

5.0 ENVIRONMENTAL CONSEQUENCES

This section presents the environmental consequences from the implementation of the Proposed Action and each of the alternatives that is carried forth for detailed evaluation in this Environmental Assessment (EA). As explained in **Sections 2.0** and **3.0** of this EA, the U.S. Department of Energy's (DOE) purpose is to relocate and consolidate all Advanced Scientific Computing Research (ASCR) – funded and other related programs in one location that is on or near the Lawrence Berkeley National Laboratory (LBNL) site. This purpose can be attained by constructing a new building to house the programs or by leasing and/or renovating existing buildings to provide the necessary space. As explained in **Section 3.0**, the University of California (UC or the University) has proposed to construct a new building to house the relocated and consolidated programs on the LBNL site. The construction of the building under the Proposed Action is therefore a consequence of the DOE's proposed federal action. Similarly, the construction of the building at the Richmond Field Station (RFS) and the California Department of Health Services (DHS) alternative sites and the renovation of the leased building in Berkeley would be a consequence of the DOE's proposed federal action. This section of the EA evaluates not only the Proposed Action's direct effects (such as changes in traffic with the relocation of staff) but also the indirect effects from the construction and renovation activities that would be triggered by the federal action (such as the effects on cultural and biological resources from the construction of a new building).

As explained in **Section 3.0**, the University determined that the Computational Research and Theory (CRT) facility is an element of the growth projected under the 2006 Long Range Development Plan (LRDP) and, in compliance with the California Environmental Quality Act, (CEQA), the University evaluated the building project for its environmental impacts in an EIR (State Clearinghouse [SCH #] No. 2007072106) that was certified in 2008 (LBNL 2008). In conjunction with its approval of the proposed CRT building, the University adopted project-level measures that have already been incorporated into the design of the facility. The University also incorporated into the proposed building project relevant standard project features (SPFs) from the 2006 LRDP EIR that are incorporated into all LBNL projects. The full text of these SPFs that are a part of the CRT facility project is provided in **Appendix 1**, herein, and these SPFs are referred to in resource subsections of **Section 5.0**, herein. The analysis presented below evaluates environmental impacts that would result from project implementation following the application of these SPFs. These SPFs are also applicable to and made part of Alternative 1 (Cafeteria parking lot site). Similarly, construction of the CRT facility at the former DHS site (Alternative 3) would be subject to the UC Berkeley 2020 LRDP. For these three alternatives, environmental consequences are evaluated below, as they would result following the implementation of the pertinent SPFs. With respect to Alternative 2 (RFS site) and Alternative 4 (leased facility on San Pablo Avenue), although not binding

on these two sites, LBNL SPF's would be adopted voluntarily for these two sites and applied by the University.

5.1 GEOLOGY AND SOILS

5.1.1 Proposed Action

Seismicity and Faults

As noted in **subsection 4.2.1**, the Proposed Action site is located within the Earthquake Fault Zone defined for the Hayward fault by the State of California pursuant to the Alquist-Priolo Earthquake Fault Zoning Act. However, a fault investigation did not identify any active fault traces at the CRT building site (Kleinfelder 2006, 2008, and 2009). As the Proposed Action site is not underlain with any active faults, there would be no potential for effects from fault rupture at the site.

In compliance with California Geological Survey (CGS) Special Publication 117 (Guidelines for Evaluating and Mitigating Seismic Hazards) and LBNL's "Force Design Criteria RD3.22," the CRT facility has been designed to resist seismic loading. The design ground motions shall have no more than a 2 percent chance of being exceeded within a 50-year period. In addition, the University has established and would implement, as part of the project, a process for the design of new buildings that applies the best available engineering technologies to maximize safety and resiliency. Under this process, the facility design would be evaluated by UC LBNL to ensure that it complies with the provisions of California Code of Regulations (CCR) Title 24, California Building Standards Code, or local seismic requirements, whichever requirements are more stringent.¹ Although conformance to the highest seismic provisions does not constitute a guarantee that structural damage would not occur in the event of a maximum credible earthquake, it is reasonable to expect that structures built in compliance with the seismic requirements would not collapse or cause loss of life in a major earthquake.

The facility under the Proposed Action would also include provisions for adequate anchorage for seismic resistance of nonstructural building elements (including, but not limited to, glass, fixtures, furnishings, and other contents, equipment, material storage facilities, and utilities [gas, high-temperature water, steam, fire protection water, etc.]) which would minimize potential hazards to persons in the event of seismic events. In order to reduce the risk of injury during seismic events, employees at LBNL are trained regularly so that they are prepared to respond to an emergency. In addition, the LBNL job hazards questionnaire recommends that new employees take a 1.5-hour earthquake/wildland fire safety course to teach employees how to take the appropriate actions to protect themselves from the harmful effects of a

¹ See <http://www.ucop.edu/facil/fmc/facilman/volume1/rpsafety.html> for more details.

major earthquake (or wildland fire) in the San Francisco Bay Area (Bay Area). This includes education of all UC building occupants (LBNL 2008). Response equipment for use by LBNL employees would be maintained on the Proposed Action site, and fire and police services are located in the vicinity of Proposed Action site.

The LBNL Master Emergency Program Plan (LBNL 2005) outlines the procedure for assessing damages to buildings and infrastructure following large seismic events. Following major earthquakes, the LBNL Damage Assessment Team, composed of engineers and the Department of Environmental Health and Safety (EH&S) safety specialists, will inspect buildings for structural and other infrastructure damage.

Liquefaction, Landslides, Erosion, and Soil Instability

The Proposed Action site is not located in an area underlain by liquefiable soils, as shown in **Figure 5.0-1, Seismic Hazard Zone Map**. Therefore, there would be no effects from liquefaction at the site. The Proposed Action site is located in a CGS-defined seismic landslide hazard area, and shallow landslide deposits have been identified at the project site, including a shallow landslide (less than 8 feet deep)² that underlies a portion of the building site. The site-specific geotechnical investigation recommended that the proposed structure be supported by a combination of spread footings directly on bedrock and piers drilled at least 10 feet into the underlying bedrock. These recommendations have been included in the facility design (Kleinfelder 2007). In addition, as noted in the description of the Proposed Action, the landslide underlying the building site would be removed and replaced with engineered fill as part of the Proposed Action before the building is constructed. A seismic slope stability investigation conducted at the project site in accordance with CGS SP 117 concluded that there is a low probability of earthquake-induced slope failure within bedrock. Based on the data acquired and reviewed for this study, Kleinfelder found that from a geologic viewpoint, it is feasible to construct the proposed CRT building at the site. Kleinfelder's previous subsurface investigations and most recently published references indicate that there is a relatively low potential for seismically induced landslides to occur at the CRT site (Kleinfelder 2010).

Additional instability of underlying soil units may also be attributed to differential settlement, soil creep, or the triggering of localized slumps or landslides in response to grading at the site. The site-specific design will minimize differential settling and structural impacts due to hillslope soil creep, which would reduce the effects related to soil instability.

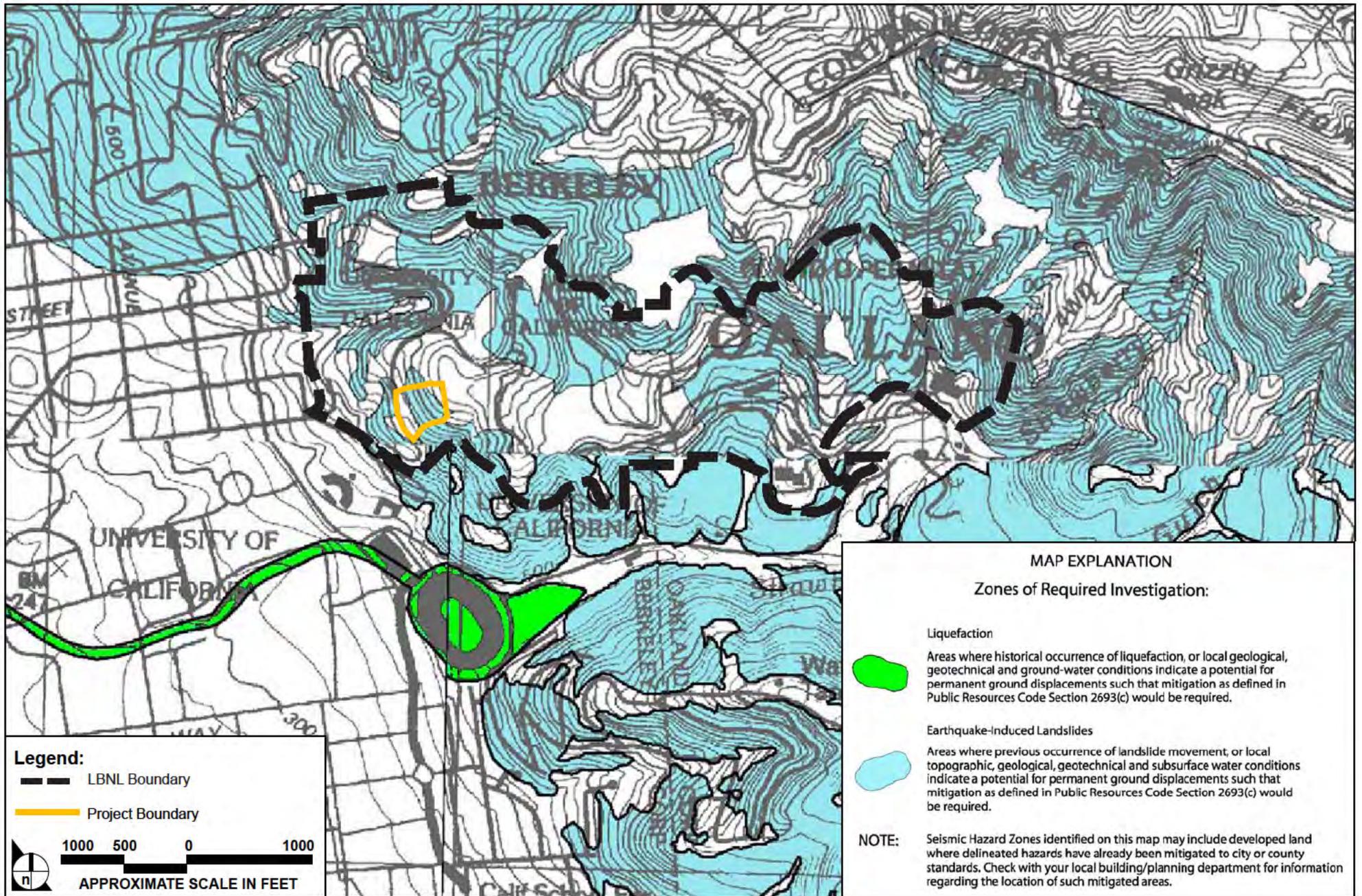
² Kleinfelder, Inc., 2009, Fault Investigation, Computation Research and Theory Building, Lawrence Berkeley National Laboratory, Berkeley, California, Revision No. 1, May 13, 2009, Consulting report prepared for LBNL, p. 10.

The building is proposed in an area of very steep slopes (an average slope of 2:1, horizontal to vertical), and therefore the site would be highly susceptible to erosion during construction. Furthermore, construction would involve substantial cuts and fills and earthmoving activities, which could result in erosion. Soil erosion can lead to increased turbidity in the receiving waters, sedimentation, and damage to aquatic habitats. Construction-related erosion would be controlled and reduced by implementation of control measures, including but not limited to the use of erosion control blankets and silt fences, covering of excavation piles, and storm drain inlet protection, in compliance with a project-specific Storm Water Pollution Prevention Plan (SWPPP) required under the Clean Water Act and UC LBNL standard contract specifications. Furthermore, in compliance with UC LBNL's standard contract specifications and LBNL SPFs GEO-3a and 3b, all disturbed areas would be revegetated with native plants following completion of the project. The environmental effects from erosion would be avoided by implementation of these required contract specifications and SPFs.

5.1.2 Alternative 1, Cafeteria Parking Lot Site

There is no potential for fault rupture at this site. Given the proximity of the Alternative 1 site to the Hayward fault, the potential for seismic shaking would be high. As with the Proposed Action, the new facility at this site would be required to comply with the provisions of CCR Title 24, California Building Standards Code, or local seismic requirements, whichever requirements are more stringent. The University would implement the same design process as described under the Proposed Action, which would require application of the best available engineering technologies to maximize safety and resiliency. Therefore, with respect to faults and seismic shaking, the alternative would be similar to the Proposed Action.

The potential for landslides and liquefaction at this site is low. As with the Proposed Action, the facility design would minimize indirect effects related to soil instability. Construction-related erosion would be controlled and reduced by implementation of control measures including but not limited to the use of erosion control blankets and silt fences, covering of excavation piles, and storm drain inlet protection, in compliance with a project-specific Storm Water Pollution Prevention Plan (SWPPP) required under the Clean Water Act and LBNL standard contract specifications. Furthermore, in compliance with LBNL's standard contract specifications and LBNL SPFs GEO-3a and 3b, all disturbed areas would be revegetated with native plants following completion of the project. The environmental effects from erosion would be avoided by implementation of these required contract specifications and SPFs.



SOURCE: California Department of Conservation, California Geologic Survey, 2003; LBNL 2006 Long Range Development Plan

FIGURE 5.0-1

Seismic Hazard Zone Map

5.1.3 Alternative 2, RFS Site

There are no faults present on or very near the RFS site and therefore there is no potential for fault rupture effects. Based on maps prepared by Association of Bay Area Governments, the RFS site has moderate to low liquefaction potential, and soil borings in the central portions of the RFS site indicate that the potential for liquefaction in the central portion is low (UC Berkeley 2003). Furthermore, the University would implement the same design process as described under the Proposed Action, which requires application of the best available engineering technologies to maximize safety and resiliency, and adherence to the requirements of the CBC. This process would minimize the risk to the CRT facility seismic ground shaking and liquefaction at the RFS. Because the RFS site is flat, the potential for landslide and soil instability effects is low.

5.1.4 Alternative 3, Former DHS Site

There are no faults present on the DHS site and therefore there is no potential for fault rupture effects. Due to the proximity to the Hayward fault, this site would also experience substantial ground shaking in the event of a large earthquake on the fault. The University would implement the same design process as described under the Proposed Action, which would require application of the best available engineering technologies to maximize safety and resiliency. Implementation of continuing campus best practices, including compliance with the UC Policy on Seismic Safety and incorporation of geotechnical recommendations that reduce hazards, would reduce risks to people and structures from ground-shaking hazards. The DHS site is not located in a liquefaction hazard zone or in an area of landslide risk or soil instability. Because the DHS site is flat and completely developed with a building and pavement, the potential for landslide, soil instability, and erosion effects is minimal. Erosion impacts would also be further reduced through compliance with a project-specific Storm Water Pollution Prevention Plan (SWPPP) required under the Clean Water Act, which would require measures such as storm drain inlet protection and covering of stockpiles.

5.1.5 Alternative 4, Leased Facility on San Pablo Avenue

The building proposed for lease was constructed by the Marchant Calculator Company in 1956 and has been improved since to comply with current building codes. Since the building is in a low liquefaction hazard zone, the risk for damage to the building and equipment as a result of seismic ground shaking would be low. Because the Alternative 4 site is flat and completely developed with a building and pavement, the potential for landslide, soil instability, and erosion effects is minimal.

5.1.6 **Alternative 5, No Action**

The existing OSF was constructed in 1964 and was constructed in accordance with the applicable building codes. The risk of potential damage to the building in response to a significant earthquake would be similar to the other alternatives. The potential for damage from liquefaction is low, according to the ABAG Liquefaction Susceptibility Map (ABAG 2009).

5.2 **WATER RESOURCES**

5.2.1 **Proposed Action**

Since the Proposed Action would not involve groundwater withdrawal, it would not result in any effects on groundwater supplies. Due to the steep slope and relatively clay-rich soils, the site is not an area of significant groundwater recharge under existing conditions, so the potential for the Proposed Action to interfere with groundwater recharge would be low. Furthermore, the Proposed Action would infiltrate storm water to the maximum extent practicable. Groundwater flow paths that do exist at the site are unlikely to be affected, as the building will extend a maximum of 25 feet below the ground surface, above the level at which groundwater is typically observed near the site.

Development under the Proposed Action would alter surface drainage patterns on the site and could result in increased peak flows and induce flooding in downstream reaches. Construction of impervious surfaces on areas currently occupied primarily by vegetated open space would, without appropriate controls, decrease stormwater infiltration at the site and result in increased peak flow and volume of flow in downstream receiving channels. These increases (often referred to as “hydromodification”) can, in turn, increase the frequency of erosive events in downstream channels. The effects are typically most prominent for the smaller rainfall events that occur more frequently on a yearly or decadal basis. However, all stormwater from newly created impervious areas at the Proposed Action site would be directed to storm drain systems that discharge to the North Fork of Strawberry Creek. Potential increases in Strawberry Creek flows for 10-, 25-, 50-, and 100-year storms would be controlled by the hydromodification vaults that are included in the project design. The vaults would release storm water at a rate no greater than storm water discharged under the pre-development conditions.

UC LBNL currently employs, and would continue to employ, a wide array of construction-phase storm water best management practices (BMPs) to minimize the potential for accidental discharges of fill or other materials into surface waters and to comply with NPDES requirements. Active management of construction-related stormwater flows from development sites is a part of LBNL standard contract specifications on all construction projects undertaken by UC LBNL. Construction projects incorporate control measures and are monitored to manage stormwater flows and potential discharge of pollutants.

