures

Standards of Significance

Project impacts on water supply and distribution, wastewater treatment and conveyance, solid waste disposal, and energy demand and conveyance 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:

Water Supply

- Require or result in the construction of new water treatment facilities or expansion of existing facilities that could cause significant environmental effects
- Result in the need for new or expanded water supply entitlements if there are not sufficient water supplies to serve the project from existing entitlements and resources

Wastewater

- Exceed wastewater treatment requirements of the applicable RWQCB
- Require or result in the construction of new wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects
- Result in a determination by the wastewater treatment provider that serves or may serve the project that it has inadequate capacity to serve the project's projected demand in addition to the provider's existing commitments

Stormwater

- Require or result in the construction of new stormwater drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects

Solid Waste

- Be served by a landfill with insufficient permitted capacity to accommodate the project's solid waste disposal needs
- Fail to comply with applicable federal, State, and local statutes and regulations related to solid waste

Energy

- Require or result in the construction or expansion of electrical and natural gas facilities, that could cause significant environmental impacts
- Encourage the wasteful or inefficient use of energy

CEQA Checklist Items Adequately Addressed in the Initial Study

The Initial Study deferred analysis of the project's water supply and distribution, wastewater treatment and conveyance, solid waste disposal, and energy demand and conveyance impacts to this EIR. Therefore, all of the CEQA checklist items listed above are addressed in the analysis.

Analytical Methods

As a conceptual land use plan, the 2014 LRDP would help guide future physical development siting. The LRDP does not commit the LBNL or UC Berkeley to any specific projects or to grow to the maximum LRDP parameters. This EIR conservatively estimates the maximum LRDP growth and commensurate increases in utility demands. The analytical approach for each utility is addressed below.

Water Supply

Full 2014 LRDP development water demand is based on bioscience programs demand and consumption. The biosciences programs were chosen because they represent a reasonable mid-range consumption of utilities, chemicals, and usage of hazardous materials. The metered data was scaled down for variations in climate, improved building and system design, and consolidation of program functions. The resulting demand is then compared to available water supplies as reported in EBMUD's 2010 Urban Water Management Plan. EBMUD was contacted

to confirm that it would be able to supply the additional amount of water that the RBC would need at full 2014 LRDP development; according to the WSA, EBMUD will be able to serve the RBC under full 2014 LRDP development with its existing and planned water supply (EBMUD 2013).

Wastewater

Future wastewater from new 2014 LRDP development is calculated as 80 percent of total future potable water use. These estimated future flows are then compared to available wastewater treatment capacity. The analysis seeks to measure any future impacts to wastewater treatment capacity and to determine if new or expanded wastewater treatment facilities would be necessary.

Solid Waste

Solid waste quantities and types are determined by extrapolating current waste streams with increased future activities, space, and population. That estimated future waste stream is then compared to projected future landfill capacity. Results are then used to help determine whether the project would be underserved by existing landfills with insufficient permitted capacity; fail to comply with applicable federal, State, and local solid waste statutes and regulations; or hinder University or municipal compliance with applicable solid waste statutes.

Energy

Existing electrical and natural gas facilities and supplies are reviewed for future capacity. Energy demand is calculated by multiplying demand factors with estimated new population, facility space, land use area, and activities. Future energy provision capacity is compared to projected energy demand to help determine new or expanded electrical and natural gas facilities or sources.

The existing and projected RBC site utility demand is in Table 4.14-2.

RBC 2014 LRDP Policies

The RBC 2014 LRDP policies related to utilities, service systems, and energy include the following:

- UI1 – Utilities and Infrastructure Policy on Efficiency: Build a safe, efficient, cost-effective infrastructure.
    - Provide a safe and reliable utility infrastructure capable of supporting the research programs conducted on the campus.
    - Design infrastructure in a manner that can be phased over time and provide redundancy as needed.
    - Consolidate utility distribution into centralized corridors that primarily coincide with campus streets.
- UI2 – Utilities and Infrastructure Policy on Sustainability: Design infrastructure improvements to embody sustainable practices.
    - Design infrastructure to minimize energy use and maximize on-site renewable energy generation.
    - Plan infrastructure in a manner that promotes minimal use of potable water.
    - Explore and implement measures to use recycled gray or black water on-site for non-potable uses such as irrigation and toilet flushing.

- Maintain or restore, to the maximum extent technically and practically feasible, the predevelopment hydrology of the property with regard to the temperature, rate, volume, and duration of stormwater flow.
- Incorporate low impact development strategies in site planning to manage stormwater.
- Protect the campus development from 55 inches of sea level rise through the year 2100 using natural shore forms where practicable; and coordinate closely with the East Bay Regional Park District on maintaining the Bay Trail embankment.

