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.

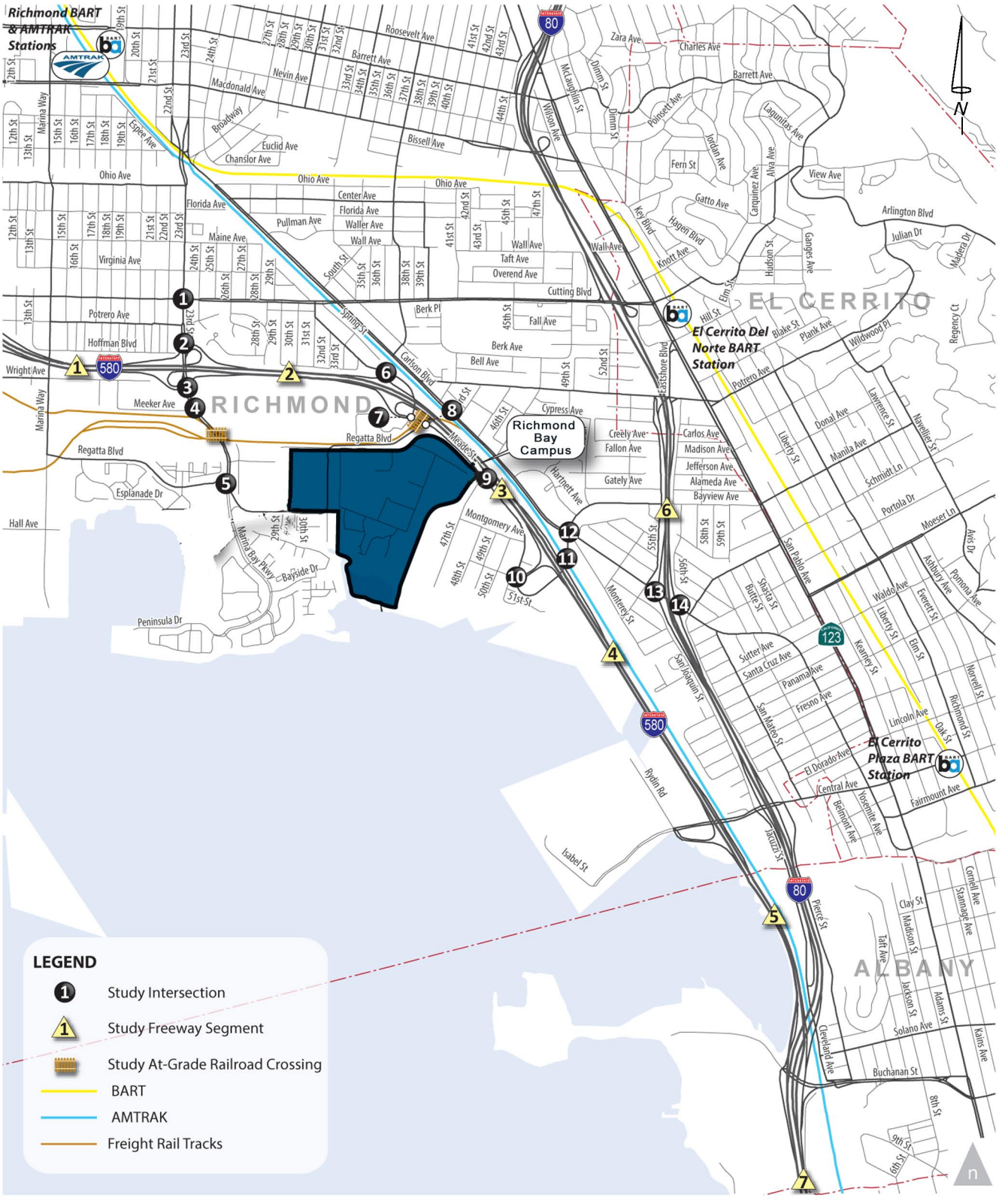
Public and agency NOP comments related to transportation and traffic are summarized below:

- 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.