With the development and implementation of a project-specific SWPPP (including a project-specific erosion control plan) as described above in **subsection 5.1.1** and the controls required by LBNL standard contract specifications, the potential for accidental discharge of pollutants to surface or groundwater during construction of the CRT facility would be minimized.

ABAG maps of tsunami danger indicate that the site is well outside any tsunami hazard zone. The site is also outside the 100-year flood plain and the area that is projected to be inundated due to a sea level rise associated with climate change. Given the topography and elevation of the site, the CRT facility would not be at risk of inundation from a creek, seiche, tsunami, mudflow, or sea level change.

5.2.2 Alternative 1, Cafeteria Parking Lot Site

Implementation of the CRT facility at the Alternative 1 site would result in substantially similar hydrology and water quality effects as the Proposed Action. Although the Alternative 1 site is already developed with impervious surfaces, and therefore the CRT facility would generate only a small increase in surface runoff at this site, hydromodification vaults would be constructed as part of the CRT facility to control peak flows and flooding. Compliance with LBNL construction-phase storm water BMPs and NPDES requirements would reduce effects related to erosion, sedimentation, and water quality.

ABAG maps of tsunami danger indicate that the site is well outside any tsunami hazard zone. The site is also outside the 100-year flood plain and the area that is projected to be inundated due to a sea level rise associated with climate change.

5.2.3 Alternative 2, RFS Site

The CRT facility site at RFS is currently undeveloped, and therefore the facility would add new impervious surfaces that would generate increased storm water runoff. Due to the site's location very near the San Francisco Bay, hydromodification effects of this increased runoff are not a concern for this site. Water quality could be affected by the runoff generated from the CRT parking lot. However, compliance with NPDES requirements would minimize water quality effects. Construction-phase water quality impacts would be addressed by the project-specific SWPPP that would be implemented in compliance with NPDES requirements.

The proposed facility would also result in increased impervious surfaces at the RFS site that could reduce groundwater recharge. However, given the proximity of the site to the bay, groundwater quality is affected by salt-water intrusion and is not used for water supply.

ABAG maps of tsunami danger show that only the marshland in the southern portion of RFS is in a tsunami inundation area (ABAG 2010). CRT construction at RFS, which is in the upland area, would not therefore place personnel at undue risk from tsunamis. In addition, according to the sea level rise map prepared by the San Francisco Bay Conservation and Development Commission (BCDC), the CRT site is not at risk from inundation due to sea level rise in the next century (BCDC 2008b).

5.2.4 Alternative 3, Former DHS Site

The DHS site is an infill site on flatlands. Because the site is already developed with impervious surfaces, the construction of the CRT facility at this site will not generate any new storm water. Construction-phase water quality effects would be addressed by the SWPPP that would be implemented in compliance with NPDES requirements.

ABAG maps of tsunami danger indicate that the site is well outside any tsunami hazard zone. In addition, according to the sea level rise map prepared by BCDC, the site is not at risk from inundation due to sea level rise in the next century (BCDC 2008a).

5.2.5 Alternative 4, Leased Facility on San Pablo Avenue

The construction of the additional floor, interior modifications, and installation of cooling equipment at the Alternative 4 site would not increase the overall impervious surfaces at the site because it would take place within the already impervious building footprint. Therefore, this alternative would not result in an increase in storm water runoff. According to the sea level rise map prepared by BCDC, the site is not vulnerable to inundation from sea level rise in the next century (BCDC 2008a).

5.2.6 Alternative 5, No Action

The use of the existing OSF would not result in environmental effects related to water resources. ABAG maps of tsunami danger and BCDC's map of projected sea level rise indicate that the site is well outside any tsunami or sea level rise hazard zone (BCDC 2008a).

5.3 HAZARDS, HUMAN HEALTH, AND ACCIDENTS

5.3.1 Proposed Action

Hazardous Materials

Construction workers would not be exposed to soil or groundwater contamination during excavation, as none is present at the site. Construction workers would be exposed to safety and health hazards

associated with use of heavy equipment and handling of hazardous substances used during construction, hazards that are typical of construction sites. Potential impacts to the health and safety of the workers would be minimized by adherence to applicable federal, state, and local regulations, Occupational Safety and Health Administration regulations, and general contractor safety plans. Electrical work would conform to applicable electrical and fire code requirements. No unusual construction site considerations are expected during construction, equipment installation, and maintenance of the proposed facility and associated infrastructure. Existing employees at the LBNL site and the general public would not be exposed to health and safety hazards during construction of the CRT facility.

The CRT facility operations would not involve the routine use, storage, or transport of hazardous materials. A non-chemical treatment system would be used to control scaling in the facility's cooling towers. The only hazardous materials on site would be battery acid from batteries used to provide backup power to operate the computers in the event of a power outage, and about 1,000 gallons of diesel. The diesel would be stored in two 500-gallon belly tanks, one for each emergency generator. The tanks would be required to have secondary containment and monitoring to comply with applicable federal and state regulations. Sealed batteries would be kept in a ventilated room on the lower mechanical level and would be collected and recycled at the end of their useful lives. Compliance with applicable federal, state, and local regulations would minimize exposure to hazards during operation. Safety precautions would include wearing the proper protective equipment when handling the batteries, air monitors, and double containment of the batteries.

As discussed in **subsection 3.1.10** of this EA, at the end of the new building's useful life, the building would be vacated and either demolished and the site restored to a hillside, or rebuilt to the applicable construction standards. If the building were demolished, utility systems would be shut off, any potential sources of environmental contamination inside the building would be removed, and the interior contents would be removed and recycled, all before demolition takes place. It is anticipated that there would be no hazardous or radioactive building waste material, conventional demolition methods would be used for demolition, and controls would be implemented to protect the workers and the environment. Prior to demolition of the building, an analysis would be conducted to verify whether environmental impacts would result from building demolition and to assess what level of further National Environmental Policy Act (NEPA) review, if any, would be appropriate. NERSC equipment that reaches the end of its useful life would be removed from the site by a licensed subcontractor and would be recycled as appropriate. Therefore, if the facility is demolished, it is anticipated that there would be minimal environmental impacts related to hazards and human health.

Emergency Response

The CRT facility would be designed to ensure that occupants can safely leave the building in case evacuation is necessary. The majority of the occupants of the CRT building would exit via the stairwells and bridge to the parking area outside Buildings 70 and the 50 complex. Occupants using the stairwell on the west face of the building would exit to the Building 50 stairs and would assemble in the parking lot of Building 88. Once occupants reached the assembly areas, the LBNL sitewide evacuation plan would be used. In the event that a fault rupture would cause the failure or blockage of Cyclotron Road, evacuees would be directed (and, if necessary, assisted) to evacuate on foot by way of the Building 50 stairs to the UC Berkeley campus.

Placement of the CRT facility at the Proposed Action site would not result in changes to evacuation routes of neighborhoods near the LBNL site. In the event of evacuation by vehicle, traffic control would be provided on Centennial Drive and Cyclotron Road, which are potential evacuation routes, by UC LBNL and UC Berkeley to ensure orderly evacuation of all persons in the area (LBNL 2008).

Wildland Fires

Although both the proposed building and the new population associated with the new building could be exposed to the risk from wildland fires, the risks of loss, injury, or death involving wildland fire are not expected because the building would be designed and constructed in conformance with the requirements defined by the California Building Code, Type I Fire Resistive Construction, and with fire code safety requirements. The building would be fitted with automatic sprinklers. Risk from building fires would be minimized through compliance with the state fire code. Furthermore, in compliance with LBNL's vegetation management program, fire-resistant ground cover would be installed as needed for erosion control in the areas surrounding the building and the access driveway. Vegetation management to reduce fuel loads would continue to be conducted on all areas near the project site, as well in other open space areas of LBNL site. All new employees on the LBNL site would be provided training and information regarding measures to be taken in the event of a fire. The fire station on the LBNL site is within 1,500 feet of the project site and would be adequately staffed to serve this facility along with other existing and proposed facilities on the LBNL site (LBNL 2008).

5.3.2 Alternative 1, Cafeteria Parking Lot Site

There is no known soil or groundwater contamination at the Alternative 1 site. Potential impacts to the health and safety of workers, the public, and the environment would be minimized by adherence to applicable federal, state, and local regulations; general contractor safety plans; and proper handling, storage, and disposal of contaminated soil and groundwater, should any be encountered. Fire hazards,

emergency response, and other hazards would be the same as the Proposed Action. Risk from building fires would be minimized through compliance with the state fire code. Therefore, environmental and human risks related to hazards under this alternative would be similar to the Proposed Action site.

5.3.3 Alternative 2, RFS Site

A portion of the RFS site has been remediated for various metals that had exceeded site-specific human and ecological target levels and soil management and groundwater monitoring programs are in place to ensure ecological and human safety (UC Berkeley 2008). However, a portion of the site is contaminated with pyrite cinders that are currently being investigated by UC Berkeley. It is anticipated that the University would remediate the site entirely, in compliance with DTSC requirements, prior to development. Potential impacts to the health and safety of construction workers would be minimized by adherence to applicable federal, state, and local regulations and general contractor safety plans. Therefore, the proposed CRT facility would be safely developed at this site and would not expose facility users or construction workers to unsafe levels of contamination.

The RFS also has an emergency response plan that includes evacuation routes, similar to the LBNL. Given the geography of the site near a marsh, the risks of wildland fires at the site are substantially lower than at the Proposed Action site. Risk from building fires would be minimized through compliance with the state fire code.

5.3.4 Alternative 3, Former DHS Site

A combination of salvage, decommissioning, and hazardous materials removal steps were implemented at the vacated DHS building. The remaining decontamination, hazardous materials removal, and demolition will be completed by the University prior to the construction of the Helios Energy Research Facility project (UC Berkeley 2009). Potential impacts to the health and safety of construction workers would be minimized by adherence to applicable federal, state, and local regulations and general contractor safety plans. Therefore, existing on-site contamination is not a concern for the CRT facility should it be constructed at the DHS site.

Similar to the LBNL site, UC Berkeley has an emergency response plan that includes evacuation routes; this plan would apply to the CRT facility. Given the location of the DHS site is in a flat, urban setting, the risk for wildland fires to occur at or near the site is low. Risk from building fires would be minimized through compliance with the state fire code.

5.3.5 Alternative 4, Leased Facility on San Pablo Avenue

The alternative would not involve any ground disturbing activities because the construction would be limited to the addition of another floor to the existing building and interior modifications to existing floors in the building. Therefore, any soil or groundwater contamination that may be present on site is not a concern for the alternative. Similar to the Proposed Action, compliance with applicable federal, state, and local regulations and general contractor safety plans would minimize exposure to hazards during construction and operation. An emergency response plan would be prepared for the Alternative 4 site that would include evacuation routes; this plan would apply to the CRT facility. Given its location in a densely developed urban setting, there is no risk for wildland fires to occur at or near the site. Risk from building fires would be minimized through compliance with the state fire code.

5.3.6 Alternative 5, No Action

The use of the existing OSF would not expose CRT facility users to hazards. An emergency response plan has been prepared for the existing facility. Given the location of the site is in a flat, urban setting, the risk for wildland fires to occur at or near the site is low. As with the Proposed Action, compliance with applicable federal, state, and local regulations and general contractor safety plans would minimize exposure to hazards during operation.

5.4 BIOLOGICAL RESOURCES

5.4.1 Proposed Action

The following discussion addresses effects from construction of a new building, which would be a consequence of the Proposed Action.

There are no wetlands or other features potentially subject to the jurisdiction of regulatory agencies such as USACE, USFWS, and CDFG present on the Proposed Action site. However, the North Fork of Strawberry Creek, a known habitat for Lee's micro-blind harvestman (*Microcina leei*, a species designated as "Special Animal" by the State of California) occurs approximately 37 and 107 meters (120 and 350 feet), to the north of the project site. Additionally, willow riparian scrub habitat associated with Cafeteria Creek occurs approximately 34 meters (110 feet) to the south of the project site. The project has been designed with a minimum setback of at least 24 meters (80 feet) from Cafeteria Creek. In addition, construction-phase BMPs specified in construction contracts at LBNL would minimize the potential for

accidental discharges of fill or other materials into jurisdictional waters and sensitive habitats.³ In addition, LBNL SPF BIO-2c, which requires construction projects to avoid ground disturbing activities during the rainy season, is part of the Proposed Action and would further reduce the potential for accidental discharge into sensitive habitats such as the creeks.

Excavation, grading, and construction activities would result in the removal of approximately 2.25 acres of vegetation, including a eucalyptus stand and mixed grassland vegetation. Approximately 75 trees would be removed, including species of eucalyptus, coast live oak, and California bay tree. The vegetation types that would be removed are common throughout the Oakland-Berkeley hills and are predominantly non-native species. Furthermore, consistent with the LBNL design standards and guidelines, which require that all trees to be removed be replaced at a 1:1 ratio, replacement trees would be planted on the project site and elsewhere at LBNL.

Tree removal activities have the potential to affect active special-status bird nests (including raptors), and special-status bats. Special-status bats that may occur on or near the project site include pallid bat (*Antrozous pallidus*), fringed myotis (*Myotis thysanodes*), and long-eared myotis (*Myotis evotis*); the first is a state species of concern and the other two are state Special Animals. Removal of trees could result in the destruction of special-status bat roosts and any unusually loud noise levels generated by project construction activities could result in the abandonment of an active maternity bat roost and active bird nests. The loss of active maternity roosts and active nests of special-status bird species would be avoided through implementation of LBNL SPF BIO-4, which requires Pre-Construction Special-Status Bat Surveys and Subsequent Actions, and SPF BIO-3, which involves pre-construction surveys and implementation of additional measures in case active nests are encountered. UC LBNL would also comply with the Migratory Bird Treaty Act and Section 3503 of the California Fish and Game Code.

The Proposed Action site is not within or contiguous to any U.S. Fish and Wildlife Service (USFWS) designated Critical Habitat for the Alameda whipsnake (*Masticophis lateralis euryxanthus*, a species listed as threatened at both the state and federal levels). Numerous biological surveys have been conducted of the Proposed Action site and its surroundings, including a June 28, 2007, site-specific suitability analysis of the Proposed Action site for Alameda whipsnake. In the latter analysis, the Proposed Action site was found to be nearby to areas containing high-quality Alameda whipsnake habitat. Specifically, coastal scrub vegetation and open space grasslands occur along south-facing slopes to the south of the project site. While core habitat does not occur within the project boundary and Alameda whipsnake is not expected to permanently reside there, and while the species has never been observed on or adjacent to the

³ A sensitive habitat is defined as any area in which plant or animal life or their habitats are either rare or especially valuable. Sensitive habitat areas include, but are not limited to, riparian corridors, wetlands, marine habitats, sand dunes, sea cliffs, and habitats supporting rare, endangered, and unique species.

Proposed Action site, it is possible that the species may temporarily occur on or nearby to the Proposed Action site (LBNL 2008).

UC LBNL has developed several SPFs for preventing the incidental taking of the Alameda whipsnake during construction and similar activities at the LBNL site. These SPFs were developed over a period of years and are based on site visits and informal consultation with the USFWS along with the assistance of biologists specializing in the Alameda whipsnake species. Implementation of LBNL SPFs BIO-5(a) through BIO-5(f) as part of the Proposed Action would ensure that the species is protected during construction and that no loss of individual whipsnakes would occur. In addition, DOE has completed an informal consultation with the USFWS and found that there is no potential for adverse effect on whipsnakes.

Infrastructure improvements to provide adequate electricity and utilities to the CRT facility at the Proposed Action site would involve installation of power lines in existing underground conduits and modifications at the Grizzly Peak substation. These improvements would be constructed within LBNL road rights of way and on the substation site where biological resources are not present.

5.4.2 Alternative 1, Cafeteria Parking Lot Site

Similar to the Proposed Action, implementation of required measures for construction activities at LBNL would minimize the potential for accidental discharges of fill or other materials into jurisdictional waters and sensitive habitats during the construction of the facility at the Alternative 1 site.

The Alternative 1 site is mostly paved and contains fewer trees in comparison to the Proposed Action. Implementation of the alternative would remove approximately 30 trees. The vegetation at the site is also considered to be common throughout the area. Given that Alternative 1 involves removal of fewer trees, the effects on nesting bird habitat and special-status bats would be slightly reduced. In addition, less potential habitat for the Alameda whipsnake occurs at this site. LBNL SPFs that are part of the Proposed Action would also be implemented in conjunction with Alternative 1. As with the Proposed Action, infrastructure improvements would be constructed in areas where no biological resources are present.

5.4.3 Alternative 2, RFS Site

The habitat on the alternative site is composed of disturbed non-native and native dominated grassland on fill, ornamental trees, eucalyptus trees, and a drainage ditch/swale. No federally protected wildlife or plant species is known to occur on the alternative site. The drainage/swale along the eastern side of the CRT facility site at RFS may be subject to U.S. Army Corps of Engineers (USACE) and/or California Department of Fish and Game (CDFG) jurisdiction. If it is determined that the drainage feature qualifies

as a jurisdictional feature, it would be avoided. If avoidance is not feasible, compliance with federal and state regulations and implementation of LBNL SPFs that would be voluntarily applied under this alternative would reduce the environmental effects related to the swale. It is anticipated that most of the trees on the site would remain under Alternative 2, and only a few trees if any would be removed. The removal of active nests and nest abandonment due to construction noise and effects on special status bats would be avoided through implementation of LBNL SPF BIO-3, which involves pre-construction surveys and implementation of additional measures in case active nests are encountered, and of LBNL SPF BIO-4, which would help protect special-status bats. UC LBNL would also comply with the Migratory Bird Treaty Act and Section 3503 of the California Fish and Game Code.