LRDP Impacts and Mitigation Measures

Water Supply

LRDP Impact UTL-1: Development under the 2014 LRDP would not result in the need for new or expanded water supply entitlements. (*Less than Significant*)

The RBC site currently consumes approximately 11 mgy, or 30,000 gpd, of water, with an estimated maximum 50 gpm flow rate, as shown in Table 4.14-2. Potable water is used for various potable uses and irrigation. Following full development of the campus under the 2014 LRDP, the estimated annual water consumption would be about 340 mgy and the maximum flow rate would be 2,230 gpm. This represents a water usage increase of 329 mgy, or approximately 0.9 mgd, over existing conditions.

RBC landscape irrigation with recycled water is being explored in discussions with EBMUD. This would reduce the potable water estimated above. Consistent with UC Sustainable Practices Policy, all new building projects would achieve at least two points of the available credits in LEED-NC's Water Efficiency category; that would minimize water use. As required by EBMUD the landscape design would be designed to a water budget as described in the California Model Water Efficient Landscape Ordinance in Title 23 of the California Code of Regulations. The project would comply with EBMUD Water Service Regulation Section 31, Water Efficiency Requirements.

EBMUD is entitled to 325 mgd of water and its service area is projected to have a 230 mgd water demand in 2040, the closest EBMUD planning year to the 2014 LRDP's 2050 planning horizon (EBMUD 2011). Without conservation and recycled water, the EBMUD service area water demand in 2040 would be 312 mgd. RBC full development under the 2014 LRDP would add 0.9 mgd to the service area demand and increase total service area water demand to 231 mgd under the EBMUD conservation and recycled water scenario, and to 313 mgd under the non-conservation and recycling scenario. Both numbers are well below the EBMUD's total water entitlement.

Table 4.14-2
RBC Annual and Peak Utility Demand

Utility	Existing Demand	Projected Demand (2050)	Difference in Demand
Potable Water	11 mgy (peak demand – 50 gpm)	340 mgy (peak demand – 2,230 gpm)	329 mgy (peak demand – 2,180 gpm)
Firefighting Water	(peak demand – 3,000 gpm)	(peak demand – 6,000 gpm)	(peak demand – 3,000 gpm)
Wastewater	9.3 mgy (peak demand – 55 gpm)	273 mgy (peak demand – 2,140 gpm)	263.7 mgy (peak demand – 2,085 gpm)
Electrical energy	3,700 megawatt hours/year (peak demand – 500 kW)	142,400 megawatt hours/year (peak demand – 24.7 MW)	138,700 megawatt hours/year (peak demand – 24.2 MW)
Standby Power	peak demand – 400 kW (installed capacity – 3.9 MW)	peak demand – 16 MW (installed capacity –20 MW)	peak demand – 15.6 MW (installed capacity –16.1 MW)
Natural Gas	73,600 therms/year (peak demand – 2,700 kBtu/h)	6,600,000 therms/year (peak demand – 240,300 kBtu/h)	6,526,400 therms/year (peak demand – 237,600 kBtu/h)

Notes:
1 Wastewater was determined to be 80 percent of the potable water demand.
2 Wastewater flows cannot be netted out because the leased facilities do not all contribute their wastewater to the same wastewater treatment plant.
gpm Gallons per minute
kBtu/h Kilo-British thermal unit hour
kW Kilowatt
Mgy Million gallons per year
MW Megawatt
NA Not Applicable

During normal rainfall years, EBMUD has adequate water supply to meet water demands, including the demand that would be added by RBC development. During drought periods the Mokelumne River would not meet the 325 mgd entitlement. The 2010 Urban Water Management Plan identified additional water sources, in addition to rationing, that could be available during drought years; these include supplemental supplies from the Freeport Regional Water Facility and the Bayside Groundwater Facility. In 2040 there would still be an EBMUD service area deficit of 73 mgd if there were three drought years in a row. Any additional deficit during dry years would be supplemented by short-term supply sources such as the Northern California Water Transfers and the Bayside Groundwater Project Expansion (EBMUD 2011).

EBMUD conducted a WSA of campus development under the proposed 2014 LRDP. According to the WSA, EBMUD will be able to serve the water demand associated with full development of the campus under the 2014 LRDP with its existing and planned water supply (EBMUD 2013). Full 2014 LRDP campus development would increase the daily water demand from EBMUD. However, the increase would be relatively small and would be served by existing water entitlements. It would be further minimized by RBC conservation measures. EBMUD may investigate expanding the existing recycled water infrastructure or constructing a localized

satellite facility to provide recycled water to the RBC site to further reduce potable water use. The impact would be less than significant.

Mitigation Measure: No mitigation measure is required.

LRDP Impact UTL-2: Development under the 2014 LRDP would not require or result in new or expanded water treatment facilities. (*Less than Significant*)

EBMUD water supplied to the RBC is treated at the Sobrante or the Orinda WTPs. Campus development would result in a net water demand increase of approximately 0.9 mgd. EBMUD would be able to serve the campus with its existing supplies for which there are currently adequate water treatment facilities (EBMUD 2013). Therefore, 2014 LRDP development would not require or result in the construction or expansion of water treatment facilities; this impact would be less than significant.