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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 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 path adjacent to the east-west railroad tracks connecting Meade Street at Seaver Street to Regatta Boulevard.
- Class 1 path along South 46th Street connecting the Bay Trail and Meade Street.
- Class 1 spur along South 46th Street with staging area providing access to the Bay Trail between Point Isabel and Marina Bay.
- Class 1 path inland of Stege Marsh on the RBC site connecting South 46th Street with the planned Bay Trail staging area at the end of South 32nd Street and the existing Class 1 Meeker Tidal Creek Trail.
- Class 1 spur at the end of South 32nd Street with a trail bridge over Meeker Tidal Creek providing access to the Bay Trail between Point Isabel and Marina Bay, as well as Marina Bay Parkway.
- 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 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.

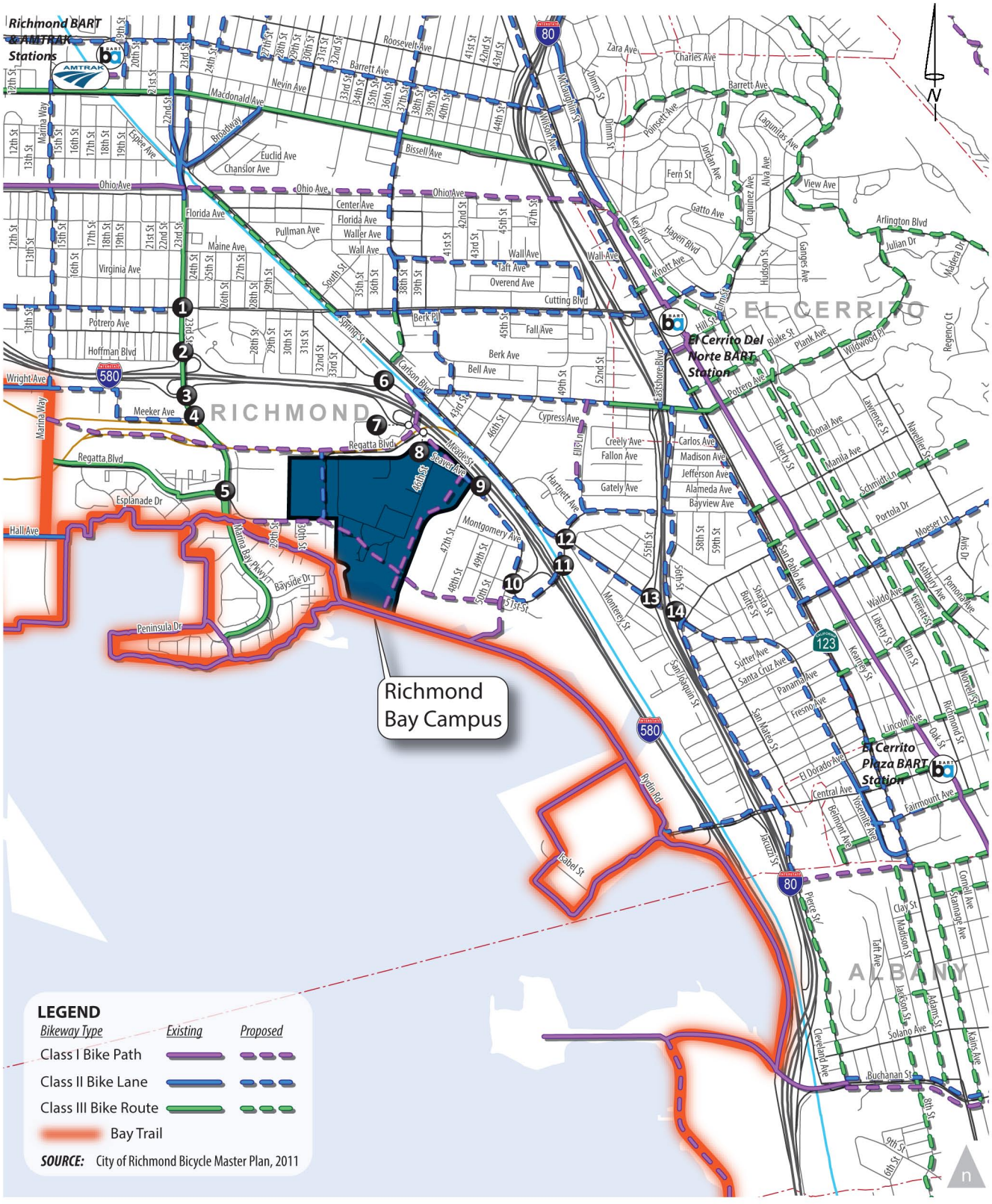
Intersection Operations

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.