In addition, Alternative 2 would potentially affect the sensitive natural communities—California Oatgrass Bunchgrass Grassland (*Danthonia californica*), and purple needlegrass (*Nassella pulchra*)—that are present on the site. Although these species are not federally protected, implementation of LBNL SPFs BIO-6a and 6b, involving floristic surveys for special-status plants, which are included in the alternative, would minimize this effect.

Infrastructure improvements, especially to provide adequate electricity and Energy Sciences Network (ESnet) service to the CRT facility at the RFS site would involve installation of cables, installation of power lines on existing poles or in existing conduits, and a substation. These improvements would be constructed within road rights of way and on the proposed CRT site at RFS. Construction of these facilities would result in similar biological effects as described above from the construction of the CRT facility.

5.4.4 Alternative 3, Former DHS Site

Due to the extent of past development, there is no remaining natural vegetation on the site and in the vicinity. Therefore, the Alternative 3 site does not provide suitable habitat for special-status plant or animal species, and no sensitive natural communities, special status species, wetlands, or important wildlife movement corridors occur in the vicinity (UC Berkeley 2009). Therefore, biological resources would not be affected by construction and operation of Alternative 3, including infrastructure improvements to serve the project.

5.4.5 Alternative 4, Leased Facility on San Pablo Avenue

The alternative consists of leasing and renovating an existing building in a densely developed urban area. The site is fully developed with a building, parking lot, and driveways and contains no natural vegetation that could support wildlife or special status plant species (see **Figure 3.0-8**). The three ornamental trees on the site are small and do not provide nesting habitat for birds. The surrounding area

is also similarly developed with urban uses and no natural habitat is present in the areas adjoining the site. Infrastructure improvements to serve the CRT facility would be located on the project site and in city streets. Therefore, this alternative would not affect sensitive biological resources.

5.4.6 Alternative 5, No Action

The existing facility in Oakland is in an existing building. The site is developed with a building, parking lot and a driveway and contains no natural vegetation that could support wildlife or special status species (see **Figure 3.0-9**). All adjacent parcels are similarly intensely developed with urban uses and no natural habitat is present on or near the site.

5.5 CULTURAL RESOURCES

5.5.1 Proposed Action

The following discussion addresses effects from construction of a new building, which would be a consequence of the Proposed Action.

Construction activities related to the Proposed Action would not directly or indirectly affect any buildings or structures that qualify as historic resources. The project would require modifications to an exterior stairway extending from the Blackberry gate to Building 50. The stairway is known locally as the Seaborg stairway. However, the wooden stairway structure is not currently listed in any register of historic resources, and is not considered eligible for listing in the National Register of Historic Places or the State Office of Historic Preservation's California Register of Historical Resources because it is an unexceptional wooden stairway that has been extensively modified over the years. Although the stairway is named after a Nobel laureate, there is no specific association of the stairway with the Nobel laureate or the research conducted by him (**Appendix 2**). Furthermore, the construction of the proposed building would not directly or indirectly affect any historic structures nearby because with the exception of Building 88, none of the other buildings adjacent or nearby to the Proposed Action are eligible for inclusion in the National Register of Historic Places. Building 88, which is separated from the CRT site by Cyclotron Road, a grove of eucalyptus trees, and sloping terrain, may be eligible for inclusion in the National Register of Historic Places. However, the potential significance of Building 88 lies in the scientific accomplishments or events that took place within the facility. The Proposed Action would not affect Building 88. Given its distance from Building 88 and the intervening busy roadway, trees, and terrain, any effect of the Proposed Action on the Building 88 viewscape would be minimal. The SHPO confirmed that Buildings 65, 70 and 70A are not eligible for National Register listing and that Building 88's historic significance would not be affected by the Proposed Action.

A pedestrian survey of the Proposed Action site was conducted by a qualified archaeologist and with the exception of an isolate, which was likely deposited on the site, no archaeological resources were encountered. Based on this survey, and the fact that most of the surrounding area of the project site has been subject to extensive excavation for surrounding buildings and infrastructure, it is unlikely that project construction would encounter archaeological resources (Condor Country Consulting 2010). Any other improvements that involve ground disturbance including installation of infrastructure, would take place on the project site or within LBNL streets, in areas that have been previously disturbed by construction and are unlikely to contain intact archaeological resources. Therefore, the Proposed Action is not likely to affect archaeological resources. In the event of the discovery of any archaeological resources during construction, LBNL SPFs CUL-3 and CUL-4, which are included in the Proposed Action, would require implementation of measures including work stoppage and appropriate treatment of the resources and Native American involvement.

As part of the National Historic Preservation Act Section 106 compliance process, consultation letters were sent to the Berkeley Historical Society, Alameda County Historical Society, the California Native American Heritage Commission, and eight individuals listed on the California Native American Heritage Commission's contact list on March 31, 2010 (**Appendix 2**). No substantive responses to these letters were received as of January 2011, other than one comment from Irene Zwierlin recommending that if an archaeological monitor is recommended and/or artifacts are located, a Native American monitor should be contacted (Condor Country Consulting 2010). Based on the information presented above, the determination has been made that this alternative does not have the potential to cause effects on cultural resources.

5.5.2 Alternative 1, Cafeteria Parking Lot Site

The project site is developed with a parking lot. The unpaved surfaces at the site are also highly disturbed and the likelihood for encountering undisturbed archaeological resources is low. However, if archaeological resources are found at the site or off site in association with installation of infrastructure during construction, LBNL SPFs CUL-3 and CUL-4, which are included in Alternative 1, would require implementation of measures including work stoppage and appropriate treatment of the resources and Native American involvement.

5.5.3 Alternative 2, RFS Site

Implementation of the CRT facility at the Alternative 2 site would not require demolition of any structures. Building 167 is adjacent to the site and would not be affected by construction or operation of Alternative 2. Infrastructure improvements, especially to provide adequate electricity and ESnet service

to the site, would involve installation of cables, installation of power lines on existing poles or in existing conduits, and a substation. These improvements would be constructed within road right of ways and on the proposed CRT site at RFS. Although the CRT facility site is in an area that has previously been disturbed by construction and remediation activities, a large portion of this site has not been excavated and the site is close to the San Francisco Bay margins. As noted in **subsection 4.2.5**, Northwest Information Center (NWIC) found that there is a moderate to high potential of encountering prehistoric resources and a moderate potential of encountering historic-period archaeological resources during excavation for the proposed CRT site at RFS. However, as noted in **subsection 3.2.2**, this alternative includes an archival search prior to ground disturbance to determine appropriate locations for archaeological monitoring during site grading. Following removal of top soil, a field inspection would be conducted by a qualified archaeologist who meets the Secretary of Interior's Standards. The archaeologist would provide recommendations for any necessary steps needed to protect archaeological resources. In addition, if unanticipated archaeological resources were found at the site during construction, LBNL SPFs CUL-3 and CUL-4, which are voluntarily included in Alternative 2, would require implementation of measures including work stoppage and appropriate treatment of the resources and Native American involvement.

5.5.4 Alternative 3, Former DHS Site

Given that the site is developed with an existing building and parking lots, the potential to encounter archaeological resources is low. Furthermore, UC Berkeley has evaluated the existing DHS building and determined it not to be a historic resource (UC Berkeley 2009). That building has been removed by the Helios Energy Research Facility project. Any other improvements that involve ground disturbance including installation of infrastructure, would take place on the project site or within city streets, in areas that have been previously disturbed by construction and are unlikely to contain intact archaeological resources. Therefore, the alternative is not likely to affect archaeological resources.

5.5.5 Alternative 4, Leased Facility on San Pablo Avenue

The Marchant building at this alternative site would be altered by the project. According to the records search by and consultation conducted with the NWIC, a 2006 architectural evaluation of the Marchant Building concluded that the building appeared to be potentially eligible for the National Register of Historic Places (**Appendix 2**). This alternative could therefore involve alterations to a potential historic resource.

Any improvements that involve ground disturbance, including installation of infrastructure, would take place on the project site or within city streets, in areas that have been previously disturbed by

construction and are unlikely to contain intact prehistoric archaeological resources. Therefore, the alternative is not likely to affect prehistoric archaeological resources.

5.5.6 Alternative 5, No Action

The existing facility would continue to be leased and no historic or prehistoric archaeological resources would be affected under the alternative.

5.6 VISUAL RESOURCES

5.6.1 Proposed Action

The following discussion addresses indirect effects from construction of a new building under the Proposed Action.

The facility to be developed under the Proposed Action would be largely screened by intervening topography, vegetation, and structures. The facility would appear as an incremental addition to the currently developed hillside. Due to surrounding topography, structures, and vegetation, the building would not be prominently visible from many off-site locations. Intervening topography would obstruct views of the building from locations in Strawberry Canyon to the southeast of the project. The Grizzly Peak substation modifications required for the Proposed Action would be visible from Grizzly Peak Road and Centennial Drive but would be changes within the context of an existing substation. Implementation of LBNL SPFs VIS-4a and VIS-4b that are included in the Proposed Action would reduce effects related to light and glare.

5.6.2 Alternative 1, Cafeteria Parking Lot Site

The CRT facility under Alternative 1 would be situated behind an existing building that would largely screen the proposed facility from public views, including the viewpoints noted above. The facility would appear as an incremental addition to the already developed hillside. LBNL SPFs VIS-4a and VIS-4b would be implemented, which would reduce environmental effects associated with light and glare. Infrastructure improvements would be constructed underground within road rights of way and on the proposed CRT site so would not result in any change to existing views.

5.6.3 Alternative 2, RFS Site

Views of the proposed facility at the Alternative 2 site would be largely screened from public views from the Bay Trail and housing by intervening buildings and vegetation. The building would be adjacent to existing structures and would therefore appear as an incremental addition to the existing development at

the RFS site. Infrastructure improvements would be constructed underground within road rights of way and on the proposed CRT site at RFS so would not result in any change to existing views.

5.6.4 Alternative 3, Former DHS Site

The existing structures at the DHS site included an eight-story tower that has recently been demolished. Until recently, the DHS site featured an abandoned and undistinguished state institutional laboratory and office building surrounded by asphalt (UC Berkeley 2009). The proposed facility would be constructed on a portion of the existing DHS site footprint. The alternative would likely improve the existing visual character of the site. In addition, requirements under the UC Berkeley LRDP that include lighting design requirements and visual character mitigation measures would be implemented as part of this alternative.

5.6.5 Alternative 4, Leased Facility on San Pablo Avenue

The construction of the additional computer floor at the Alternative 4 site would appear as an incremental addition to the industrial urban setting of the site. The addition would be small in comparison to the existing facility and the facility is in a largely industrial area; thus construction would have a very minimal effect on the visual environment.

5.6.6 Alternative 5, No Action

The No Action alternative would not involve construction of any structures, and as such, would result in no visual changes at the OSF site.

5.7 AIR QUALITY

5.7.1 Proposed Action

Construction of the CRT facility under the Proposed Action is anticipated to commence in early 2011 and continue for approximately 30 months until fall 2013. The project site is currently vacant and would not require demolition operations. Prior to building construction, the entire site would be graded to prepare for asphalt paving and building activities. Fugitive dust PM₁₀ would be generated on the project site as a result of earthmoving and grading activities. In addition, criteria air pollutants including reactive organic gases (ROG) and oxides of nitrogen (NO_x), among others, would be emitted by heavy-duty construction equipment. Construction activities would also involve asphalt paving for four handicapped parking spaces. The Proposed Action would not involve the construction of a new parking structure or surface lot. During building construction, emissions would primarily be generated from heavy-duty construction equipment, construction worker trips, and material delivery trips. Although temporary, construction

emissions have the potential to cause adverse effects on local air quality in the vicinity of the project site. Once constructed, the Proposed Action would result in operational emissions from the staff vehicle trips to and from the site, boiler operations, emergency generator testing, and general area sources.

Applicable Standards and Thresholds

The air quality impact assessment in this EA has been prepared in accordance with the applicable federal law, including CEQ's directives and the Clean Air Act (CAA), administered by the U.S. Environmental Protection Agency (U.S. EPA). Because the CEQ NEPA Regulations require NEPA documents to discuss possible conflicts with "State and local...land use plans, policies, and controls for the area concerned," local air quality planning by the California Air Resources Board (CARB) and the Bay Area Air Quality Management District (BAAQMD) was also considered.

Criteria Pollutants

The U.S. EPA is responsible for enforcing the CAA and the National Ambient Air Quality Standards (NAAQS). The NAAQS identify levels of air quality for seven pollutants that are the maximum levels of ambient (background) air pollutants considered safe, with an adequate margin of safety, to protect the public health and welfare. The seven criteria pollutants are listed in **subsection 4.2.7**.

Based on monitoring data collected in the air basin, the San Francisco Bay Area Air Basin (SFBAAB) is currently classified by the U.S. EPA as a nonattainment/marginal area for the 8-hour O₃ standard. The SFBAAB was recently designated non-attainment for the new federal PM_{2.5} standard. For all other federal standards, the SFBAAB is in attainment or unclassified.

In response to its enforcement responsibilities, the U.S. EPA requires each state to prepare and submit a State Implementation Plan (SIP) describing how the state will achieve the Federal standards by specified dates, depending on the severity of the air quality within the state or air basin.

General Conformity

The U.S. EPA adopted the General Conformity Rule in November 1993 to implement the conformity provision of Title I, Section 176 (c)(1) of the Federal CAA. This provision requires that the federal government not engage, support, or provide financial assistance to licensing, permitting, or approving any activity not conforming to an approved SIP. To determine whether a federal action would conform or conflict with an approved SIP, a conformity review is performed. The review process comprises the following four steps:

1. Determine whether the proposed action causes emissions of criteria air pollutants.

2. Determine whether the emissions of a criteria pollutant or its precursor would occur in a non-attainment or maintenance area for that criteria pollutant.
3. Determine whether the federal action is exempt from the conformity requirement as per 40 CFR 93.153 (c)(2)-(e).
4. Estimate emissions and compare to the threshold emissions rate and the nonattainment or maintenance area's emissions inventory.

The de minimis levels for a conformity analysis vary based on the attainment status of each criteria pollutant in the air basin, as shown in Table 5.0-1, **General Conformity De Minimis Levels**, below. Because the SFBAAB is a non-attainment/marginal area for the 8-hour O₃ standard and has been designated non-attainment for the new federal PM_{2.5} standard, a general conformity analysis is required for the Proposed Action. As such, the estimated emissions for the Proposed Action and alternatives must be compared with the de minimis levels set forth in 40 CFR 93.153 (b)(1) and (2). If the emissions are greater than or equal to the de minimis levels, a conformity determination must be performed. The purpose of the conformity determination, if needed, is to show if a proposed action conforms to the applicable SIP.

**Table 5.0-1
General Conformity De Minimis Levels**

Pollutant	Area Designation Type	De Minimis Levels (Tons/Year)
Ozone (ROG or NO _x)	Serious non-attainment	50
	Severe non-attainment	25
	Extreme non-attainment	10
	Other areas outside an ozone transport region	100
Ozone (NO _x)	Marginal and moderate non-attainment inside an ozone transport region	100
	Maintenance	100
Ozone (ROG)	Marginal and moderate non-attainment inside an ozone transport region	50
	Maintenance within an ozone transport region	50
	Maintenance outside an ozone transport region	100
CO, SO ₂ , and NO ₂	All non-attainment and maintenance	100
PM ₁₀	Serious non-attainment	70
	Moderate non-attainment and maintenance	100
PM _{2.5}	Non-attainment	**
Lead (Pb)	All non-attainment and maintenance	25

Note: Bold indicates status of SFBAAB relative to attainment and relevant de minimis levels.

*** The U.S. EPA has not established a general conformity de minimis level for PM_{2.5}.*

Source: U.S. EPA, "De Minimis Levels," <http://www.epa.gov/air/genconform/deminimis.html>

BAAQMD CEQA thresholds are presented in **Appendix 3** for reference.

Construction

Fugitive Dust

Construction activities associated with the CRT facility would generate fugitive dust emissions from site grading, building construction, hauling of equipment, hauling soil to and from the site, and construction worker commuting. These emissions would be temporary and would be further reduced by LBNL SPF AQ-1a, which is included in the Proposed Action and would require basic, enhanced, and optional control measures to minimize the generation of fugitive dust. This measure would reduce the fugitive dust emissions to acceptable levels.

Criteria Pollutants

In addition, construction activities for the CRT facility would generate criteria pollutants (ROG, NO_x, PM₁₀, PM_{2.5}, CO, and SO₂). These pollutants were calculated using the URBEMIS2007 Environmental Management Software, in accordance with emission factors and parameters recommended by the BAAQMD and compared against general conformity de minimis levels for emissions of criteria pollutants. Modeling results in pounds per day are shown in Table A-3, Estimated Proposed Action Construction Emissions, in **Appendix 3**. Emissions would not exceed de minimis levels for any of the criteria pollutants. LBNL SPF AQ-1b to minimize the generation of exhaust emissions during construction is included in the Proposed Action and would be implemented during the construction of the proposed facility. This would ensure that emissions of ozone precursors are minimized during construction. Construction activities would also comply with BAAQMD Regulation 8, Rules 3 and 15, related to architectural coatings and emulsified and liquid asphalt (LBNL 2008). Construction emissions of criteria pollutants would also be below BAAQMD CEQA thresholds of significance.

