

SEISMIC SAFETY & MODERNIZATION PROGRAM

Environmental Analysis and Checklist

Prepared By:

**University of California
Lawrence Berkeley National Laboratory
One Cyclotron Road
Berkeley, California 94720**

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Contact: Jeffrey Philliber, Site & Environmental Planner
jgphilliber@lbl.gov

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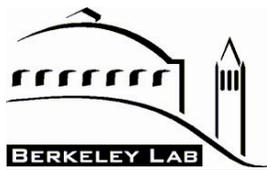
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1.0 ENVIRONMENTAL ANALYSIS AND CHECKLIST

- Project Title:** Seismic Safety and Modernization Program
- Lead Agency:** The University of California Lawrence Berkeley National Laboratory (UC LBNL, the University, or Berkeley Lab)
- Location:** Lawrence Berkeley National Laboratory
One Cyclotron Road
Berkeley, California 94720
- Applicant:** See Lead Agency above
- Existing LRDP Designation:** Central Commons; Academic and Research
- Existing On-site Land Use:** The two project sites are currently developed. The first project site is existing Building 54 which houses the LBNL Cafeteria and the adjacent parking lot and driveway area; the second project site is Building 48, which houses the LBNL first-responder personnel.
- Surrounding Land Uses:** Both project sites are located in central portions of the Berkeley Lab and are surrounded by existing LBNL facilities. Buildings 70 and 70A are located to the west and southwest of Building 54, and Buildings 2, 6, and 23 are located to the east. Land to the south and southeast of Building 54 is undeveloped and slopes downward and away from the project site. Buildings adjacent to Building 48 include Buildings 35 and 45 to the west and Building 30 to the north. Land to the south and east of Building 48 is undeveloped.
- Description of Project:** See Project Description in **Section 2.0** of this document.
- Responsible Agencies:**
- San Francisco Bay Regional Water Quality Control Board (Coverage under the Statewide NPDES General Permit for Stormwater Discharges Associated with Construction Activity and Land Disturbance Activities)
 - East Bay Municipal Utility District (wastewater discharge permit to manage accumulated ground and stormwater)

Identification of previous documents incorporated by reference:

This environmental analysis incorporates by reference the text in the following documents:

- 2006 Long Range Development Plan Final EIR. SCH No. 2000102046
- Seismic Life Safety, Modernization and Replacement of General Purpose Buildings, Phase 2 Project (Including Supplementation of the LBNL 2006 LRDP EIR with respect to Traffic Impacts at One Intersection) Final EIR. SCH No. 2008122030
- 2012 Memorandum: Construction Truck Trips (Updated), prepared by Fehr & Peers, 2012
- Building 59 Upgrade & Installation and Operation of NERSC-9 (Including Supplementation of the 2006 LRDP EIR with respect to Greenhouse Gas Emissions and Energy Impacts) Final EIR. SCH No. 2016062007

These documents are available for review at the following locations:

<https://www.lbl.gov/community/SSMWelcomeCenter/>

and

Lawrence Berkeley National Laboratory
1 Cyclotron Road Mail Stop 76-225
Berkeley, California 94720-8281

2.0 PROJECT DESCRIPTION

2.1 Introduction

The section describes the proposed Seismic Safety and Modernization (SSM) Program need and objectives, its various components and design features, its associated population, its operational activities, and its construction schedule.

The University of California, as the management and operating contractor of the Lawrence Berkeley National Laboratory (UC LBNL)¹, proposes to implement the SSM Program that comprises the following two projects: (1) the Welcome Center Building project which involves demolition of Building 54 (Cafeteria) and the construction of a new Welcome Center at the site of Building 54 that would house the LBNL Cafeteria, Health Services Department, Human Resources Department space, and a Conference Center; reconfiguration of the Building 54 Parking Lot and the area between Building 54 and Lawrence Road to improve vehicle and pedestrian circulation; and extension of the Parcel 21 (Building 54 and parking lot) ground lease. (2) Building 48 Seismic Retrofit project which involves the seismic retrofit of the second floor of Building 48 (Firehouse building).