Existing and Future Bicycle Network

Richmond, California

TETRA TECH

Figure 4-12

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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

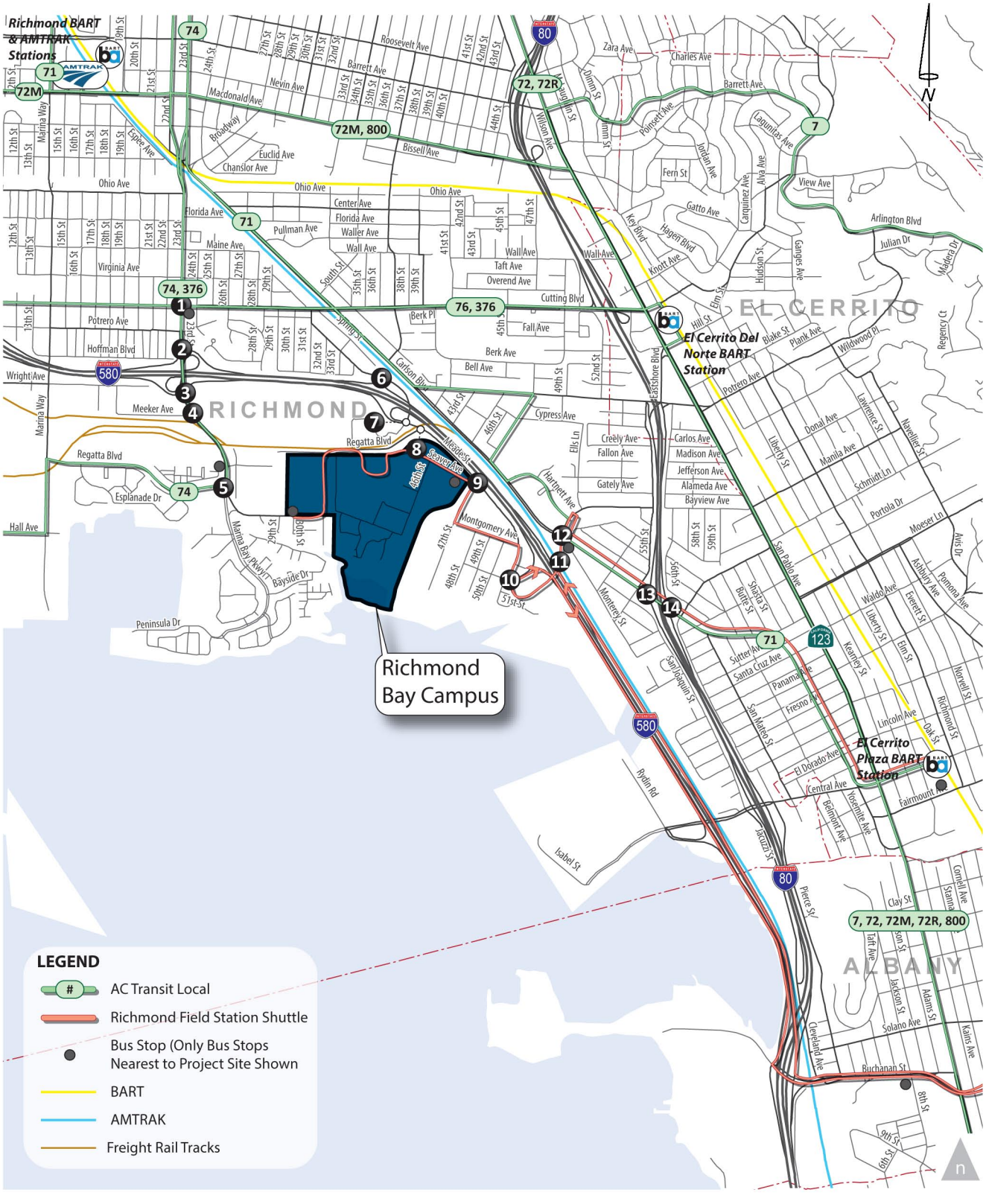
Local bus service in Richmond is provided by AC Transit. Figure 4-13 shows the existing AC Transit routes near the RBC. Table 4.13-5 describes the service provided on these routes and the stops nearest to the RBC site.