Carbon Monoxide

CO is produced in greatest quantities from vehicle combustion and is usually concentrated at or near ground level under cool, stable (i.e., low or no wind) atmospheric conditions because it does not readily disperse into the atmosphere. As a result, potential air quality impacts to sensitive receptors are assessed through an analysis of localized CO concentrations. The BAAQMD guidance has a screening procedure for CO hotspots. If the project meets the following criteria, it is not likely to result in CO hotspots:

1. Project is consistent with an applicable congestion management program established by the county congestion management agency for designated roads or highways, regional transportation plan, and local congestion management agency plans.

2. The project traffic would not increase traffic volumes at affected intersections to more than 44,000 vehicles per hour.
3. The project traffic would not increase traffic volumes at affected intersections to more than 24,000 vehicles per hour where vertical and/or horizontal mixing is substantially limited (e.g., tunnel, parking garage, bridge underpass, natural or urban street canyon, below-grade roadway).

The CRT facility would meet all of the above criteria. Therefore, the traffic generated by the Proposed Action would not result in substantial CO concentrations or cause a CO hotspot.

Toxic Air Contaminants

As the U.S. EPA has not established a numerical value for de minimis levels for PM_{2.5}, BAAQMD CEQA thresholds have been used instead to evaluate effects from emissions of PM_{2.5}. The BAAQMD has established a concentration-based threshold for exhaust emissions of PM_{2.5} during construction. Diesel particulate matter (DPM) is primarily emitted as PM_{2.5}. The PM_{2.5} concentrations and associated PM_{2.5} and LECR are calculated for emissions from both on-site, off-road construction equipment, and off-site, on-road construction truck traffic. As shown in Table A-4, Modeled PM_{2.5} Concentrations (Construction), in **Appendix 3**, concentrations of PM_{2.5}, and the resulting cancer risk and chronic health hazard would be much lower than the BAAQMD thresholds.

Operation

Operational emissions associated with the day-to-day activities of the proposed facility would result from increased vehicular trips to and from the CRT facility site (i.e., mobile sources). Area source emissions associated with the CRT facility would include the use of natural gas for water and space heating and landscape maintenance equipment. Stationary source emissions would include a small boiler, five cooling towers, and two emergency generators (750-kilowatt [kW] each).

Criteria Pollutants

Emissions of criteria pollutants from mobile and area sources were calculated using the URBEMIS2007 Environmental Management Software, in accordance with emission factors and parameters recommended by the BAAQMD. Stationary source emissions were calculated using emission standards from the CARB and the U.S. EPA. Detailed methodology is presented in **Appendix 3**. The results are provided in Table A-5, in **Appendix 3**. Operational emissions associated with the day-to-day activities of the proposed CRT facility would not exceed de minimis levels for ROG, CO, NO_x, SO_x, or PM₁₀. PM_{2.5} emissions would not exceed BAAQMD CEQA thresholds of significance. Projects that generate emissions

below de minimis levels would not be considered to contribute a substantial amount of air pollutants to the SFBAAB or contribute substantially to the nonattainment status of the air basin.

Toxic Air Contaminants

The BAAQMD has established a concentration-based threshold for exhaust emissions of PM_{2.5} during project operation. The PM_{2.5} concentrations were calculated for stationary source emissions and area source emissions. As shown in Table A-6, Modeled PM_{2.5} Concentrations (Operational), in **Appendix 3**, concentrations of PM_{2.5} would be much lower than the BAAQMD thresholds and the effects to sensitive receptors (e.g., residences) from DPM during operation would be insubstantial. Under the Proposed Action, there would be two 750-kW diesel emergency generators. The human health hazards from toxic air contaminants (TACs) associated with the proposed CRT facility, including DPM from emergency generator maintenance testing, are presented in Table A-7, Summary of Maximum Modeled Cancer Risks, in **Appendix 3**. As shown in the table, the maximum on-site and off-site cancer risks resulting from the proposed project's TAC emissions would be less than the BAAQMD significance threshold of 10 in 1 million (10×10^{-6}).

In addition to the potential cancer risk, exposure to TACs can result in acute (i.e., short-term) and chronic (i.e., long-term) noncancer health impacts. The chronic noncancer hazard quotients for the Proposed Action were calculated by dividing the maximum annual average concentration of the DPM by the chronic noncancer reference exposure levels. Table A-8, Summary of Maximum Modeled Chronic Noncancer Health Impacts, in **Appendix 3**, shows the maximum chronic hazard indices due to TAC emissions from the CRT facility at on-site and off-site receptors would be less than the BAAQMD significance threshold of 1.0.

5.7.2 Alternative 1, Cafeteria Parking Lot Site

This alternative would be located at the LBNL site. The same air quality effects would apply to the site as described above for the Proposed Action. Construction of Alternative 1 would include an additional subphase involving demolition of the parking lot at the site as compared to the Proposed Action. As shown in Table A-9, Estimated Construction Emissions – Alternative 1, in **Appendix 3**, construction emissions would not exceed de minimis levels or BAAQMD significance thresholds for any of these criteria pollutants during any of the construction phases. The construction PM_{2.5} emissions of Alternative 1 would be lower than the Proposed Action's because less cut and fill are involved at this site; and since the Proposed Action's cancer risk and chronic hazard index are much lower than the BAAQMD thresholds as shown in Table A-4 in **Appendix 3**, the PM_{2.5} emissions from Alternative 1 would not exceed BAAQMD's thresholds for cancer risk and chronic health hazards.

Operation of the CRT facility at the Alternative 1 site would involve the same stationary sources, including the cooling towers and emergency generators, as the Proposed Action. The number of persons that would relocate to LBNL under this alternative would be the same as that of the Proposed Action; therefore, there would be no change in the mobile source emissions. As shown in Table A-10, Estimated Operational Emissions – Alternative 1, in **Appendix 3**, operational emissions of Alternative 1 are below both de minimis levels and BAAQMD significance thresholds. Similar to the Proposed Action, Alternative 1 would meet all of the criteria for CO hotspot assessment and would not result in a CO hotspot.

The Proposed Action and Alternative 1 result in the same operational PM_{2.5} emissions, and as shown in Table A-6 in **Appendix 3**, concentrations of PM_{2.5} would be much lower than the BAAQMD threshold for sensitive receptors (e.g., residences) from PM_{2.5} during operation. In addition, the cancer risk and chronic noncancer health impacts associated with Alternative 1 would be similar to the Proposed Action and below the BAAQMD significance thresholds. As shown in Table A-7 and Table A-8, the Proposed Action's cancer risk is lower than the BAAQMD significance threshold of 10×10^{-6} and the chronic noncancer health impact is much less than the BAAQMD significance threshold of 1.0.

5.7.3 Alternative 2, RFS Site

Under Alternative 2, construction of the CRT facility would occur at the RFS site. Emissions from construction traffic and construction equipment would be similar to the Proposed Action because construction activities would be generally comparable. As shown in Table A-11, Estimated Construction Emissions – Alternative 2 in **Appendix 3**, calculations show that emissions would not exceed de minimis levels or BAAQMD significance thresholds for any of these criteria pollutants during any of the construction phases. The construction PM_{2.5} emissions of Alternative 2 would be lower than the Proposed Action's because less cut and fill would be involved at this site; and since the Proposed Action's cancer risk and chronic hazard index are much lower than the BAAQMD thresholds as shown in Table A-4, **Appendix 3**, the PM_{2.5} emissions from Alternative 2 would not exceed BAAQMD's thresholds for cancer risk and chronic health hazards.

Operation of the CRT facility at the RFS site would involve the same stationary sources, including the cooling towers and emergency generators, as the Proposed Action. However, under Alternative 2, mobile source emissions would likely increase because the number of vehicles traveling to the site would increase. Therefore, the overall operational emissions related to the operation of the CRT facility at the Alternative 2 site would be slightly higher. As calculated in Table A-12, Estimated Operational Emissions – Alternative 2, in **Appendix 3**, operational emissions of Alternative 2 are below both de minimis levels

and BAAQMD significance thresholds. Similar to the Proposed Action, Alternative 2 would meet all of the criteria for CO hotspot assessment and would not result in a CO hotspot.

The PM_{2.5} concentrations are calculated for stationary source emissions and area source emissions from project operations. The Proposed Action and Alternative 2 result in the same stationary and area source operational PM_{2.5} emissions, and as shown in Table A-6, Modeled PM_{2.5} Concentrations (Operational), in **Appendix 3**, concentrations of PM_{2.5} would be much lower than the BAAQMD thresholds for sensitive receptors (e.g., residences) from DPM during operation. In addition, the cancer risk and chronic noncancer health impacts associated with Alternative 2 would be similar to the Proposed Action and below BAAQMD significance thresholds. As seen in Table A-7, Summary of Maximum Modeled Cancer Risks and Table A-8, Summary of Maximum Modeled Chronic Noncancer Health Impacts, in **Appendix 3**, the Proposed Action's cancer risk is less than the BAAQMD significance threshold of 10×10^{-6} and the chronic noncancer health impact is much less than the BAAQMD significance threshold of 1.0.

5.7.4 Alternative 3, Former DHS Site

Under Alternative 3, construction of the CRT facility would occur at the former DHS site. Emissions from construction traffic and construction equipment would generally be similar to the Proposed Action because construction activities would be comparable. As shown in Table A-13, Estimated Construction Emissions – Alternative 3, in **Appendix 3**, emissions would not exceed de minimis levels or BAAQMD significance thresholds for any of these criteria pollutants during any of the construction phases. The construction PM_{2.5} emissions of Alternative 3 would be lower than the Proposed Action's; and since the Proposed Action's cancer risk and chronic hazard index are much lower than the BAAQMD thresholds, as shown in Table A-4 in **Appendix 3**, the PM_{2.5} emissions from Alternative 3 would not exceed BAAQMD thresholds.

Operation of the CRT facility at this site would involve the same stationary sources, including the cooling towers and emergency generators, as the Proposed Action. The total number of vehicle trips generated under Alternative 3 would be greater than the Proposed Action because 300 new people would commute to this location, instead of the 135 people under the Proposed Action. Due to availability of transit service to the site and proximity to the Bay Area Rapid Transit (BART) station, 40 percent of the 300 people are assumed to use alternative transportation. The net result would be that an estimated 180 persons would drive to this location. Therefore, operational emissions of criteria pollutants under Alternative 3 would be higher than those estimated for the Proposed Action. However, as shown in Table A-14, Estimated Operational Emissions – Alternative 3, **Appendix 3**, operational emissions of Alternative 3 are below both de minimis levels and BAAQMD significance thresholds. Similar to the Proposed Action, Alternative 3 would meet all of the criteria for CO hotspot assessment and would not result in a CO hotspot.

The PM_{2.5} concentrations are calculated for stationary source emissions and area source emissions. The Proposed Action and Alternative 3 result in the same stationary and area source operational PM_{2.5} emissions, and as shown in Table A-6 in **Appendix 3**, concentrations of PM_{2.5} would be much lower than the BAAQMD thresholds and the potential adverse effects to sensitive receptors (e.g., residences) from DPM during operation would be insubstantial. In addition, the cancer risk and chronic noncancer health impacts associated with Alternative 3 would be similar to the Proposed Action and below BAAQMD significance thresholds. As seen in Table 5.0-7 and Table A-8 in **Appendix 3**, the Proposed Action's cancer risk is less than the BAAQMD significance threshold of 10×10^{-6} and the chronic noncancer health impact is much less than the BAAQMD significance threshold of 1.0.

5.7.5 Alternative 4, Leased Facility on San Pablo Avenue

Under Alternative 4, construction activities would be limited to the construction of an additional floor, interior modifications, and installation of cooling equipment. Given that the extent of construction would be less under this alternative, the emissions related to construction would be proportionally lower. As shown in Table A-15, Estimated Construction Emissions – Alternative 4, in **Appendix 3**, calculations indicate that emissions would not exceed de minimis levels or BAAQMD significance thresholds for any of these criteria pollutants. The construction PM_{2.5} emissions of Alternative 4 are lower than the Proposed Action's; and since the Proposed Action's cancer risk and chronic hazard index are much lower than the BAAQMD thresholds, as shown in Table A-4, in **Appendix 3**, the PM_{2.5} emissions from Alternative 4 would not exceed BAAQMD thresholds.

Operation of the facility at the Alternative 4 site would involve similar stationary sources to the Proposed Action and emissions from stationary sources would likely be similar. The total number of vehicle trips generated under Alternative 4 would be greater than the Proposed Action because 300 new people would commute to this location, instead of the 135 new persons that would commute to the LBNL site under the Proposed Action. Due to availability of transit and shuttle services to the site, 20 percent of the 300 persons are assumed to use alternative modes of transportation. The net result would be that an estimated 240 persons would drive to this location. Operational emissions of criteria pollutants under Alternative 4 would therefore be higher than those estimated for the Proposed Action. However, as calculated in Table A-16, Estimated Operational Emissions – Alternative 4, in **Appendix 3**, operational emissions of Alternative 4 are below both de minimis levels and BAAQMD significance thresholds. Similar to the Proposed Action, Alternative 4 would meet all of the criteria for CO hotspot assessment and would not result in a CO hotspot.

The PM_{2.5} concentrations are calculated for stationary source emissions and area source emissions from project operation. The Proposed Action and Alternative 4 result in the same stationary and area source

operational PM_{2.5} emissions, and as shown in Table A-6 in Appendix 3, concentrations of PM_{2.5} would be much lower than the BAAQMD thresholds. In addition, the cancer risk and chronic noncancer health impacts associated with Alternative 4 would be similar to the Proposed Action and below BAAQMD significance thresholds. As seen in Table A-7 and Table A-8 in Appendix 3, the Proposed Action's cancer risk is less than the BAAQMD significance threshold of 10×10^{-6} and the chronic noncancer health impact is much less than the BAAQMD significance threshold of 1.0.

5.7.6 Alternative 5, No Action

Under Alternative 5, no new building space would be constructed; therefore, the No Action alternative would not result in any additional air pollutants compared to existing conditions. The existing operational emissions from the OSF would continue. As calculated in Table A-17, Estimated Operational Emissions – Alternative 5, **Appendix 3**, existing operational emissions for Alternative 5 are below both de minimis levels and the BAAQMD significance thresholds. Alternative 5 would not result in increases of impacts associated with PM_{2.5}, CO hotspots, cancer risk, and chronic health risks.

5.8 GREENHOUSE GASES

As stated in **subsection 4.2.8**, increased concentrations of greenhouse gases (GHGs) in the atmosphere due to human activities and the associated changes in global climate represent potential adverse environmental effects. The Proposed Action and alternatives are evaluated below for their potential to generate GHGs and potentially contribute to global climate change.

The appropriate approach to evaluating a project's potential impact on global climate under NEPA is still under development. The Council on Environmental Quality (CEQ), the agency responsible for administering NEPA, has released draft NEPA guidance on greenhouse gas emissions. The guidance recommends a threshold of 25,000 CO₂-equivalent metric tons (MTCO_{2e})⁴ of direct emissions as a threshold for analysis within NEPA documents. The guidance suggests that emissions below this threshold would not be relevant to and would not need to be discussed within a NEPA analysis. The draft NEPA guidance focuses on direct emissions only (GHG emissions that would be generated on site by the project) and does not include off-site indirect emissions such as those generated by vehicle trips to and from the project site or from the generation of electricity used by the proposed project.

⁴ The CO₂ equivalent emissions are commonly expressed as "metric tons of carbon dioxide equivalent (MTCO_{2e})."
The carbon dioxide equivalent for a gas is derived by multiplying the tons of the gas by the associated global warming potential (GWP), such that MTCO_{2e} = (metric tons of a GHG) × (GWP of the GHG). For example, the GWP for methane is 21. This means that emissions of one metric ton of methane are equivalent to emissions of 21 metric tons of CO₂.

Although the CARB has not yet put forth significance thresholds for use to evaluate projects in California, CARB has implemented a mandatory GHG reporting program that requires large industrial GHG emitters to report their GHG emissions. Large stationary combustion facilities that emit greater than or equal to 25,000 MTCO₂ per year are subject to the reporting requirements. While CARB's reporting program and the CEQ's draft NEPA guidance do not provide significance thresholds, the 25,000 MTCO₂e reporting threshold can be seen as a dividing line for major GHG emitters, which could have the potential to result in an adverse impact on the environment.

In June 2010, the BAAQMD issued guidance for evaluating the climate change impact of land development projects in the Bay Area and stationary source projects subject to BAAQMD permitting authority. The BAAQMD guidance does not require quantification of a project's construction-phase GHG emissions nor does the guidance include a significance threshold for evaluating the impact of construction-phase emissions. The BAAQMD guidance includes quantitative thresholds of significance for operational impacts that were developed based on a consideration of certain categories of future projects in the Bay Area. The Proposed Action is not within the categories of projects considered by the BAAQMD. More importantly, the new thresholds do not apply to this project, as BAAQMD directed lead agencies to apply the new thresholds only to projects for which a Notice of Preparation is published and for which environmental analysis commences on or after June 2, 2010 (see Bay Area Air Quality Management District, Resolution No. 2010-06). The environmental review for the CRT project under CEQA began in 2007 and was completed in 2008, and the NEPA review was commenced in October 2009. Furthermore, the EA is a NEPA document, which utilizes federal thresholds where available.

5.8.1 Proposed Action

The construction and operation of the CRT facility would generate GHG emissions, which would contribute to potential cumulative impacts on global climate.

Construction Phase GHG Emissions

GHG emissions from construction activities would occur from internal combustion engine exhaust associated with off-road construction equipment, exhaust from on-road trucks associated with the CRT facility, and construction worker commute vehicle travel. GHG emissions were estimated using the same methods and models used to calculate criteria pollutant emissions presented in **Section 5.7. Table 5.0-2, Estimated Construction GHG Emissions**, shows a summary of the total estimated GHG emissions from the construction of the Proposed Action.