Because the Welcome Center Building project would be undertaken on land owned by the UC Regents and would require UC Regents design approval, the Parcel 21 ground lease extension would require approval from the Regents Real Estate Committee, and the seismic retrofit of Building 48 would require approval at the Berkeley Lab under authority delegated by the Regents, the University must evaluate the environmental impacts of the proposed projects that comprise the SSM Program pursuant to the California Environmental Quality Act (CEQA). CEQA Section 15168(c)(2) provides that if, pursuant to CEQA Section 15162, no new impacts could occur and no new mitigation measures are required, then a project may be considered within the scope of a governing program Environmental Impact Report (EIR) and no new environmental documentation is required. Berkeley Lab's current governing programmatic CEQA document is its 2006 Long Range Development Plan (LRDP) Final EIR, certified in 2007 and as later supplemented (the "2006 LRDP EIR").² UC LBNL has evaluated the proposed SSM Program in accordance with *State CEQA Guidelines* Section 15168(c)(2) to determine whether the proposed

¹ In this document, "LBNL" refers to the Lawrence Berkeley National Laboratory, a national federally funded research and development center located in the Oakland-Berkeley hills, and "UC LBNL" refers to the University in its role as the management and operating contractor of the laboratory. LBNL facilities are owned or controlled by the Department of Energy (DOE) and are located at the main LBNL site in the Berkeley-Oakland hills and at a number of leased properties, such as the Potter Street facility in Berkeley. The main LBNL site is on land owned by the Regents of the University of California and includes land the federal government leases from the University and on which it constructs federally-owned buildings, as well as UC-owned land not leased to the federal government.

² The 2006 LRDP EIR was supplemented in 2010 (Seismic Life Safety, Modernization and Replacement of General Purpose Buildings, Phase 2 Project (Including Supplementation of the LBNL 2006 LRDP EIR with respect to Traffic Impacts at One Intersection) Final EIR SCH No. 2008122030) and in 2017 (Building 59 Upgrade & Installation and Operation of NERSC-9 (Including Supplementation of the 2006 LRDP EIR with respect to Greenhouse Gas Emissions and Energy Impacts) Final EIR SCH No. 2016062007).

projects that comprise the SSM Program are within the scope of the LBNL 2006 LBNL EIR. The University's intent to analyze projects under the 2006 LRDP program using the 2006 LRDP EIR pursuant to CEQA Section 15168(c)(2) is identified and explained in the Introduction, Summary, and Project Description sections of the 2006 LRDP Final EIR.

UC LBNL has determined—on the basis of the environmental analysis and checklist in this document—that the environmental impacts from construction and operation of the Welcome Center and the seismic retrofit of Building 48 are adequately analyzed in the Program EIR, and that under *State CEQA Guidelines* Section 15162(a) there would be no increase in the severity of previously identified impacts, there would be no new significant impacts, and no new mitigation measures or alternatives, are required, and the preparation of a subsequent EIR is not required. Therefore, further evaluation and documentation under CEQA are not required for the proposed SSM Program. (*State CEQA Guidelines* Section 15168(c)(2).)

2.2 Project Need and Objectives

Lawrence Berkeley National Laboratory (“LBNL” or “Berkeley Lab”), located on a 202-acre site in the hills above the University of California Berkeley campus, employs 3,400 full time employees and is home to five U.S. Department of Energy (DOE) Office of Science (SC) national user facilities. Berkeley Lab is located less than one mile from the Hayward fault and less than 25 miles from the San Andreas fault, which would both pose a potential life safety risk to employees, visitors and guests during a significant seismic event (HDR 2019).

UC LBNL has taken a systematic approach to address seismic safety risk. All buildings on Lab site have been seismically evaluated and rated in accordance with the University of California rating system. Critical lab facilities such as the Cafeteria, Firehouse, and Health Services building have been identified as significant and extensive seismic safety hazards that will suffer significant structural damage in the event of a 6.0 or higher magnitude earthquake on the Hayward Fault or an 8.3 or higher magnitude earthquake on the San Andreas Fault. The U.S. Geological Survey's latest earthquake forecast, the third Uniform California Earthquake Rupture Forecast (UCERF3), states a 98% probability of a 6.0 magnitude or higher earthquake in the San Francisco Bay Area before 2043. Potential damage to seismically deficient buildings from an earthquake of this magnitude will impede LBNL's ability to resume operations (HDR 2019).