Mitigation Measure: No mitigation measure is required.

LRDP Impact UTL-3: Development under the 2014 LRDP would require the construction of new or expanded water delivery systems. The construction of new or expanded water delivery systems would not result in significant environmental effects. (*Less than Significant*)

The RBC site is currently served by three 8-inch laterals, each connected to 12-inch EBMUD water mains at South 46th Street, Regatta Boulevard and South 32nd Street, and Regatta Boulevard and South 34th Street. Full 2014 LRDP campus development would require that these 8-inch laterals be upgraded to 12-inch laterals, and that they be supplemented and cross-connected by a 12-inch RBC fire water distribution system. This would ensure adequate future delivery of potable and fire water. The underground distribution system would include piping, sectionalizing valves, back-flow preventers, and pressure reducers generally in utility corridors defined in the 2014 LRDP. Each new facility would include an isolation valve and meter at the building's service entry point. The potential environmental effects associated with upgrading and expanding the RBC site water delivery systems are evaluated in Sections 4.1 through 4.13. As indicated by the analysis in these sections, the impacts will be less than significant or will be reduced to less than significant with mitigation. The analysis in LRDP Impact CR-3 in Section 4.4, Cultural Resources, concludes a significant and unavoidable impact. However the future water conveyance systems would not require demolition of a historic building. Although there would be other significant and unavoidable impacts of LRDP development related to operational criteria pollutant and toxic air contaminant emissions, operational GHG emissions, and traffic, due to the nature of infrastructure upgrades and expansion, these improvements would not cause or contribute to these significant and unavoidable impacts.

EBMUD has indicated that improvements to off-site water mains may be necessary to serve the campus development. To the extent that any improvements to off-site water mains are needed, the construction of these improvements is not expected to result in significant environmental impacts. Due to the nature of infrastructure projects (i.e., underground pipelines placed in existing right-of-way underneath city streets), potential impacts are expected to be less than significant or if potentially significant, mitigable to a less than significant level.

Therefore, the environmental impacts from potentially constructing or expanding on- and off-campus water conveyance infrastructure would be less than significant.

Mitigation Measure: No mitigation measure is required.

Wastewater

LRDP Impact UTL-4: Development under the 2014 LRDP would require the construction of new or expanded wastewater treatment facilities. (*Potentially Significant; Less than Significant with Mitigation*)

Currently, the RBC site generates 9.3 mgy, or 25,479 gallons per day (gpd), of wastewater that is discharged into the City's sewer system for treatment at the RMSD WWTP. This wastewater would increase to an estimated 273 mgy or 747,945 gpd at full 2014 LRDP development. This represents an increase of 263.7 mgy or 722,466 gpd (0.7 mgd) of wastewater over existing conditions, as shown in Table 4.14-2.

The current RMSD WWTP dry-weather secondary treatment capacity is 24 mgd and dry weather influent flows are approximately 7 mgd. If projected 2014 LRDP campus wastewater flows of 0.7 mgd were added to the current influent flows of 7 mgd, the total influent would still be substantially below the WWTP's 24 mgd dry-weather treatment capacity. Incremental RBC flows would take up only 3 percent of the WWTP's dry-weather treatment capacity. Therefore, by itself, the proposed project would not require the construction of new or expanded wastewater treatment facilities. For the combined effect of the proposed project in conjunction with other reasonably foreseeable future development on wastewater treatment capacity, see Cumulative Impact UTL-1 below.

The current RMSD WWTP wet weather primary treatment capacity is 40 mgd and wet weather flows peak at 56 mgd due to infiltration and inflow (I&I). Inflow is stormwater that enters into the sanitary sewer systems at system connection points and infiltration is groundwater that enters sanitary sewer systems through pipe and joint cracks or leaks. Peak wet weather flows exceed the primary treatment capacity of 40 mgd by approximately 16 mgd, or 40 percent. I&I accounts for the drastic increase in peak flows to the RMSD WWTP during wet weather events. The proposed project would not increase I&I discharges to the RMSD WWTP as its infrastructure would be new and not subject to I&I problems.