**Table 5.0-2
Estimated Construction GHG Emissions**

GHG Emissions Source	Emissions (Metric Tons CO ₂ e/year)
Period 1 (10/01/2010 - 12/31/2010): Grading/Trenching	138.91
Period 2 (2011): Building Construction	232.42
Period 3 (2012): Building Construction	233.38
Period 4 (1/1/2013 - 6/30/2013): Building/Coating/Paving	161.83
NEPA Threshold	None

Source: Impact Sciences, Inc.

Operation-Phase GHG Emissions

Operation of the CRT facility would generate GHG emissions from a number of sources that include (1) area sources (natural gas consumption), (2) motor vehicles, (3) indirect sources (electricity consumption, water, and wastewater), and (4) stationary sources (a boiler and two emergency generators).

Table 5.0-3, Estimated Operational GHG Emissions (Direct and Indirect Sources) shows a summary of the total estimated GHG emissions from operation of the Proposed Action. The Proposed Action's direct (Scope 1) emissions⁵ of 635 MTCO₂e would not exceed the threshold of 25,000 MTCO₂e proposed by the CEQ. As noted earlier, the CEQ has not proposed this threshold to evaluate whether the impact of a project would be substantial; the proposed threshold suggests that a project that generates emissions below this number does not represent a major emitter of GHGs. The Proposed Action would therefore not be considered a major emitter of GHGs.

Although current NEPA guidance does not require consideration of a project's indirect emissions (Scope 2 and 3 emissions) for completeness **Table 5.0-3** presents these emissions as well. The table also presents the emissions associated with the operation of NERSC at OSF. Because the Proposed Action would replace the operations at OSF, these emissions were subtracted to obtain net new emissions. As the table shows, the Proposed Action's net total emissions (12,474 MTCO₂e) would also not exceed the CEQ threshold of 25,000 MTCO₂e.

⁵ Scope 1 emissions include direct emissions from area and stationary combustion sources, and fugitive emissions (e.g., refrigerant loses, research gases, fume hood testing, electrical switches, fire extinguishers, and distribution losses in natural gas lines). Scope 2 emissions include indirect emissions related to the production and consumption of electricity; and Scope 3 emissions include all other indirect emissions from commuting, air travel. Construction emissions may also be included as Scope 3.

**Table 5.0-3
Estimated Operational GHG Emissions (Direct and Indirect Sources)**

GHG Emissions Source	Emissions (MTCO _{2e} /year)	CEQ Threshold (MTCO _{2e} /year)
Direct Sources		
Stationary Sources	467	
Area Sources	168	
Total Direct	635	25,000
Indirect Sources		
Mobile Sources	435	
Electricity Consumption*	34,711	
Water Supply	1	
Wastewater Treatment	< 1	
Total Indirect	35,147	None
Grand Total	35,782	
Less Existing Emissions at OSF	23,309	
Net New Emissions	12,473	None

* The GHG emissions calculation is based on the average of the various generation sources for the electricity supplied through the Northern California DOE Laboratory Electric Power Purchasing Consortium.

The CRT building at the LBNL site would receive electricity from the Western Area Power Administration (WAPA). WAPA delivers electricity that is approximately 20 percent supplied from hydropower. For this reason, the estimated total GHG emissions from electricity consumptions reported above were calculated using the assumption that 20 percent of electricity would be from hydroelectric sources and the remainder would be from a mix of electricity sources.

Furthermore, the CRT facility incorporates features that would substantially lessen its contribution to GHG emissions and global climate change. The UC Policy on Sustainable Practices provides emission-reduction strategies, including practices related to green building design, clean energy, climate protection, transportation, operations, recycling and waste management, and environmentally preferable procurement. In compliance with UC Policy, the Proposed Action incorporates numerous design features that are also consistent with AB 32 goals and strategies and with the mitigation measures in the BAAQMD guidelines. These features reduce the Proposed Action's GHG emissions by substantially more than 29 percent compared to business-as-usual (BAU) emissions (BAU is generally defined as development without any measures to reduce greenhouse gas emissions). The project has been designed to meet LEED Gold standards, which means among other things that the project's electricity consumption

would be more than 30 percent better than the state's energy efficiency standards for residential and nonresidential buildings established under Title 24, Part 6 of the California Code of Regulations. The project includes numerous measures to minimize electricity use, including a cool roof, natural ventilation, daylighting, use of high performance computer exhaust heat to warm up the office space, etc. In order to achieve green building principles and to be consistent with the 2006 LRDP, the design of the proposed facility would integrate the building into the hillside. High performance glazing and shading would be used to reduce the effects of afternoon heat gains. The exterior of the HPC portion of the building would be primarily of metal with minimal fenestration to reduce temperature changes to the interior. The facility also includes high-efficiency evaporative cooling towers, high-efficiency fixtures, waterless urinals, and rain harvesting, all of which would reduce water demand and GHG emissions from use of electricity associated with water supply. The CRT facility would also include parking for approximately 30 bicycles and would not provide general use parking spaces with the purpose of discouraging single occupant vehicle trips. The Proposed Action includes showers for bike users, transit service, and a TDM program. The Proposed Action also includes roof and non-roof paving materials that are designed to reduce the facility's heat island effect and waste reduction measures, including use of recycled materials. The CRT HPC has been designed with a power usage efficiency that is better than any data center benchmarked to date. The office component as designed would achieve 47 percent electricity savings when compared to the baseline-building model. In addition, UC LBNL is in the process of developing a climate action plan (CAP). Once the plan is developed, all facilities (including the proposed CRT facility) and LBNL operations would be required to comply with the CAP to reduce GHG emissions. The UC operates and maintains LBNL under contract with the DOE. The DOE operating contract requires submittal of a Site Sustainability Plan (SSP), which addresses the same elements as a UC Climate Action Plan (CAP). LBNL submitted the FY 2011 SSP in December 2010. All LBNL facilities (including the proposed CRT facility) and other LBNL operations are required to comply with the SSP to reduce GHG emissions.

The Proposed Action would include the removal of trees, largely consisting of non-native trees, as discussed in **Section 3.0**. This removal of trees, and vegetation removal associated with the near-term cumulative projects, would result in the loss of some carbon sequestration. The Proposed Action includes, however, replacement plantings of native plant species to replace the removed trees at a 1:1 ratio, and this replacement planting would substantially lessen the project's contribution to any cumulative impact on carbon sequestration.

5.8.2 Alternative 1, Cafeteria Parking Lot Site

This alternative would also be located at the LBNL site and would be essentially identical to the Proposed Action in terms of its size, construction, and operation. The environmental effects described above for the

Proposed Action would also apply to this alternative. **Table 5.0-4, Summary of Maximum Estimated Emissions**, reports the GHG emissions from this alternative.

5.8.3 Alternative 2, RFS Site

Under Alternative 2, construction of the CRT facility would occur at the RFS site. GHG emissions from construction would be similar to the Proposed Action because construction activities would be generally comparable. Under Alternative 2, mobile source emissions would likely increase because the number of vehicles traveling to the site would increase. In addition, emissions associated with electricity use would be higher. Therefore, the GHG emissions related to the operation of the CRT facility at the Alternative 2 site would be higher compared to the Proposed Action. **Table 5.0-4** reports the GHG emissions from this alternative.

5.8.4 Alternative 3, Former DHS Site

Under Alternative 3, construction of the CRT facility would occur at the former DHS site. GHG emissions related to construction would be similar to the Proposed Action because construction activities would be comparable. In addition, operation of the CRT facility would involve the same stationary sources, including the cooling towers and emergency generators, as the Proposed Action. As explained in **subsection 5.7.4** under Alternative 3, the total number of vehicle trips generated would be greater than the Proposed Action and an estimated 180 persons would drive to this location. Mobile source emissions from this alternative would increase because the number of vehicles traveling to the site would increase. In addition, emissions associated with electricity use would be higher. GHG emissions related to the operation of the CRT facility at the Alternative 3 site would be higher than the Proposed Action GHG emissions. **Table 5.0-3** reports the GHG emissions from this alternative.

**Table 5.0-4
Summary of Maximum Estimated Emissions (in MTCO_{2e} per year)**

Emission Source	MTCO _{2e} per year					
	Proposed Action	Alternative 1 Cafeteria Parking Lot Site	Alternative 2 RFS Site	Alternative 3 Former DHS Site (40% trip reduction)	Alternative 4 Leased Facility on San Pablo Avenue (20% trip reduction)	Alternative 5 No Action
Construction						
Period 1: Grading/Trenching	139	121	139	139	59	0
Period 2: Building	232	232	232	232	232	0
Period 3: Building	233	233	233	233	233	0
Period 4: Building/Coating/Paving	162	162	162	162	117	0
Operational						
Area Sources	168	168	168	168	168	106
Stationary Sources	467	467	467	467	467	*
Mobile Sources	435	435	968	580	776	226
Indirect Electricity, Water, Wastewater	34,712	34,712	43,376	43,376	43,376	22,977
Total Operational	35,782	35,782	44,978	44,591	44,786	23,309
Net Increase in Emissions Compared to No Action	12,473	12,473	21,669	21,282	21,477	NA

* Stationary source emissions included in Area source emissions.
Source: Impact Sciences, 2010.

5.8.5 Alternative 4, Leased Facility on San Pablo Avenue

Under Alternative 4, the extent of construction would be less and the GHG emissions related to construction would be proportionally lower. As explained in **subsection 5.7.5**, the total number of vehicle trips generated under Alternative 4 would be greater than the Proposed Action and an estimated 240 persons would drive to this location. Mobile source emissions under Alternative 4 would likely increase because the number of vehicles traveling to the site would be greater. In addition, emissions associated with electricity use would be higher. GHG emissions related to the operation of the CRT facility at the Alternative 4 site would be higher than the Proposed Action GHG emissions. **Table 5.0-3**, reports the GHG emissions from this alternative.

5.8.6 Alternative 5, No Action

The No Action alternative would not result in any additional GHG emissions compared to existing conditions. However, continuing operations of the OSF would generate GHG emissions that are reported in **Table 5.0-3**.

5.9 NOISE

5.9.1 Proposed Action

Construction Noise

Construction activities would temporarily elevate noise levels at the Proposed Action site and in the surrounding areas. The construction noise analysis prepared for the CRT Facility EIR was based on generic construction noise data. Detailed phase-by-phase information was not available for the numbers and types of pieces of equipment expected at the construction site. New information has become available since publication of the CRT Facility EIR. For construction of the facility under the Proposed Action, there is now information on the numbers and types of equipment expected at the construction site during each phase, as well as the number of days that the equipment would be present on the construction site. The analysis of construction noise levels was refined to provide a realistic worst-case assessment, based on this new information (Illingworth & Rodkin 2010a).

Noise levels were calculated at the two noise-receiver locations identified in the EIR as being the most affected receivers: the Foothill Student Housing Complex, which is located about 685 feet west of the project site, and the Nyingma Institute, located about 790 feet west of the project site. The effect of topographical shielding was also evaluated in the refined analysis given that the site is on a hillside over 200 feet above the elevation of the noise-receiver locations and there are intervening undulations in the

topography. The shielding analysis indicated that there would be a direct line of sight between the Nyingma Institute and the CRT construction site, so no acoustical shielding was assumed. Acoustical shielding provided by intervening topography would attenuate noise in the direction of the Foothill Student Housing Complex for construction noise sources at or near the ground. Five A-weighted decibels⁶ (dB[A]) of noise attenuation was calculated for sources at or near the ground. No attenuation was assumed for sources above the ground, such as the tower crane (Illingworth & Rodkin 2010a).

The results of the refined noise analysis are shown in **Table 5.0-5, Construction Noise Levels**. The table shows noise levels received at a theoretical reference distance of 50 feet from all operating noise sources, at the Foothill Student Housing Complex, and at the Nyingma Institute. The projected noise levels reported in **Table 5.0-5** represent the maximum noise levels expected on a workday when all pieces of equipment anticipated for that construction phase are operating simultaneously. During times of the day or during days when all equipment is not operating, noise levels would be lower than the noise levels presented in **Table 5.0-5**.

**Table 5.0-5
Construction Noise Levels**

Construction Phase	Received Noise Level (dB(A))		
	Reference (at 50 ft)	Foothill Student Housing	Nyingma Institute
Excavation/Site Work	87	59	63
Foundation	85	58	61
Building Erection	88	61	64
Exterior Finishes	90	62	66

Source: Illingworth & Rodkin, Inc. 2010a

According to the Berkeley Municipal Code (BMC), construction activities lasting more than 10 days shall not produce exterior noise levels in excess of 60 dB(A) on adjacent residential properties zoned R-1 and R-2 during weekdays and in excess of 65 dB(A) during weekdays on adjacent properties zoned R-3 and above multifamily residential. The Nyingma Institute and the Foothill student housing sites are zoned R-3 and R-5 respectively under the City of Berkeley zoning.

⁶ Noise levels in this analysis are reported as "A-weighted decibels." A-weighting is a method of adjusting decibels to correspond more accurately with the way the human ear hears.

According to the analysis, exterior noise levels during construction would range from 58 to 62 dB(A) at the Foothill Student Housing Complex. Noise from vehicular traffic on Cyclotron Road near Foothill Student Housing was measured at an average typical daytime level of 57 dB(A) and ranges from 55 to 65 dB(A). Therefore, construction noise levels would not substantially exceed existing noise levels at Foothill Student Housing. Furthermore, calculations demonstrate that noise from CRT construction activities will not exceed City of Berkeley Noise Ordinance limits at Foothill Student Housing, which is set at 65 dB(A) for construction noise at multi-family residential developments.

As shown in **Table 5.0-5**, noise levels during construction would range from 61 to 66 dB(A) at the Nyingma Institute depending on the phase of construction occurring at the project site. For most of the construction period, exterior noise levels that would be experienced at the Institute from construction activities at the CRT site would not exceed 65 dB(A), except for intermittent periods during the short duration of exterior finishing activities (4.5 months). This would be when the project's construction noise levels are conservatively calculated to be 66 dB(A) at the Institute if all exterior finishing activities are occurring at the same time. Such calculated noise levels would exceed the maximum noise level for long-term construction noise set by the Berkeley Noise Ordinance for multi-residential developments by 1 dB(A). However, this theoretical 1 dB(A) exceedance would occur only if all equipment used in exterior finishing activities on the CRT façade facing Nyingma Institute are in use at the construction site simultaneously, a scenario that would potentially occur on occasions but not during the entire 4.5 months of exterior finishing activities. Furthermore, the Nyingma Institute adjoins Hearst Avenue and the portions of the building that would be oriented towards the construction site are already exposed to noise from traffic on Hearst Avenue. Ambient noise measurements along Hearst Avenue at Highland Place near the Nyingma Institute show an average noise level of 64 dB(A), with noise levels ranging from 57 to 80 dB(A) as vehicle traffic fluctuates. Construction noise levels during finishing activities would not substantially exceed existing hourly average noise levels and would fall within the range of existing traffic noise levels in the area (Illingworth & Rodkin 2010a).

The nearest single-family residences are located more than 1,000 feet to the northwest of the project site. These residences are afforded substantial shielding by topography and Building 88. With noise attenuation due to topographical shielding and the additional distance between the construction site and the single-family residences, construction noise levels of less than 60 dB(A) would be experienced at the nearest single-family residences, below the City of Berkeley maximum allowable receiving noise standard for single family residential uses (Illingworth & Rodkin 2010a).

The effect of the Proposed Action's construction truck traffic in conjunction with other construction truck traffic associated with LBNL and UC Berkeley projects is discussed in **subsection 6.2.9**.

Operational Noise from Project Traffic

Traffic data at five study intersections were used to determine whether or not there would be a substantial increase in traffic noise on streets serving the Proposed Action site as a result of traffic generated by the Proposed Action. Traffic generated by the CRT facility would not result in a noticeable increase in the day/night average noise level (less than 0.5 dB(A) day/night noise [L_{dn}]) along any of the roadway segments, including Hearst Avenue segment adjacent to the Nyingma Institute (LBNL 2008).

Operational Noise from On-Site Equipment

Operation of heating, ventilating, and air conditioning equipment (HVAC) at the Proposed Action site could affect long-term ambient noise levels and potentially affect the nearby off-site receptors—the most affected receivers being the Foothill Student Housing Complex and the Nyingma Institute located west of the project site. BMC Table 13.40-1 presents the maximum exterior noise levels allowable for residential and commercial land uses. The City uses these noise levels to control the maximum noise from the operation of stationary equipment on one property from adversely affecting adjacent properties. According to the BMC, the maximum allowable exterior noise levels from the operation of stationary equipment as received on an adjacent residential property zoned R-1 and R-2 are 55 dB(A) between the hours of 7 AM to 10 PM and 45 dB(A) from 10 PM to 7 AM. For properties zoned R-3 and above, the maximum allowable exterior noise levels are 60 dB(A) between the hours of 7 AM to 10 PM and 55 dB(A) from 10 PM to 7 AM.

Taking into consideration the attenuation due to distance and the shielding provided by the topography in the case of Foothill Student housing and attenuation due to distance and the shielding provided by the CRT building in the case of the Nyingma Institute, the calculated exterior noise levels from the cooling towers are 43 to 44 dB(A) at Foothill Student Housing, the Nyingma Institute and in the surrounding areas, well below the BMC allowable level for R-3 and R-5 zoning. With respect to air handlers associated with the building's HVAC systems, LBNL SPF Noise-4, which is a part of the Proposed Action, requires that noise from stationary sources such as HVAC equipment meet the Berkeley noise ordinance limits. Based on detailed analyses completed by Charles M Salter Associates in July 2010, noise levels from the project air handlers would comply with the Berkeley noise ordinance limits at the Institute and other off-site residential receptors (Illingworth & Rodkin 2010b). Noise levels would be less at all other off-site sensitive receiver locations.