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.



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Existing Transit Service

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 South 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 CR1.5 – Safe and Convenient Walking and Bicycling.** Promote walking and bicycling as a safe and convenient mode of transportation. Improve pedestrian and bicycle amenities to serve the recreation and travel needs of residents and visitors in all parts of Richmond. Where feasible, the City will connect major destinations such as parks, open spaces, civic facilities, employment centers, retail and recreation areas with pedestrian and bicycle infrastructure; promote shared roadways in residential streets; require new development and redevelopment projects to provide pedestrian and bicycle amenities, streetscape improvements, and linkages to planned and completed City and regional multi-use trails; and develop safe routes to schools and out-of-school programs that allow access by bicycle and pedestrian paths or reliable and safe transit.

  Explore innovative solutions such as bicycle-sharing programs and encourage businesses, schools, and residential developments to provide secure bicycle parking to ensure that these ecologically-friendly, low-impact transportation modes are available to all community members, thereby reducing emissions from vehicles within the City, improving environmental quality, and enhancing mobility and connectivity.

- **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.

- **Action CR1.D – Bicycle, Pedestrian, and Trail Standards.** Develop standards for bicycle, pedestrian, and trail improvements and amenities in new development and redevelopment projects. Include requirements for adequate, safe, and accessible bicycle parking, drinking fountains, public restrooms, benches, landscaping and lighting. Require new development and redevelopment projects to be pedestrian and bicycle friendly, and to provide adequate connections to the existing and proposed bicycle and pedestrian network.

  Require all new commercial, industrial, and residential developments to provide access for construction and operation of a trail where a local or regional trail is designated or planned. Include provisions that require owners of property along the shoreline to provide maximum feasible public access to the shoreline and to complete the Bay Trail as part of any project approval process.

- **Action CR1.E – Trails and Greenway Program.** Expand multi-use trails and greenways in the City. Provide connector trails and linkages to improve access from neighborhoods in Central Richmond to the regional open space in the hills and along the shoreline. Address barriers such as freeways, the Richmond Parkway, and railroad tracks that limit shoreline access. Provide interpretive signs, maps, brochures, and signage along the trails to enhance the experience of users and to provide information on the City's cultural and historical assets. Create a Class 1 multi-use trail loop north of Meeker Tidal Creek and Stege Marsh as a transportation and scenic route. Also provide trailhead staging areas at the south end of 32nd and 46th Streets with bridges across Meeker Tidal Creek and the unnamed creek east of South 32nd Street.

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 CR2.1 – 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 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 Conservation and Natural Resources Element (Element 7) identifies goals and policies for promoting public access and circulation with respect to open space planning efforts. The goals and policies relevant to the 2014 LRDP are:

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

- **Policy CN2.2 – Richmond Shoreline. Conserve, protect, and enhance natural and cultural resources along the Richmond shoreline.** Promote a balance of uses along the shoreline that supports multiple community needs such as economic development, recreation, historic preservation, and natural resource protection.
- **Action CN2.H – Specific Actions for the Point Isabel Area.** Initiate and carry through coordinated planning to provide public access at points along Richmond's southern shoreline, from Point Isabel to and including the Marina Bay. Require the dedication of trailheads at the ends of South 46th and South 32nd Streets as part of any plans to redevelop the lands adjacent to the existing Richmond Field Station.

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

Standard CEQA practice typically includes assessing transportation and traffic impacts against baseline existing conditions for intersections and roadway segments. Based on the date of the Notice of Preparation, the general baseline for the RBC development is January 2013. Because development under the 2014 LRDP is anticipated to occur through 2050, those existing conditions do not represent a realistic baseline for the anticipated transportation and traffic impacts. The more appropriate baseline for analyzing these impacts is 2035, the furthest year for which the Countywide Travel Demand Model provides projections. For this reason, the analysis that follows includes both a comparison to existing conditions (LRDP Impacts TRA-2 and TRA-4) as well as to 2035 conditions (LRDP Impacts TRA-1 and TRA-3). However, because the impact analysis under 2035 conditions represents a more realistic condition, the University is using the findings under LRDP Impacts TRA-1 and TRA-3 as the basis for its mitigation commitments.