Furthermore, the City of Richmond has commenced efforts to address the wet weather problem at the RMSD WWTP. In 2011, the City of Richmond prepared and adopted the Sewer Collection System Master Plan, which concluded that a 10-year, 24-hour storm could produce a peak flow of 67 mgd (Veolia Water 2011). As stated above, the current wet weather primary treatment capacity is 40 mgd. Therefore, during the specified storm, there would be an excess of 27 mgd of wastewater above treatment capacity. The City of Richmond is currently in the process of constructing storage facilities for the excess wet weather flows. The wet weather storage basin project has not begun construction but is expected to be completed in late 2014. The project would temporarily store the excess flow of up to 27 mgd in storage basins and then return the flow to the WWTP for treatment after the peak flows have subsided. When finished, this project would prevent overflows from overflow structures to Richmond Harbor during storm events but it would not eliminate sewer system overflows from other upper reaches of the sewer system. Based on the project's current schedule, the wet weather storage basin project would be completed before any new wastewater is generated at the RBC site and the impact related to excessive flows beyond wet weather treatment capacity would not occur. However, should that project be delayed and new buildings are constructed and occupied on the campus that generated new wastewater flows, campus development could potentially result in a significant impact related to wastewater. In addition, until such time that all I&I flows are eliminated from the sewer mains between the

RBC site and the RMSD WWTP, new wastewater generated by campus development could potentially contribute to localized system overflows and result in a potentially significant impact.

In summary, 2014 LRDP campus development would not have a significant effect on wastewater treatment capacity during dry weather conditions. During wet weather conditions, RBC development would not contribute to I&I flows but if the completion of wet weather storage facilities is delayed, RBC development could potentially add flows to a WWTP that is operating over capacity during wet weather. In addition, it could add wastewater flows to sewer mains that are at capacity due to I&I and result in localized system overflows. To address this potentially significant impact, Mitigation Measure LRDP CUM UTL-4 is proposed. With mitigation, the impact would be less than significant. In addition, Government Code Section 54999 authorizes public utilities to charge the University a limited capital facilities fee under certain circumstances (i.e., a non-discriminatory charge to defray the actual cost of that portion of a public utilities facility actually serving the University). If there are any costs incurred by the City of Richmond associated with providing wastewater facilities to serve the campus, the University would be expected to comply as authorized under Section 54999.

LRDP MM UTL-4: When a project under the 2014 LRDP is proposed that would increase wastewater flows discharged from the RBC site, the University shall work with the City of Richmond to evaluate the impact of the specific project on both the sewer mains and at the RMSD WWTP, and if necessary based on the results of the evaluation, the University will compensate the City for the cost of implementing improvements such as slip-lining sewer pipelines downstream of the project site to reduce I&I flows volumes equivalent to or greater than the incremental volume of wastewater generated by the project, or if necessary would construct underground vaults on the RBC site to detain wastewater to reduce peak flows to sewer mains during wet weather.

LRDP Impact UTL-5: Development under the 2014 LRDP would require the construction of new or expanded wastewater conveyance systems. The construction of new or expanded wastewater conveyance systems would not result in significant environmental effects. (*Less than Significant*)

Full 2014 LRDP campus development would produce 263.7 mgy or 0.7 mgd of wastewater over current flows, as shown in Table 4.14-2. The current RBC site wastewater conveyance system is not adequate to collect future campus wastewater flows, so additional sewer lines would be needed to connect to the main sewer line at the south end of the developed uplands area. The potential environmental effects of expanding or providing new RBC site wastewater conveyance systems are evaluated in Sections 4.1 through 4.13. As indicated by the analysis in these sections, the impacts will be less than significant or will be reduced to less than significant with mitigation. Although the analysis in LRDP Impact CR-3 in Section 4.4, Cultural Resources, concludes a significant and unavoidable impact related to demolition of historic structures, the future wastewater conveyance systems would not require demolition of a historic building. While there would be other significant and unavoidable impacts of LRDP development related to operational criteria pollutant and toxic air contaminant emissions, operational GHG emissions, and traffic, due to the nature of infrastructure upgrades and expansion, these improvements would not cause or contribute to these significant and unavoidable impacts.

It is not known if and when any improvements to off-site wastewater mains would be needed. RBC wastewater flows would continue to be monitored by LBNL/UC Berkeley and the City of Richmond to determine when off-site improvements are necessary. If improvements to the off-site wastewater mains are needed, their construction is not expected to result in significant environmental impacts. Due to the nature of infrastructure projects (i.e., underground pipelines installed in existing right-of-way under City streets), potential impacts are expected to be less than significant or if potentially significant, mitigable to a less than significant level. If there are any costs incurred by the City of Richmond associated with the provision of wastewater facilities to serve the campus, the University would comply as authorized under Government Code Section 54999.

Therefore the environmental impacts from the construction or expansion of wastewater conveyance facilities on- and off-campus would be less than significant.

Mitigation Measure: No mitigation measure is required.