Total Operational Noise

As discussed above, the project's operational traffic would not make an appreciable difference to those existing noise levels – the project's traffic would increase the ambient noise levels by less than 0.5 dB(A).

Also as discussed above, other sources of operational noise associated with the Proposed Action (cooling towers and air handling units) would not add to the noise levels experienced by sensitive receptors, including the Nyingma Institute and Foothill Student Housing, because noise levels generated by the Proposed Action's stationary equipment would meet the City's ordinance requirements at the LBNL property line with the Institute. The operation of the CRT facility would therefore not generate substantial levels of noise at the nearest sensitive receptors.

5.9.2 Alternative 1, Cafeteria Parking Lot Site

Similar to the Proposed Action, the alternative would result in traffic generation that could increase ambient noise levels at intersections. The effects under Alternative 1 would be substantially similar because the population added to the site under Alternative 1 would be the same.

This alternative site is located upslope and to the east of the Proposed Action site and therefore is more than 1,100 feet from the Foothill Student Housing Complex and 1,200 feet from the Nyingma Institute, the two nearest off-site sensitive receptors. Therefore, in comparison to the Proposed Action, noise levels associated with operation and construction of the facility would be reduced because sensitive-receiver locations would be farther away and the noise would be attenuated more.

5.9.3 Alternative 2, RFS Site

Noise levels related to operation and construction of the facility would be the same as described under the Proposed Action. The Alternative 2 site is not located near sensitive receptors. The nearest residential neighborhood is located at least 457 meters (1,500 feet) from the alternative site, and there are several intervening buildings between the site and the homes in this neighborhood and a clear line of sight is not available. Given the intervening buildings and distance to the residences, it is expected that the residential receptors would not be exposed to substantial noise level increases from project construction and operation. The vehicular traffic generated under Alternative 2 would not travel past any homes and therefore would not increase ambient noise levels near sensitive receptors.

5.9.4 Alternative 3, Former DHS Site

In the vicinity of the former DHS site, traffic noise on the street network dominates the noise environment. Along Shattuck Avenue, typical hourly average noise levels range from 68 to 71 dB(A) during the daytime and drop to about 55 dB(A) at night. The measured day/night average noise level on Shattuck Avenue in the Campus Park area was 71 L_{dn}. Short-term measurements made along other streets in the areas adjacent to the Campus Park showed similar noise levels (UC Berkeley 2009).

Construction and operation of the CRT facility under Alternative 3 would generate noise in the vicinity of the former DHS site. Development of the facility would be subject to the mitigation measures prescribed in the UC Berkeley 2020 LRDP EIR that would reduce noise levels associated with facility operation and construction. Mechanical equipment selection and shielding would be utilized to ensure noise levels from operation of the facility do not cause City of Berkeley Noise Ordinance limits to be exceeded in the vicinity. Construction noise-control specifications would include such information as general provisions, definitions, submittal requirements, construction limitations, requirements for noise and vibration monitoring and control plans, noise-control materials and methods (UC Berkeley 2009). However, despite implementation of control measures, the noise generated by construction of the CRT facility at this site would exceed the levels set by the local ordinance at the 1910 Oxford Street apartments, which are on the same city block as the CRT facility.

Because of the site's proximity to transit facilities, this alternative would not result in a substantial increase in vehicle trips. Therefore, the increase in traffic noise due to this alternative would be minimal.

5.9.5 Alternative 4, Leased Facility on San Pablo Avenue

Since construction activities would be limited to the construction of an additional floor, interior modifications, and installation of cooling equipment, the duration of construction under this alternative would be shorter and the exposure to construction noise would be over a shorter period of time in comparison to the Proposed Action. However, the nearest sensitive receptors (residences) are located about 30 meters (82 feet) to the south of the alternative site, and there are no intervening buildings or vegetation to attenuate noise. Therefore, although construction activities under the alternative would be limited, the duration of construction activities would be greater than 10 days and the nearest residences would be exposed to temporary noise levels that would exceed 65 dB(A), which is the maximum allowable receiving noise level for residential uses according to the City of Oakland's noise ordinance. Implementation of LBNL SPFs NOISE-1a and 1b, requiring noise reduction measures during construction, which are voluntarily included in the alternative, would reduce construction noise levels. Construction-period noise controls would reduce the noise levels but would not necessarily bring them below 65 dB(A) at the nearest residential receptor.

Operation of the facility under this alternative would generate noise similar to the operational noise levels described above for the Proposed Action. Mechanical equipment that would be installed at the building site would generate noise. However, standard acoustical shielding and the use of quieter equipment would adequately control operational noise from facility operations. The relocation of staff to the leased facility in Berkeley would result in a small increase in traffic volumes along San Pablo Avenue and other routes accessing the site compared to existing volumes. Because the traffic increase would be

small and it takes a doubling of traffic to result in a 3 dB(A) increase in noise, the increase in noise levels would not be perceptible.

5.9.6 Alternative 5, No Action

The No Action alternative would maintain current staff travel patterns and operations at OSF and there would be no change in noise levels at or near the OSF site.

5.10 TRANSPORTATION AND TRAFFIC

5.10.1 Proposed Action

Construction Traffic

Construction of the proposed CRT facility is expected to start in early 2011 and be completed by fall 2013. Construction could result in temporary impacts from truck traffic, material staging, construction worker commute trips, and parking. The 2006 LRDP EIR identified existing construction management “best practices” routinely undertaken at LBNL to limit otherwise potentially adverse construction-related impacts and set these forth as LBNL Best Practices 6a through 6c. The LRDP EIR identified these best practices as continuing best practices required to be incorporated into contract specifications and management oversight for all development projects under the 2006 LRDP. They require construction contractors to meet with UC LBNL and prepare a Construction Traffic Management Plan (CTMP) to lessen the impacts of construction on traffic and parking. The CTMP must propose truck routes, limit truck traffic during peak commute period (7:00 to 9:00 AM and 4:00 to 6:00 PM), and prepare a parking management plan for construction workers. A CTMP would be prepared and implemented during project construction.

Approximately 12,200 cubic yards (cy) of structural fill, which would be hauled to the project site from a storage area on the LBNL site, would be required to construct the CRT facility at the Proposed Action site. Trucks would use existing internal LBNL roadways to transport the fill materials from the storage site. Assuming a truck capacity of 12 cy, there could be up to 1,020 internal truck trips between the storage area and the project site as a result of the transfer of fill.

Off-haul of approximately 15,500 cy of earth materials would be required. Assuming a truck capacity of 12 cy, this would require approximately 1,290 truck trips from the CRT facility site to the freeway, and 1,290 return truck trips. These truck trips would follow the designated truck route (Hearst–Oxford–University Avenue) in the City of Berkeley to and from the LBNL site. In addition to off-haul of earth materials, project construction activities would generate daily construction vehicle trips associated with

delivery of construction materials and transport of construction workers to the site. There would be an average of three large delivery truck trips per day, with a peak number of 10 to 15 trips per day, in fall 2011 associated with the delivery of concrete, rebar, form work, structural steel, mechanical and electrical equipment, exterior siding and windows, drywall and studs, pipes and conduits, roofing materials, etc. On an average, there would be 1 to 5 construction worker bus trips (round trips) each day, and there would be from 10 to 50 small truck deliveries to the project site daily during the construction period. Therefore, at peak there could be up to 10 large delivery truck trips, about 50 small delivery truck trips, and 1 to 5 construction worker bus trips to the site in one day.

As explained above, UC LBNL is required to incorporate LBNL Best Practices 6a through 6c into contract specifications and management oversight for all development projects under the 2006 LRDP, thereby minimizing construction traffic impacts on City streets. Pursuant to LRDP Best Practice TRANS-6c, UC LBNL has instituted a program to manage aggregate construction truck trips to avoid exceeding impact thresholds during heavy truck activity periods. As a part of this program, the designated UC LBNL Construction Coordinator oversees each construction project on the LBNL site to keep the total number of one-way truck trips on the Hearst–Oxford–University Avenue truck route below 98 trips per day.⁷ Truck trips associated with the Proposed Action would also be subject to this LBNL site program, which is a part of the project and would ensure that the project's construction truck trips when added to truck trips from other ongoing construction projects would not exceed the established limit. Construction worker vehicle trips would be avoided by providing parking at an off-site location and bringing the workers to the site by bus.

Operational Traffic

The Proposed Action would increase the daily population of the LBNL site by 135 employees. These relocating staff would generate new vehicle trips that could affect roadways leading to and from the LBNL site. To evaluate the Proposed Action's effects on the transportation system, based on City of

⁷ The LRDP EIR, under Impact TRANS-6 (focused on construction traffic), concluded that estimated construction truck traffic from the LBNL site including 65 one-way daily truck trips (33 trucks per day) in a peak year would not result in a significant impact to city intersections. Since the certification of the 2006 LRDP EIR, in anticipation of concurrent construction of a number of large projects on the LBNL site, UC LBNL conducted a reevaluation of the traffic impacts associated with construction truck trips. This study, conducted by Fehr & Peers, examined the existing (2009) traffic conditions along the designated truck route from the LBNL site through the City of Berkeley to I-80, focusing on major intersections that are known to be operating at or near failing conditions. The study determined that so long as the total number of one-way truck trips from the LBNL site that pass through the Hearst Avenue, Oxford Street, and University Avenue intersections do not exceed 98 one-way truck trips per day (or 49 trucks per day) and LBNL's construction truck traffic does not exceed 50 one-way truck trips (or 25 trucks a day) through the Gayley Road/Stadium Rim Way intersection, construction traffic will result in minimal effects on city intersections, based on the City of Berkeley standards of significance. The study utilized the City's thresholds of significance that were amended in late 2007.

Berkeley standards, the following thresholds of significance were used. For signalized and all-way-stop intersections, traffic impacts were considered significant if the Proposed Action caused:

- intersection operations to degrade from Level of Service (LOS) D to LOS E or worse and there is more than a 2-second increase in delay; or
- more than a 3-second increase in delay at intersections operating at LOS E without and with the project; or
- intersection operations to degrade from LOS E to LOS F and there is more than a 3-second increase in delay; or
- at intersections operating at LOS F without the project, the volume-to-capacity ratio to change by more than 0.01.

For side-street stop-controlled intersections, the traffic impacts were considered significant if:

- the project caused the critical approach to operate at LOS F,
- the intersection meets peak hour signal warrants; and
- no alternative routes are available.

Trip Generation

Vehicle trips for the CRT facility under the Proposed Action were estimated based on trip generation rates established in the LBNL 2006 LRDP EIR, which assumed that vehicle trips generated by the growth under the 2006 LRDP would be proportional to the estimated population increase. The approximately 4,000 employees at the LBNL site currently generate 5,700 daily trips, 610 AM peak hour trips, and 660 PM peak hour trips (LBNL 2007). Based on the existing rates, the 135 additional employees under the Proposed Action would generate 192 new daily trips, 21 new AM peak hour trips, and 22 new PM peak hour trips.

Traffic Impacts

The CRT facility under the Proposed Action would be constructed and operational by 2013. Other reasonably foreseeable projects at the LBNL site listed in **Section 6.0, Cumulative Effects**, would be constructed concurrently and completed by 2018. Therefore, the effects of the project's operational traffic were evaluated at the four study intersections under 2018 conditions with and without the project. Major projects completed after collection of existing condition data, currently under construction, or expected to be completed by 2018 would add to the traffic in the study area. These projects included in this analysis are described below:

- Underhill Parking Structure, recently completed by UC Berkeley, provides 690 net new parking spaces in the Southside area.

- Lower Hearst Parking Structure, recently completed by UC Berkeley, provides 100 net new parking spaces in the Northside area.
- Southeast Campus Integrated Projects (SCIP) would consolidate existing parking spaces and provide 300 additional parking spaces in the southeast area of the UC Berkeley campus. About 546 parking spaces would be provided at the Maxwell Family Field Parking Structure, located at Stadium Rim Way just east of Gayley Road.
- Solar Energy Research Center (SERC) Project, located near the center of the LBNL site, would increase LBNL population by about 50 persons.
- BELLA and the Guest House projects would add up to 20 employees at the LBNL site.
- User Test Bed Facility Project would increase the LBNL site population by no more than 10 persons.

Other planned LBNL projects, including Seismic Phase 1, Seismic Phase 2, Seismic Phase 3, User Support Building, and Old Town demolition would not add any new population to the LBNL site and therefore generate no new trips. New trips generated by other UC Berkeley projects such as the Northeast Quadrant Science and Safety projects (NEQSS), Law School Infill, Naval Architecture Restoration and Blum Center, and Warren Hall replacement are included in the trips associated with the parking structure projects.

Study intersections and existing peak hour traffic volumes are shown on **Figure 5.0-2, Study Intersection Locations, Lane Configurations, and Traffic Control** and **Figure 5.0-3, Existing Peak Hour Traffic Volumes**. Estimated traffic generated by the near-term projects was added to the existing conditions volumes to estimate intersection volumes under Near-Term No CRT and is shown on **Figure 5.0-4, Near-Term No CRT Conditions – Peak Hour Traffic Volumes**. Vehicle trips generated by the CRT facility were added to the Near-Term No CRT traffic volumes to estimate Near-Term With CRT volumes and are shown on **Figure 5.0-5, Near-Term with CRT Conditions – Peak Hour Traffic Volume**. Delay and LOS results for AM and PM peak hours under the Near-Term No Project and With Project conditions are presented in **Table 5.0-6, 2018 Conditions – Study Intersection LOS Summary**. As the results show, the traffic associated with the CRT facility would not cause an exceedance of the significance thresholds for traffic impacts established by the City of Berkeley.

Table 5.0-6
2018 Conditions – Study Intersection LOS Summary

Intersection	Control	Peak Hour	Near-Term No Project		Near-Term With Project	
			Delay (Seconds) ¹	LOS ¹	Delay (Seconds) ¹	LOS ¹
Hearst Avenue/Gayley Road/La Loma Avenue	Signalized	AM	33	C	35	D
		PM	57	E	57	E
Stadium Rim Way/Gayley Road	All-Way	AM	49	E	50	E
	Stop-Controlled	PM	>60 (v/c = 1.15)	F	>60 (v/c = 1.16)	F
Bancroft Way/Piedmont Avenue ²	All-Way	AM	>60 (v/c = 1.01)	F	>60 (v/c = 1.02)	F
	Stop-Controlled	PM	>60 (v/c = 0.88)	F	>60 (v/c = 0.88)	F
Durant Avenue/Piedmont Avenue	All-Way	AM	21	C	22	C
	Stop-Controlled	PM	22	C	22	C

Source: Fehr & Peers, August 2010.

¹ Signalized and all-way stop-controlled intersection delay and LOS based on average control delay per vehicle for the intersection according to the Highway Capacity Manual, Special Report 209, Transportation Research Board, 2000. For intersections operating at LOS F, the volume-to-capacity ratio (v/c) is also reported.

² Based on the 2000 HCM methodology, the intersection would operate at LOS F during the AM peak hour and LOS D during the PM peak hour under Near-Term No Project and Near-Term With Project conditions. Based on field observations and measurements, the intersection currently operates at LOS F during both AM and PM peak hours due to the high number of pedestrian crossings, which the 2000 HCM methodology does not account for. Thus, the intersection would continue to operate at LOS F during both AM and PM peak hours under Near-Term No Project and Near-Term With Project conditions.

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

Alternative Transit

The proposed CRT project would provide only four disabled access parking spaces and no general use parking. The facility would also include 30 bicycle parking spaces. Employees and visitors would be encouraged to take transit, bicycle, or walk to the site. One of the principles of the LBNL 2006 LRDP is to encourage a higher transit mode share. Pursuant to LBNL SPFs (SPF TRANS-1d), UC LBNL would implement a TDM program which includes specific measures and strategies to encourage and accommodate higher transit use. Thus, the incremental increase in transit demand generated by the CRT project is consistent with the LRDP principle to encourage higher transit use and the expanded TDM program is expected to encourage and accommodate the higher transit use.

5.10.2 Alternative 1, Cafeteria Parking Lot Site

The traffic effects for Alternative 1 would be similar to those described above for the Proposed Action.