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

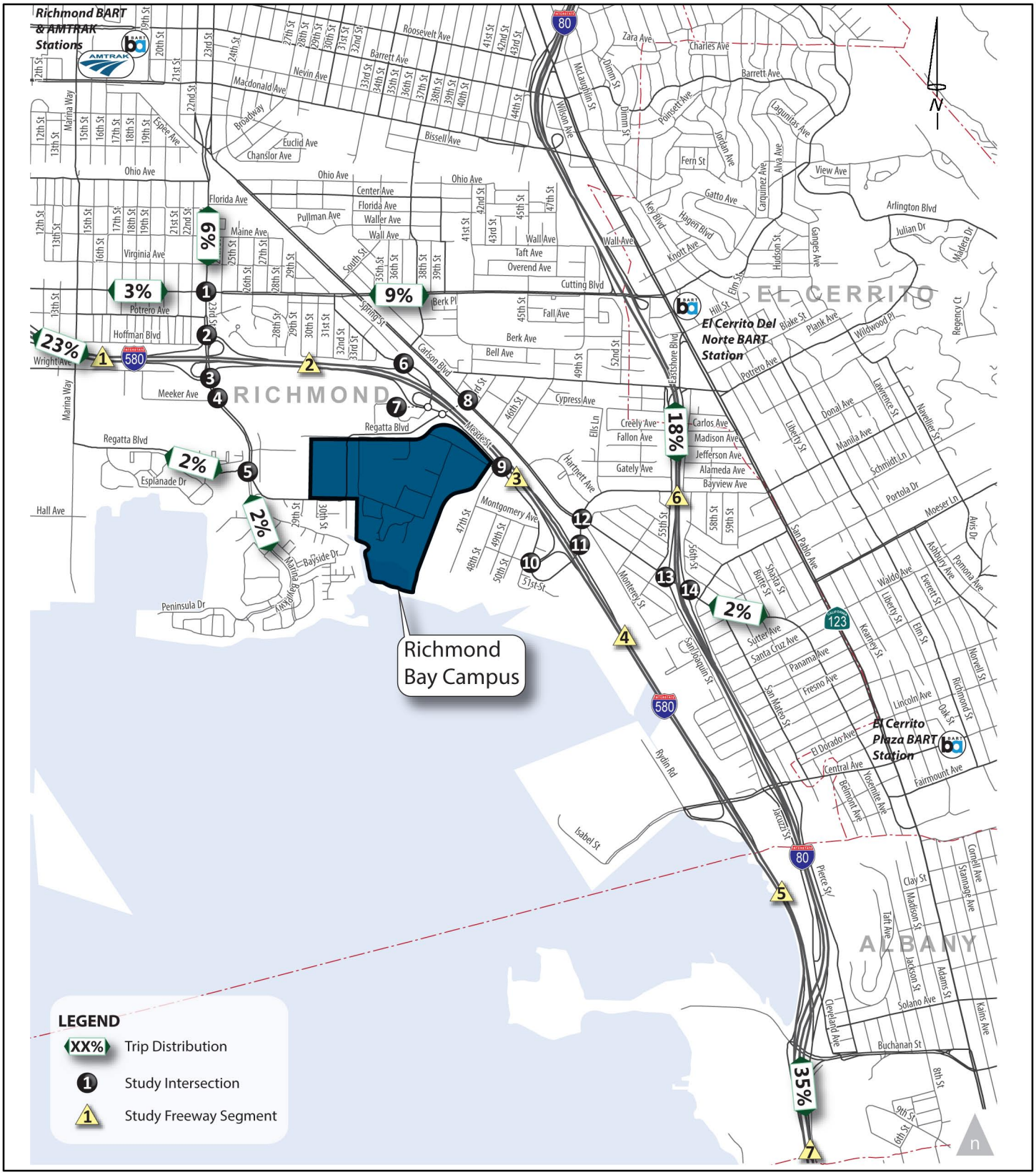
The trip distribution is based on a select-zone assignment using the Contra Costa Countywide Travel Demand Model. Figure 4-14 shows the resulting trip distribution that was used to distribute the traffic from the full development of the RBC.

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.



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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.