Stormwater

LRDP Impact UTL-6: Development under the 2014 LRDP would require the construction of new or expanded stormwater drainage facilities. The construction of new or expanded stormwater drainage facilities would not result in significant environmental effects. (*Less than Significant*)

2014 LRDP campus development would result in the construction of 5.4 million gsf of building space and parking structures. Because much of the new construction and development would take place on currently disturbed and developed surfaces, impervious surfaces on the campus would not increase substantially over existing conditions. As discussed in Chapter 2, RBC site surface area is currently about 42 percent impervious and 58 percent pervious. With full 2014 LRDP development, the RBC would likely comprise about 43 percent impervious and 57 percent pervious surfaces. The increase in impervious surfaces would be relatively small (about 3 acres). Reductions in stormwater runoff would be achieved through the incorporation of LID design techniques consistent with NPDES requirements, the UC Sustainable Practices Policy, and LRDP goals that the site model sustainability.

The State Water Resources Control Board would require a project Construction General Permit to minimize erosion and sediment runoff as well as to prohibit the discharge of any pollutants in storm water runoff through the use of BMPs. The Construction General Permit applies to construction projects disturbing 1 or more acres; it requires all such dischargers to develop and implement a SWPPP. The SWPPP specifies BMPs to prevent construction pollutants from contacting stormwater, control off-site delivery of sediment and other construction-related pollutants, eliminate or reduce non-stormwater discharges to storm sewer systems and other jurisdictional waters, and inspect and monitor the success of all BMPs.

EISA Section 438 poses new requirements for stormwater runoff reduction for federally funded development projects. There are a variety of stormwater management design practices that can be used to meet the requirements including rain gardens, porous pavements, vegetated swales, and bioswales.

Future RBC site runoff is expected to decrease due to the LID and the sustainable design of the new campus. As portions of the RBC site are developed or redeveloped, new on-site stormwater drainage systems would be constructed. On-site stormwater drainage patterns would remain largely

unchanged: the RFS portion would continue draining to Meeker Slough and the Regatta portion would continue draining into the City storm drain system. The potential environmental effects associated with constructing new on-site stormwater drainage systems are evaluated in Sections 4.1 through 4.13. As indicated by the analysis in these sections, the impacts will be less than significant or will be reduced to less than significant with mitigation. Although the analysis in LRDP Impact CR-3 in Section 4.4, Cultural Resources, concludes a significant and unavoidable impact, the future storm drain systems would not require demolition of a historic building. While there would be other significant and unavoidable impacts of LRDP development related to operational criteria pollutant and toxic air contaminant emissions, operational GHG emissions, and traffic, due to the nature of storm drain systems, these improvements would not cause or contribute to these significant and unavoidable impacts. The NPDES permit for construction requires that stormwater runoff be the same or less than runoff under existing conditions. No changes to off-site storm drain systems are anticipated because the campus drainage patterns and volumes would remain substantially unchanged. Therefore, the environmental impacts from on-site stormwater drainage facilities construction would be less than significant.

Mitigation Measure: No mitigation measure is required.

Solid Waste

LRDP Impact UTL-7: Development under the 2014 LRDP would generate solid waste, but not enough to require new or expanded permitted landfill capacity. (*Less than Significant*)

Construction and Demolition

The 2014 LRDP campus would generate construction and demolition waste and debris as long as new development and renovation were to continue. The waste would be disposed of at the primary regional landfill serving the site, Potrero Hills Landfill. Additional landfills listed in Table 4.14-1, are also used by the WCCIWMA to dispose of waste. The Potrero Hills Landfill has a permitted daily intake limit—the maximum amount of waste that can be accepted at the landfill in one day—of 4,330 tons.

As reported in Chapter 2, demolition waste is estimated to be approximately 125 pounds per square foot of demolition. Construction waste is estimated at approximately 3.9 pounds per square foot of construction (EPA 1998). Without taking into account recycling, demolition of 750,000 square feet of existing buildings and construction of 5.1 million square feet of buildings on the RBC site would result in 56,825 tons of construction and demolition debris over the approximately 40 year planning period. Table 4.14-3 shows that amount of demolition and construction waste averaged over the 40 year planning period; it also shows the estimated peak debris amount that could be produced in any one year. Using these numbers, the average daily construction/demolition disposal requirement is estimated to be 5.5 tons. During a peak year of construction and demolition, the average daily volume is estimated to be 72.9 tons. These daily volumes were compared to the Potrero Hills Landfill's permitted daily intake limit of 4,330 tons. The comparison shows that campus demolition and construction waste requiring landfill disposal would represent between 0.12 and 1.7 percent of the permitted daily intake limit at the Potrero Hills Landfill. As needed, other landfills would be used to dispose of waste that would reduce the impact on the Potrero Hills Landfill.