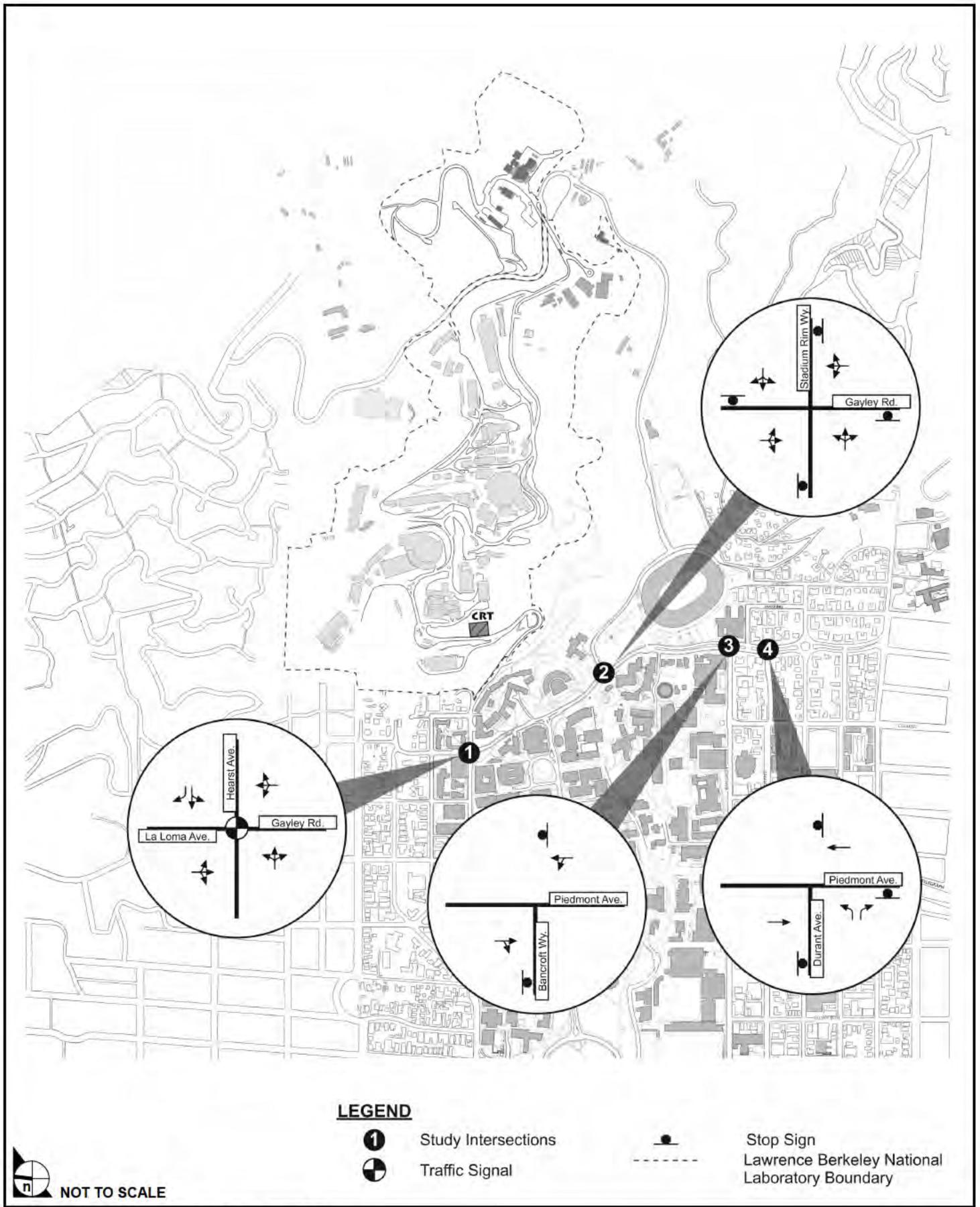


FIGURE 5.0-2

Study Intersection Locations, Lane Configurations, and Traffic Control

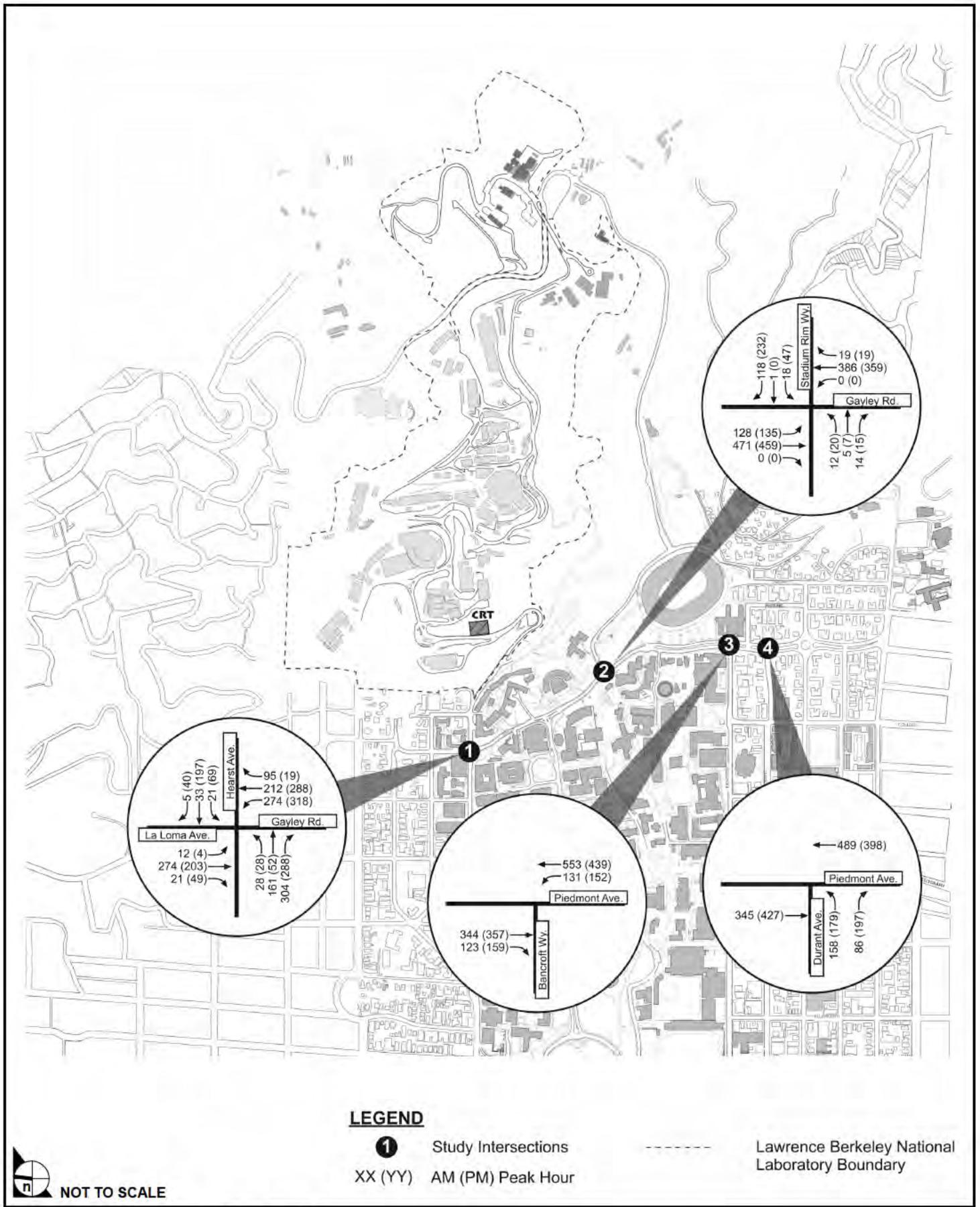
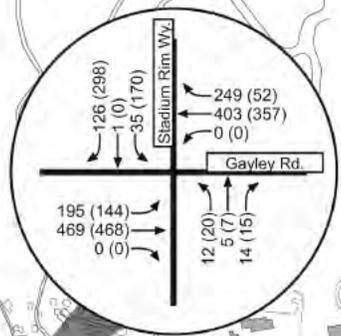
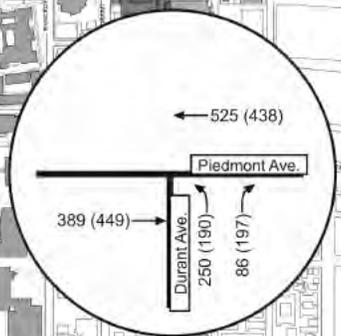
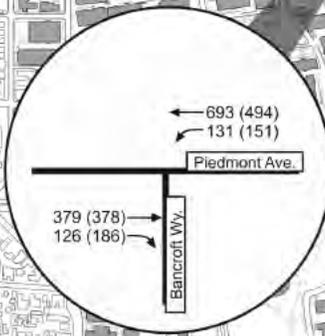
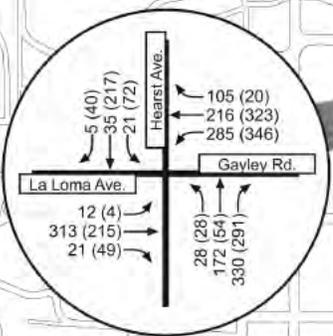
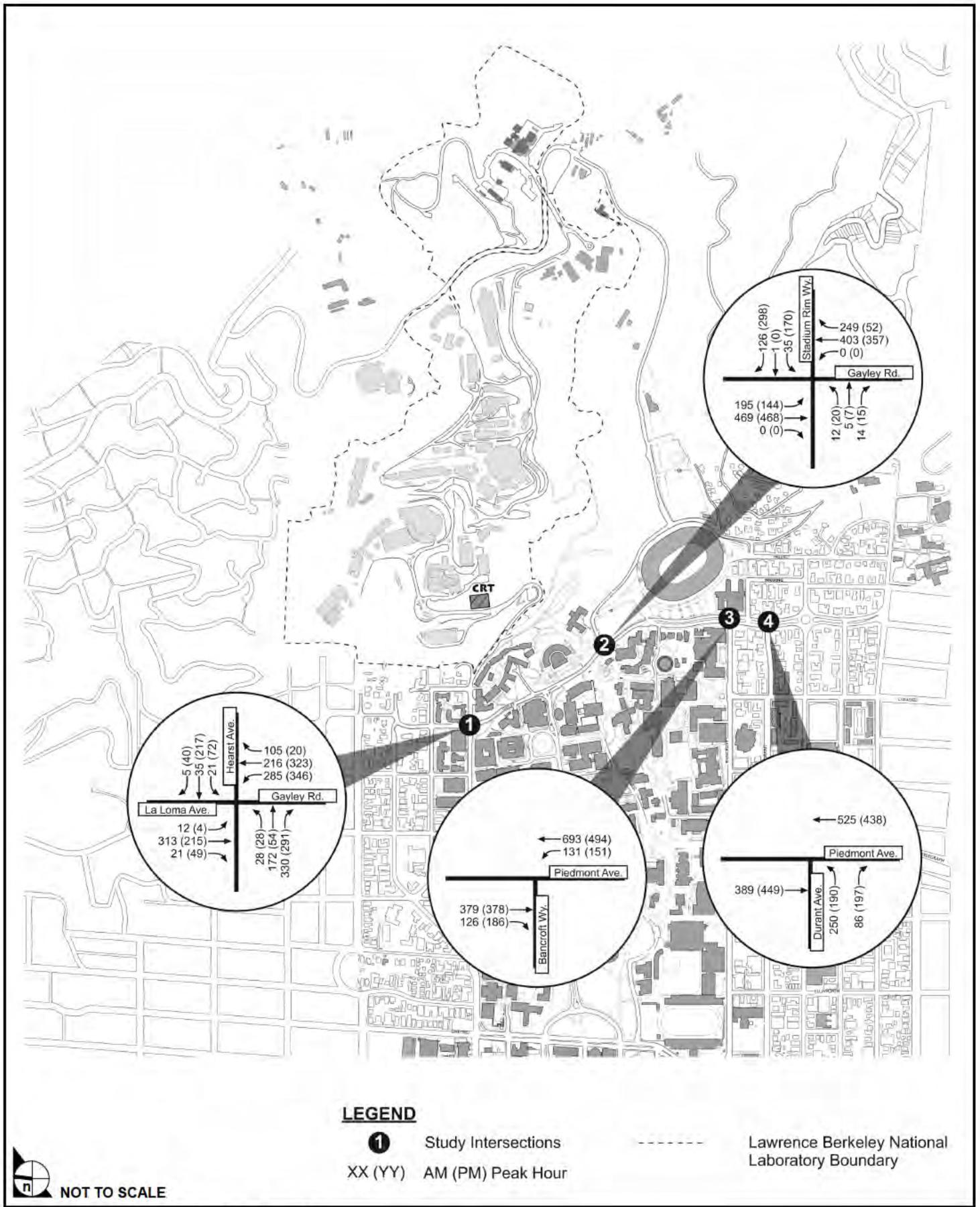
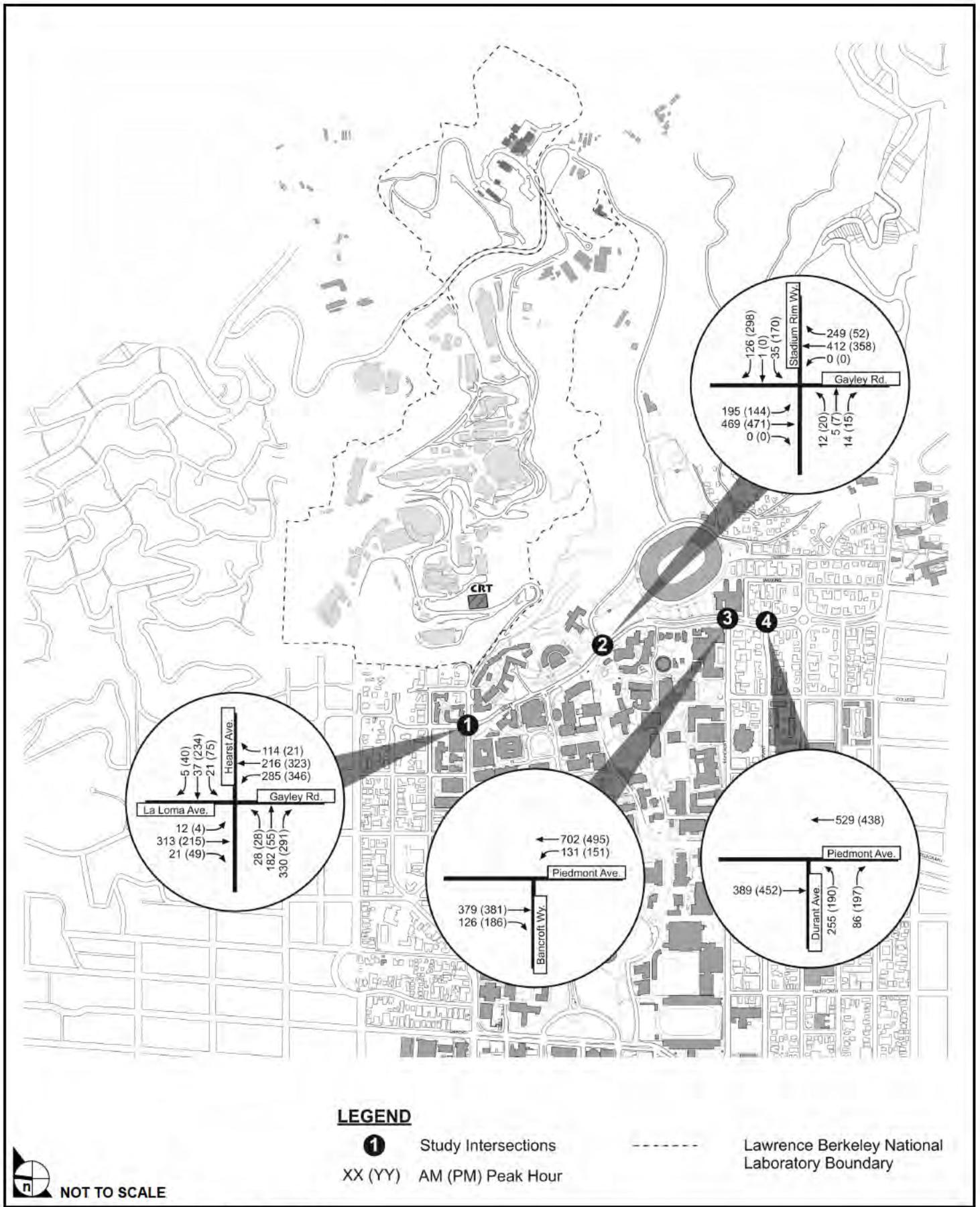


FIGURE 5.0-3

Existing Peak Hour Traffic Volumes





SOURCE: Fehr & Peers Transportation Consultants – January 2010

FIGURE 5.0-5

Near-Term with CRT Conditions – Peak Hour Traffic Volume

5.10.3 Alternative 2, RFS Site

Under Alternative 2, approximately 300 employees would be added to the RFS site. RFS is located directly off of I-580 and although the site can be accessed via three interchanges, the Regatta interchange provides the most direct access to the site. Vehicles traveling to and from the RFS site via the Regatta interchange travel through one major intersection which is the intersection of Regatta Boulevard and Meade Street, which currently operates at an acceptable level of service in accordance with City of Richmond standards. Conservatively assuming that all 300 employees would drive to the site, it is anticipated that Alternative 2 would generate up to 160 AM peak hour trips and 150 PM peak hour trips, based on trip generation rates for Single Tenant Office uses in the Institute of Traffic Engineers (ITE) *Trip Generation* guide (ITE 2008). Assuming conservatively that all these vehicles would use the Regatta interchange, this volume of traffic when added to the roadway would have little effect.

5.10.4 Alternative 3, Former DHS Site

Under this alternative, it is assumed that no parking would be provided at the former DHS site. Given the site's proximity to the Downtown Berkeley BART station, and the availability of AC transit bus service via a number of bus lines and UC Berkeley and LBNL shuttle service near the site, the majority of the relocating staff are expected to use public transit. Persons who would drive would be expected to use UC parking facilities near the site including the Genetics garage. The addition of a small number of trips by the CRT facility is not expected to adversely affect the road network. The EIR prepared for the UC Berkeley 2020 LRDP concluded that new traffic added by growth on the campus would increase vehicle trips and traffic congestion at the University Avenue and Sixth Street intersection and University Avenue and San Pablo Avenue intersection, leading to substantial degradation in level of service. Alternative 3 would contribute to this cumulative impact. The project would be subject to standard project features required by the UC Berkeley LRDP EIR, which are designed to reduce the impacts of new traffic added by growth on the campus.