Transportation Demand Management (TDM). 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 will 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. The University shall report on implementation of adopted TDM strategies, whether defined in the LRDP or in a stand-alone TDM program, annually following completion of an initial traffic-inducing project under the RBC LRDP.

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 no less frequently than every 5 years to determine campus-generated traffic. The University may undertake such traffic counts in connection with specific development projects at the RBC in order to inform signal warrant analyses and to help guide the selection of improvements that would mitigate significant traffic impacts.

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 improvements to signalized and unsignalized intersections, roadway segments, and in connection with railroad crossings that are necessary to mitigate the RBC's significant traffic impacts. Those improvements may include, but are not limited to, new traffic signals, conversion of intersection approaches, conversion or optimization of traffic signal operations, and advance queue warning signs. The University's contribution, which shall be

proportional to the University's responsibility for any traffic increases that necessitate mitigation, shall include funds for the design and construction of required improvements. When determining the University's contribution, the University's proportional responsibility for traffic impacts shall be measured through comparison to the traffic conditions that prevailed at the time of the LRDP's approval, as described and analyzed in the LRDP EIR's discussion of existing traffic conditions.

With respect to unsignalized intersections specifically, the University shall contribute funding on a fair-share basis—following University approval of traffic-inducing development at the RBC—for signal warrant analyses at unsignalized intersections significantly impacted by traffic resulting from the approved development. Data from the University's campus traffic impact monitoring counts, described above, may inform the signal warrant analyses. Those analyses would be used by the City to determine when a signal is needed.

When 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 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. Because the impact analysis under 2035 conditions represents a more realistic condition, the University is using the findings under LRDP Impact TRA-1 as the basis for its mitigation commitments regarding the study intersections.

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.

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.

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.

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. If the City or Caltrans were to make improvements to the affected facilities, the University's implementation of LRDP MM TRA-2 would reduce the project's impact to a less than significant level at all intersections.

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.

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.

LRDP MM TRA-3: Implement LRDP MM TRA-1. No freeway capacity projects are currently planned by Caltrans for this section of I-580. As the feasibility of freeway widening is not known, this impact is considered to be significant and unavoidable.

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.

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. Because the impact analysis under 2035 conditions represents a more realistic condition, the University is using the findings under LRDP Impact TRA-3 as the basis for its mitigation commitments regarding CMP facilities (freeways).

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.

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.

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.

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

Alameda-Contra Costa Transit District. 2013. Maps and Schedules. Internet website: http://www.actransit.org/maps/

Alameda County Transportation Commission. 2011. Congestion Management Program 2011, December 2011.

BART (Bay Area Rapid Transit). 2013. Monthly Ridership Report, January 2013. Internet website:,www.bart.gov/about/reports/ridership.aspx. Accessed January 2013.

California Department of Transportation (Caltrans). 2011. 2011 Traffic Volumes on California State Highways. Internet website:,www.traffic-counts.dot.ca.gov/2011all/index.html. Accessed January 2013.

Caltrans (California Department of Transportation). 2010. California Manual on Uniform Traffic Control Devices (MUTCD) for Streets and Highways, Part 4: Highway Traffic Signals, Chapter 4C: Traffic Control Signal Needs Studies, 2010.

City of Oakland. 1998. Envision Oakland, City of Oakland General Plan, Land Use and Transportation (LUTE) Element, as amended through March 24, 1998.

City of Richmond. 2011a, Bicycle Master Plan. October 2011.

City of Richmond. 2011b. Pedestrian Plan. October 2011.

City of Richmond. 2012. Shaping the New 100 Years, Richmond General Plan 2030, Circulation Element, adopted April 2012.

Contra Costa Transportation Authority. 2011. 2011 Contra Costa Congestion Management Program, adopted November 2011.

Contra Costa Transportation Authority. 2006. Technical Procedures Update, July 2006.

Federal Railroad Administration. 2013. Crossing Inventory and Accident Reports database. Internet website: www.safetydata.fra.dot.gov/Office of Safety/Default.aspx. Accessed January 2013.

Fehr and Peers, Inc. 2013. Richmond Bay Campus Long Range Development Plan Transportation Impact Analysis. May 2013.

Transportation Research Board. 2000. 2000 Highway Capacity Manual.

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