Table 4.14-3
Demolition and Construction Waste Generated by the 2014 LRDP

Type of Activity	Anticipated Site-wide Average Annual Waste	Anticipated Site-wide Average Daily Waste[a]	Percent of Total Permitted Daily Intake[b]	Anticipated Peak Waste in One Year	Anticipated Peak Waste in Per Day[a]	Percent of Total Permitted Daily Intake[b]
Demolition (125 lbs/sf)	1,172 tons	4.5 tons	0.1%	15,625 tons	60.1 tons	1.4%
Construction (3.9 lbs/sf)	249 tons	1.0 ton	0.02%	3,315 tons	12.8 tons	0.3%
Total	**1,421 tons**	**5.5 tons**	**0.12%**	**18,940 tons**	**72.9 tons**	**1.7%**

Notes:
a Assuming waste is produced during the workweek only, 260 days a year.
b Assuming the Potrero Hills Landfill is open to receive waste only during weekdays, 260 days a year.
lbs/sf Pounds per square foot

Based on current UC Sustainability Practices Policy, a minimum of 75 percent of the construction waste would be diverted. The analysis above describes the worst case scenario of debris produced and transported to the landfill. Therefore, substantially less waste debris would be generated by RBC site construction and demolition.

As campus development construction and demolition debris would not result in an exceedance of the Potrero Hills Landfill's daily intake limit, construction related impacts to solid waste facilities would be less than significant. Implementation of LRDP ENVIRONMENTAL PROTECTION PRACTICE UTL-7 would further reduce this impact.

Operation

2014 LRDP development would increase RBC site population up to an additional 9,700 people who would operate and maintain the campus. This activity level would generate up to 21.3 tons of waste per day,[37] or 7,775 tons per year (CalRecycle 2012b). As the campus would comply with the UC Sustainable Practices Policy that requires UC facilities to attain a goal of 75 percent diversion by 2012 and a zero waste goal by 2020, the waste volume requiring landfill disposal would be considerably less than that estimated amount.

The Potrero Hills Landfill has a permitted daily intake limit of 4,330 tons. The increased RBC waste volume is projected to be less than 0.5 percent of the permitted daily intake limit. The WCCIWMA does deliver waste as needed to other landfills, listed in Table 4.14-1, which would further reduce the impact to any single landfill. Daily RBC waste volumes would not require expansion of regional landfills. Therefore, the 2014 LRDP development impact on regional landfills would be less than significant.

LRDP ENVIRONMENTAL PROTECTION PRACTICE UTL-7:

LBNL and UC Berkeley shall develop and implement a plan to maximize diversion of construction and demolition materials from landfill disposal. The plan would set a goal of a minimum of 75 percent diversion, consistent with the UC Sustainable Practices Policy.

[37] Based on the waste generation rate of 0.8 tons/employee/year from CalRecycle for "Services – Education."

LRDP Impact UTL-8: Development under the 2014 LRDP would comply with all applicable federal, State, and local statutes and regulations related to solid waste. (*Less than Significant*)

The University of California is not subject to AB 939. However, the University does reduce the amount of waste materials sent to landfills to the greatest extent possible. The RBC would comply with UC Sustainable Practices Policy that requires all University operations to prioritize waste reduction in the following order: reduce, reuse, then recycle. The University adopted a goal of zero waste by 2020. 2014 LRDP campus development would not violate any applicable state or federal statutes and would result in a less than significant impact.

Mitigation Measure: No mitigation measure is required.

Energy

LRDP Impact UTL-9: Development under the 2014 LRDP would require the construction of new or expanded electrical distribution facilities. The construction of new or expanded electrical distribution facilities would not result in significant environmental effects. (*Less than Significant*)

All RBC development would comply with the UC Sustainable Practices Policy. The Policy's green building goals stipulate that all new building projects, other than acute care facilities, shall be designed, constructed, and commissioned to outperform the CBC energy-efficiency standards by at least 20 percent; that all new buildings (except acute care facilities) will achieve at minimum a LEED Gold certification; and that the University will design, construct, and commission new laboratory buildings to achieve a minimum of LEED Gold certification and meet at least the prerequisites of the Labs21 EPC. All of these measures would minimize RBC site energy use.

Full campus development under the 2014 LRDP would result in a peak power demand of about 25 MW and would consume approximately 142,400 MWh annually, as shown in Table 4.14-2. The net electricity demand, factoring in the current energy use of the existing facilities on the RFS site, would be 138,700 MWh per year. Campus development would require on-site construction of 115 kv lines and a 115:12 kv substation that would supply a 12 kv distribution system. The substation would be built near the junction of Regatta Boulevard and 34th Street. The underground distribution system would include ductbanks, manholes, sectionalizing switches, and additional safety equipment generally in defined utility corridors. Each new facility would include transformers, switchgear, and a standby electrical generator with required capacity.

The potential environmental effects associated with upgrading and expanding the RBC site electrical power infrastructure are evaluated in Sections 4.1 through 4.13. As indicated by the analysis in these sections, the impacts will be less than significant or will be reduced to less than significant with mitigation. Although the analysis in LRDP Impact CR-3 in Section 4.4, Cultural Resources, concludes a significant and unavoidable impact, the future electrical power infrastructure development would not require demolition of a historic building. While there would be other significant and unavoidable impacts of LRDP development related to operational criteria pollutant and toxic air contaminant emissions, operational GHG emissions, and traffic, due to the nature of infrastructure upgrades and expansion, these improvements would not cause or contribute to these significant and unavoidable impacts.