5.10.5 Alternative 4, Leased Facility on San Pablo Avenue

The leased facility site is located along a main arterial roadway in the cities of Berkeley, Emeryville, and Oakland. Access to the site is typically from I-80/580 and State Route 24 via Ashby and San Pablo Avenues. Users of the facility could also enter the site from Seventh Street off of Ashby Avenue. Intersections along Ashby Avenue and San Pablo Avenue were evaluated for the *West Berkeley Project Draft EIR*. According to the LOS analysis prepared for that EIR, the intersections of Ashby Avenue and San Pablo Avenue, and Ashby Avenue and Seventh Street currently function at LOS D during the evening peak hour. Although the intersection of Ashby Avenue and San Pablo Avenue is projected to

operate at an acceptable LOS (a high LOS D, which means near capacity) in 2015, the intersection of Ashby Avenue and Seventh Street is projected to operate at LOS E in 2015 (Wilbur Smith Associates 2010).

This alternative would involve the relocation of about 300 staff to this site. Because transit is currently available, it is anticipated that many users of the facility would be able to rely on alternative transportation, including shuttle service to be provided from the LBNL site to the facility on San Pablo Avenue. Furthermore, the project would be subject to LBNL SPFs, which are designed to reduce the impacts of new traffic. However, conservatively it is assumed that all persons associated with the CRT facility would drive. Based on trip generation rates for Single Tenant Office uses in the ITE *Trip Generation* guide (ITE 2008), the CRT facility would generate approximately 160 AM peak hour trips and 150 PM peak hour trips. The addition of these peak hour trips to the intersections of Ashby Avenue and San Pablo Avenue and Ashby Avenue and Seventh Street would incrementally increase the delay at these intersections during peak hours. Traffic added by the alternative may adversely affect the intersection of Ashby and San Pablo Avenue, which is forecasted to operate near capacity in 2015. The traffic generated by the alternative would adversely affect intersection operations at Ashby Avenue and Seventh Street by contributing trips to an intersection that would be operating poorly in 2015.

5.10.6 Alternative 5, No Action

The No Action alternative would not result in new vehicle trips and there would be no change compared to existing conditions as a result of the No Action.

5.11 UTILITIES AND WASTE MANAGEMENT

5.11.1 Proposed Action

The facility constructed under the Proposed Action would generate wastewater from restrooms and cooling tower blowdown. There is sufficient treatment capacity at East Bay Municipal Utility District's (EBMUD) wastewater treatment plant to accommodate this wastewater. The wastewater from the site would be directed to the Hearst Monitoring Station and to sub-basin 17-013. Given that sub-basin 17-013 is not constrained during peak wet weather flows, and is expected to have future wet weather capacity, the Proposed Action would not overburden the existing capacity of sanitary sewer systems (LBNL 2008).

Implementation of the CRT facility under the Proposed Action would increase impervious surfaces at the LBNL site by 1.49 acres, which would increase site storm water flows. The existing LBNL storm water drainage facilities have adequate capacity to service existing and future development in the area. The design features incorporated into the facility include a series of subsurface hydromodification vaults that

would be sized to hold peak storm flows and release storm water discharge at a rate no greater than the pre-development condition (LBNL 2008).

Water consumption for the CRT facility at full occupancy is estimated at approximately 32 million gallons per year or an average of about 88,000 gallons per day (gpd). This includes demand for domestic water, fire suppression water, and cooling tower water. The proposed facility would include high-efficiency fixtures and storm water reclamation for toilet flushing and recirculation of cooling water, which would reduce water demand. EBMUD prepared and approved a water supply assessment for growth at the LBNL site under the 2006 LRDP. In order to address the water demand for the CRT facility, UC LBNL presented a revised estimate of 80 million gallons of water needed per year by 2025 for all facilities on the LBNL site (compared to a need for about 61 mgd, which was the previous estimate under the 2006 LRDP) to EBMUD. EBMUD indicated that it can provide this volume of water to LBNL from its existing supply sources. Therefore, EBMUD can meet the demands for water associated with the Proposed Action from its existing supply sources (LBNL 2008).

As stated in **Section 4.0**, electrical power at the LBNL site is purchased from WAPA and delivered by PG&E transmission system to the LBNL's Grizzly Peak substation located adjacent to Building 77. The Grizzly Peak substation consists of two DOE-owned transformers with a combined capacity of 100 MW. This substation is exclusively for LBNL use. In addition, power can be supplied to LBNL from UC Berkeley's Hill Area Substation, located adjacent to the Grizzly Substation. Total electrical power consumption at LBNL in 2006 was 71,100-megawatt hours (MWh). The CRT facility would require up to 7.5 megawatts (MW) of power at the time of initial building occupancy, and 17 MW at full buildout of the facility, which corresponds to 148,900 MWh of power consumption per year and represents a three-fold increase in electricity consumption at LBNL. The electricity demands under the Proposed Action would require modifications to the Grizzly Peak substation and transmission facilities within the LBNL site. These modifications would be accomplished entirely within the footprint of existing utilities or the CRT project site and would include use of existing spare breakers at the Grizzly Peak substation, installation of new conductors from the substation to the proposed CRT facility using spare conduits through an existing electrical manhole, and extension of a new duct bank from the existing manhole to the CRT building. The construction of these improvements would take place in areas that are already disturbed, so the potential to encounter cultural and biological resources would be low. In addition, the upgrades would not modify views of the site. The natural gas pipeline segment within the CRT building footprint would be relocated to the north within the CRT site. This relocation would not adversely affect cultural or biological resources for reasons discussed in **Section 5.4, Biological Resources** and **Section 5.5, Cultural Resources**.

5.11.2 Alternative 1, Cafeteria Parking Lot Site

All of the utility requirements at the Alternative 1 site would be substantially similar to the Proposed Action. The environmental impacts would be the same as described above for the Proposed Action.

5.11.3 Alternative 2, RFS Site

An estimated 300 people would be added to the RFS site under this alternative, in comparison to 135 persons added to the LBNL site under the Proposed Action. Therefore, demands for utilities services, including water, wastewater, and solid waste disposal, under the alternative would be higher in comparison. However, based in current usage levels and capacity, it is anticipated that sufficient utilities and service systems would be available for the proposed facility at the RFS site.

Energy demands under the alternative would be the same as the Proposed Action. PG&E provides electricity to the RFS via a 12-kilovolt (kV) electrical line (UC Berkeley 2008). The electrical system is at 65 percent capacity. Assuming the line operates at a maximum load of 600 amperes, the remaining capacity would be 2.5 MW. The CRT facility would require 7.5 MW at facility startup and 17 MW at full buildout. Improvement to the distribution system and a substation would be required which would be constructed on the RFS site and would result in environmental impacts that are described in other sections of this EA, including but not limited to **Section 5.4, Biological Resources; Section 5.5, Cultural Resources; Section 5.6, Visual Resources; Section 5.7, Air Quality; Section 5.8, Greenhouse Gases; Section 5.9, Noise; and Section 5.10, Transportation and Traffic.**

The RFS site is not adequately served by high-speed and high-bandwidth networking. This alternative would therefore require installation of ESnet infrastructure. Installation of 100-gigabyte fibers would require considerable extra cost. The environmental impacts from the installation of ESnet within the RFS site are described in other sections of this EA.

5.11.4 Alternative 3, Former DHS Site

Implementation of the proposed facility at the Alternative 3 site would incrementally add to the new academic and support program space anticipated under the UC Berkeley 2020 LRDP EIR. The demand for utilities such as water supply and infrastructure, wastewater facilities, stormwater drainage facilities, and solid waste services associated with new building space was accounted for in the 2020 LRDP EIR. The water demands, wastewater generation, and solid waste demands would not be substantial in comparison to research facilities that involve laboratory uses. However, given that the facility's demand for electricity would be substantial, additional improvements such as installation of power lines using existing conduits and a substation would be needed to ensure that the supply and transmission facilities

are available to meet needs of the building. The construction of these improvements would take place in city streets and the former DHS site in areas that are already disturbed. The site is not adequately served by high-speed and high-bandwidth networking. This alternative would therefore require installation of ESnet infrastructure. There is no ESnet infrastructure available at the site and an extension of the cable system will be necessary. The environmental impacts from installing additional cables in city streets would be minimal.

5.11.5 Alternative 4, Leased Facility on San Pablo Avenue

The facility to be leased is already served by existing utilities providers. However, given that the facility's demand for electricity would be substantial, additional improvements such as installation of power lines on existing poles or using existing conduits and a substation would be needed to ensure that the supply and transmission facilities are available to meet needs of the building. Because these improvements would be constructed within city streets and on the 6701 San Pablo Avenue site—environments that are already disturbed, their construction would not result in substantial adverse environmental effects. The site is not adequately served by high-speed and high-bandwidth networking. This alternative would therefore require installation of ESnet infrastructure. Although the environmental impacts from installing additional cables in city streets would be minimal, installation of 100-gigabyte fibers would require considerable extra cost.

5.11.6 Alternative 5, No Action

No changes would occur with respect to utilities under the No Action alternative.

5.12 PUBLIC SERVICES

5.12.1 Proposed Action

The CRT facility would be built to all currently applicable codes and would provide emergency access as required under applicable laws and regulations. The on-site fire station would provide first response capabilities in the event of a fire or hazardous materials release. The on-site security would be addressed in the contract for services between the UC LBNL and the private security firm. The 135 new people that are anticipated under the Proposed Action would represent a small percent of the average daily population of around 4,515 at the LBNL site in 2006. Based on the historic average of calls for police services (approximately 10 calls per year), new staff associated with the Proposed Action would not cause a noticeable increase the number of calls for police services. Given the distance between the LBNL site and the OSF, it is unlikely that the staff from that facility would relocate their place of residence for commuting purposes, therefore the Proposed Action would not likely result in changes to residential

populations. The effects from population growth on school and park facilities and services would be minimal.

5.12.2 Alternative 1, Cafeteria Parking Lot Site

If the CRT facility were constructed at the Alternative 1 site, effects on public services would be substantially the same as those described above for the Proposed Action because the population added to the LBNL site would be the same.

5.12.3 Alternative 2, RFS Site

The addition of 300 people associated with the proposed facility would minimally increase demands for law enforcement and fire protection services at RFS. Given that the alternative is not likely to result in relocation of families of staff and researchers, project-related population would place minimal demand on recreational facilities and schools.

5.12.4 Alternative 3, Former DHS Site

Placement of the facility at the former DHS site would minimally increase demands for law enforcement and fire protection services in that area. The demands would be substantially similar to those described under the Proposed Action because the population of the facility would be the same. Similarly, demand on schools and recreational facilities would also not increase.

5.12.5 Alternative 4, Leased Facility on San Pablo Avenue

The facility to be leased at 6701 San Pablo Avenue is already served by existing public services providers. A private security contractor would supplement existing law enforcement personnel serving the project site. Given that the leased facility is generally close to the existing OSF and LBNL sites, it is unlikely that the majority of the relocated staff would move their place of residence in order to work at the Alternative 4 site. Therefore, the alternative would place minimal demand on recreation, parks, and schools in the area.

5.12.6 Alternative 5, No Action

No changes would occur with respect to public services under the No Action alternative.

5.13 POPULATION AND HOUSING, SOCIOECONOMICS, AND ENVIRONMENTAL JUSTICE

5.13.1 Proposed Action

The proposed CRT facility would accommodate approximately 300 employees, of which approximately 250 would be UC LBNL staff and 50 would be UC Berkeley staff and students. Approximately 15 staff could be new or relocated LBNL staff. These new persons would not add substantially to the total population within the Bay Area. Given the distance between the LBNL site and the OSF, it is unlikely that many, if any, of the staff relocating from OSF would relocate their place of residence for commuting purposes.

Construction activities associated with the Proposed Action would draw temporary workers from the local area at the discretion of subcontractors selected to perform the work. All contractors and staff would be hired in compliance with UC and DOE guidelines.

Executive Order 12898, "Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations," requires agencies to identify and address disproportionately high and adverse human health or environmental effects its activities may have on minority and low-income populations. As stated in **subsection 4.2.13**, minority and low-income populations are present in the census tracts adjacent to the Proposed Action site. However, the Proposed Action would not result in environmental effects or human health risks that could affect minority or low-income populations in the surrounding area. The environmental effects and human health risks associated with the Proposed Action are the subject of this EA; as shown by the analysis in this EA, no adverse environmental consequences are anticipated under the Proposed Action.

5.13.2 Alternative 1, Cafeteria Parking Lot Site

Given that Alternative 1 is also located on the LBNL site, the effects related to population and housing, socioeconomics, and environmental justice would be the same as described above for the Proposed Action.

5.13.3 Alternative 2, RFS Site

The relocation of 300 LBNL and UC staff to the RFS site would not likely result in relocation of the majority of those families since the distance between the LBNL site and the RFS site is approximately 5 miles. Therefore, the alternative would not substantially increase the residential population of Richmond.

The site is largely isolated from the adjoining residential areas in the City due to the location of the freeway and railroad tracks. The nearest residential uses are south and west of the RFS site, approximately 1,500 feet away. Furthermore, this EA found no adverse human health or other effects from the construction and operation of the CRT facility at RFS. Therefore, the alternative would not result in disproportionate impacts to low-income and minority populations.

Similar to the Proposed Action, the hiring of construction contractors and any new staff would be subject to UC and DOE guidelines.

5.13.4 Alternative 3, Former DHS Site

Similar to the evaluation for the Proposed Action site, relocating staff at the DHS site would not likely trigger housing changes in the area given its proximity to the LBNL site and OSF, and therefore the alternative would not substantially increase the residential population of the City of Berkeley.

Although minority and low income populations are present in the census tracts near the DHS site, this EA found no adverse human health effects from the construction and operation of the CRT facility at this site. This EA found that construction of the facility at the DHS site would elevate noise levels above the City's thresholds for residential land uses. Although the apartments adjacent to the DHS site would be exposed to elevated noise levels during construction, the effects would be temporary. Furthermore, the elevated noise levels would not disproportionately affect the minority or low-income populations compared to all populations in the areas. Therefore, the alternative would not result in a disproportionate impact on low-income and minority populations.

The hiring of new staff related to construction and operation of the project would be consistent with UC and DOE policy.

5.13.5 Alternative 4, Leased Facility on San Pablo Avenue

Relocation of staff to the leased facility at 6701 San Pablo Avenue would not result in substantial residential relocation because the facility is less than 4 kilometers (2.5 miles) away from the LBNL site and approximately 5 kilometers (3 miles) away from the OSF site. Therefore, the alternative would not substantially increase the residential population of the cities of Berkeley, Emeryville, or Oakland.

Minority and low income populations are present in the census tracts near the leased facility at 6701 San Pablo Avenue. This EA found that construction of the facility at the San Pablo Avenue site would elevate noise levels above the City's thresholds for residential land uses. Although the apartments adjacent to the leased facility site would be exposed to elevated noise levels during construction, the effects would be

temporary. Furthermore, the elevated noise levels would not disproportionately affect the low-income populations compared to all populations in the areas. Therefore, the alternative would not result in a disproportionate impact on low-income and minority populations.

5.13.6 Alternative 5, No Action

No changes would occur with respect to population, housing, socioeconomics, and environmental justice under the No Action alternative.

5.14 CONSTRUCTION TRAFFIC ACCIDENTS

Accidents are discussed in various different sections of this EA. For accidents due to earthquakes and landslides, see **Section 5.1, Geology and Soils**. For information about risks from hazardous materials and wildland fires, and a description of emergency response, see **Section 5.3, Hazards, Human Health, and Accidents**. Traffic accidents are discussed below.

5.14.1 Proposed Action

The Proposed Action would not change the physical characteristics of the street network on the site or along the designated truck route. Construction traffic generated by the Proposed Action would be controlled by the Site Construction Coordinator and would be maintained below the level required to avoid exceeding City of Berkeley thresholds governing intersection operations, roadway segment operation, and pavement conditions. In other words, there would not be a considerable increase in construction truck traffic and therefore no corresponding increase in potential for traffic accidents compared to existing conditions. Furthermore, truck traffic contributed by the Proposed Action would not in itself increase the potential for traffic accidents to occur. Therefore, there would be no reasonably foreseeable increase in risk to health and safety from transporting demolition or construction material associated with the Proposed Action.

5.14.2 Alternative 1, Cafeteria Parking Lot Site

The potential for truck collisions during construction of Alternative 1 would be similar to those described above for the Proposed Action.

5.14.3 Alternative 2, RFS Site

As described above in **Section 5.10, Transportation and Traffic**, the intersection of Syndicate Street and Meade Street, between the RFS site main entrance and the freeway, currently operates at an acceptable level of service. Given that construction trucks have only a short distance to travel from the RFS site

entrance to the freeway, and the intersection has relatively low volumes of traffic, the risk of traffic accidents on Richmond Streets related to construction of Alternative 2 would be low.

5.14.4 Alternative 3, Former DHS Site

Given that trucks from the Alternative 3 site would follow the same truck route as the Proposed Action, the potential for collisions from construction trucks would be similar. As explained in **subsection 5.14.1**, this potential risk would be minimal.

5.14.5 Alternative 4, Leased Facility on San Pablo Avenue

Under Alternative 4, construction traffic would be limited because construction would be confined to interior modifications and the addition of a floor to an existing building and no grading activities would be needed. Construction traffic would travel through two or more intersections that operate at a LOS D. However, given the limited number of trucks needed for construction, the risk of traffic accidents associated with construction at the Alternative 4 site would be low.

5.14.6 Alternative 5, No Action

There would be no construction associated with the No Action Alternative. Therefore, no construction traffic accidents would occur.