No improvements to the off-site electrical infrastructure are anticipated. If improvements to off-site distribution lines are needed to serve the expanded campus, PG&E would evaluate the likely effects of these improvements and provide mitigation, as appropriate, for any significant environmental impacts.

Mitigation Measure: No mitigation measure is required.

LRDP Impact UTL-10: Development under the 2014 LRDP would require the construction of new or expanded natural gas distribution facilities. The construction of new or expanded natural gas distribution facilities would not result in significant environmental effects. (*Less than Significant*)

Campus development under the 2014 LRDP would result in a peak demand of about 240,300 kBtu/h and would annually consume approximately 6,600,000 therms of natural gas, as shown in Table 4.14-2. The net natural gas demand, factoring in the current energy use of the existing facilities on the RFS site, would be 6,526,400 therms/year. Natural gas would be provided to the campus by PG&E. To meet the demand, a new 8-inch gas pipeline would be installed in the eastern RBC site with three 5- or 6-inch laterals branching off of the main line to serve different clusters of facilities. A new 6-inch gas pipeline would be installed to serve development on the RBC's western portion. The underground distribution system would include piping, sectionalizing valves, and additional safety equipment generally in defined utility corridors. Each point of connection to PG&E would include new pressure reducers, meters, vaults, and safety equipment.

The potential environmental effects associated with upgrading and expanding the natural gas infrastructure are evaluated in Sections 4.1 through 4.13. As indicated by the analysis in these sections, the impacts will be less than significant or will be reduced to less than significant with mitigation. Although the analysis in LRDP Impact CR-3 in Section 4.4, Cultural Resources, concludes a significant and unavoidable impact, the future natural gas infrastructure development would not require demolition of a historic building. While there would be other significant and unavoidable impacts of LRDP development related to operational criteria pollutant and toxic air contaminant emissions, operational GHG emissions, and traffic, due to the nature of infrastructure upgrades and expansion, the impacts would not be significant and unavoidable.

No improvements to the off-site natural gas infrastructure are anticipated. If improvements to off-site distribution lines are needed to serve the expanded campus, PG&E would evaluate environmental impacts and, if appropriate, identify or provide any needed mitigation.

Mitigation Measure: No mitigation measure is required.

LRDP Impact UTL-11: Development under the 2014 LRDP would not result in the wasteful, inefficient, or unnecessary energy use. (*Less than Significant*)

Campus development under the 2014 LRDP would meet or exceed sustainability goals, including UC Sustainable Practices policies regarding green building, clean energy, and sustainable operations. The construction and renovation of facilities, and their operation and maintenance, would incorporate energy-efficient practices to reduce electricity and natural gas demand where possible. Any facility, such as a laboratory or data center, not required to meet code requirements for energy consumption would be designed to meet specific energy and carbon performance metrics, such as those defined by the Labs21. Laboratories for the 21st Century (Labs21) is a

voluntary partnership program cosponsored by EPA and DOE. LBNL is not required to participate in the Labs21 but could use the guidance to improve energy efficiency and environmental performance. RBC facility construction and operation would ensure that electricity and natural gas is used efficiently, so campus development under the 2014 LRDP would not result in the wasteful, inefficient, or unnecessary use of energy.

Mitigation Measure: No mitigation measure is required.

Cumulative Impacts and Mitigation Measures

Cumulative Impact UTL-1: Development under the 2014 LRDP, in conjunction with other regional growth, could increase the demand for utilities, service systems, and energy, the construction of which may result in significant environmental impacts. (*Potentially Significant; Less than Significant with Mitigation*)

As discussed above, with mitigation, campus development under the 2014 LRDP would not result in significant impacts on utilities and service systems. However, RBC development, in conjunction with reasonably foreseeable development in the City of Richmond and in nearby communities, could result in significant increases in demand for utilities and energy. The potential for significant cumulative impacts on utilities is discussed below.

Water Supply

EBMUD has indicated that the project site and its associated water demand are accounted for in the 2010 Urban Water Management Plan cumulative demand projections through 2040. Therefore, cumulative development, including the proposed project, would not result in the need for new, currently unplanned water supply facilities. There would be no significant environmental impacts from the development of new water supply facilities.

Wastewater

As analyzed above under the LRDP Impact UTL-4 analysis, the RSMD WWTP has enough wastewater treatment capacity to accommodate current and future dry weather flows, including under RBC development conditions. Wastewater service is provided on a first-come first-serve basis. During the 40-year campus development period, some of the available WWTP dry weather capacity may be taken up by other future development in the area. The proposed LRDP includes sustainability goals to minimize RBC water demand and wastewater; this would minimize the project's contribution to cumulative impacts. As a result of cumulative growth including the RBC project, some utility system improvements—especially to wastewater treatment capacity—could be necessary. The Richmond General Plan 2030 identifies the need for increased wastewater capacity by 2040 to accommodate projected dry weather wastewater flows. This would be addressed by constructing new wastewater facilities or expanding existing facilities. The Richmond General Plan EIR notes that because the specific nature of the needed improvements is not currently known, the types and significance of environmental impacts from WWTP improvements cannot be determined, so it conservatively finds that the impact would be significant and unavoidable.

In addition, as discussed for LRDP Impact UTL-4, due to I&I, wet weather flows exceed the WWTP's current wet weather treatment capacity. Because the campus would develop new on-site wastewater conveyance systems, it would not create new sources of I&I intrusion. However, project wastewater could contribute to WWTP capacity exceedances when added to regional, I&I-influenced wet weather flows and could contribute to localized sewer main overflows caused by I&I. To address this existing problem, the City of Richmond/Veolia Collection Systems

Master Plan has identified capacity improvement projects that would install larger diameter pipelines, parallel relief sewers, and wet weather storage. The cumulative impact related to sewer overflows into the harbor or in city streets is anticipated to be resolved by the City's actions of constructing wet weather storage facilities as well as making other improvements such as slip lining existing sewers and constructing relief sewers. When proposing future WWTP improvements or improvements to sewer mains and relief sewers, the City would presumably evaluate such projects for environmental impacts and mitigate as appropriate for potentially significant impacts. To the extent that the RBC would contribute to these impacts, pursuant to LRDP CUM MM UTL-1, the University would contribute its proportional share of the cost of environmental mitigation. Therefore, with mitigation, the contribution of the proposed LRDP to the cumulative impact related to wastewater treatment capacity improvements or improvements to sewer mains and relief sewers would not be cumulatively considerable.

Although CEQA does not consider a proposed project's fiscal impacts, Government Code Section 54999 authorizes public utilities to charge the University a limited capital facilities fee under certain circumstances (i.e., a non-discriminatory charge to defray the proportional cost of that public utility improvement directly benefiting the University). If the City incurs costs associated with wastewater facility improvements to serve the RBC, the University would defray appropriate costs as required by Section 54999. Capital facilities fees would compensate the utility provider for utility system improvement costs.

Energy

The proposed project, in conjunction with other foreseeable development in the surrounding area, would cumulatively contribute to electricity and natural gas demand increases. New development would occur in a largely built-out urban area served by existing utilities and service systems. These cumulative increases in demand would be individually addressed through appropriate CEQA review and by service provider assessments prior to new specific development approvals. The incremental 2014 LRDP increases in electricity and natural gas demand would not be substantial relative to overall service area demand; furthermore, existing utility delivery systems are expected to handle proposed RBC growth.

This far in advance, it is speculative whether cumulative development would trigger construction of new electricity generation facilities. Neither can any new generation facilities nor their potential environmental construction and operational impacts be known at this time. Before any new production and transmission facilities are approved for development, PG&E would analyze construction and operations and mitigate as appropriate any potentially significant impacts. Therefore, the cumulative electricity production and transmission facilities impact is not considered further in this Draft EIR. The 2014 LRDP includes sustainability goals to substantially minimize the Campus's energy use. The extensive programs focused on demand reduction would further minimize the project's cumulative impacts contribution.

Solid Waste

Cumulative City of Richmond development would produce additional quantities of solid waste, depending on net increases in population, building space, use intensity, and construction and demolition debris. This development would contribute to regional solid waste disposal and landfill capacity demands. There are 15 landfills available to serve the area, listed in Table 4.14-1, with a remaining aggregate capacity of 352,407,341 cubic yards.

The 2014 LRDP campus operations would generate an estimated 7,775 tons of solid waste per year. For the early years of campus development, about 75 percent of that solid waste would be recycled; with increased waste diversion in later years, that recycling percentage would grow. Considering the existing capacity in the disposal and recycling system and the extent of campus

efforts to decrease solid waste generation, the project contribution to this impact would not be cumulatively considerable.

Through City and private sector efforts, numerous source reduction, recycling, composting, and reuse programs have been implemented in the City of Richmond. These programs have increased waste diversion in City government and in the residential and commercial/industrial sectors. The City is currently diverting 50 percent of its solid waste. Given the City's record up to now, cumulative development in the City of Richmond would not hamper the City's ability to reach its waste diversion goals. The RBC would achieve a minimum 75 percent diversion rate with incorporation of solid waste diversion into campus practices. As all municipal jurisdictions are expected to meet the state-mandated diversion requirements and because the RBC would voluntarily reduce its solid waste for landfill disposal, there would not be a cumulative impact.

LRDP CUM MM UTL-1: The University will pay its proportional share of the environmental mitigation measures costs associated with required wastewater service improvements.

4.14.5 References

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