The UC LBNL Health Services and the on-site Fire Department provide critical services needed to respond to a major natural disaster or emergency. Therefore, the poor seismic conditions of the buildings that house these functions present considerable risks to the safety of emergency response personnel and employees.

Building 26, the Health Services building, was constructed in 1963 and is rated seismically “poor” and is not expected to survive a major earthquake without incurring significant damage. Deficiencies include an undersized structural moment frame and inadequate bracing, undersized columns and beams in the Building addition, and an inadequate seismic gap between the original Building and a subsequent addition of office and conference room space. The current Health Services space is also undersized for current health care modalities offered and patient / client throughput (HDR 2019). After the relocation of Health Services to the Welcome Center Building, Building 26 would remain vacant for the foreseeable future. At some later date, it may either be seismically renovated or demolished.

Building 48 (Firehouse) was constructed in 1981 and includes offices, dorms, a kitchen and a monitoring and dispatch office that is rated seismically “fair.” The structural connections between the roof framing and the perimeter reinforced masonry walls are inadequate, posing a life safety risk to the building’s second floor occupants. The Firehouse is continuously occupied 24 hours a day, seven days a week and houses emergency first responders, whose availability is essential for rapid seismic, fire, medical, or other major emergency response (HDR 2019).

Building 54, originally constructed in 1949, is the campus’ central cafeteria and is occupied during its busiest hours by over 300 people who would be exposed to life safety risks in a seismic event. Building 54 is rated seismically “poor” and is not expected to survive a major earthquake without significant damage to the structure; this poses a safety hazard to building occupants. Building deficiencies include the lack of adequate shear strength in the walls at the main entrance, coffee bar, serving, and dining areas. In addition, there is a roof diaphragm weakness in the dining room and kitchen areas. Also, structural columns in the kitchen area lack attachment to the building foundations (HDR 2019).

The existing Building 54 site is centrally located within the Berkeley Lab and would be a natural congregation area for employees in the event of an earthquake or other shelter-in-place emergency. The Building 54 site is in close proximity to the Advanced Light Source and Guest House, which attract visitors and guests who also would likely congregate in the Cafeteria in the event of an emergency. However, the existing building does not meet the required safety rating to act as a safe shelter after a major earthquake, and there is not adequate space to accommodate a large number of people. Further, conference facilities are natural emergency congregation areas. However, LBNL’s existing conference facilities are currently dispersed across the campus and are inadequate in size and quantity for many events that the institution would prefer to host on-site. Large, centralized conference facilities located near user facilities would help alleviate emergency response and communication difficulties; they would also greatly improve the experience of visitors and LBNL employees while increasing the level of collaboration among the diverse research community (HDR 2019).

Lastly, current traffic and pedestrian circulation around Building 54 present risks to employees and visitors to LBNL. Pedestrians making their way to Building 54 from the east, where the Advanced Light Source and Guest House are located, are forced to walk through a shuttle route and loading dock or navigate their way through a busy parking lot. Separating pedestrian pathways from vehicular lanes along with changes to ingress and egress traffic flow would greatly improve the safety profile of this area and improve access and response times for multiple emergency vehicles in the event of a major emergency (HDR 2019).

Key objectives of the proposed project are to:

1. Provide a seismically sound space to provide food services to employees, visitors, and guests to effectively support scientific operations and maintain continuity of operations.
 - a. Substantially reduces the risk of injury to employees, visitors, and guests at the Cafeteria.
 - b. Provides the ability to serve food to emergency personnel, employees, and guests after a seismic event.

2. Provide a modern Health Services facility that is seismically rated to withstand a significant earthquake.
 - a. Substantially reduces the risk of injury to Health Services employees and patients.
 - b. Allows Health Service employees to provide effective medical treatment to emergency personnel, employees, and guests after a seismic event.
3. Provide a Firehouse that is seismically rated to withstand a significant earthquake.
 - a. Substantially reduces the risk of injury to emergency first responder personnel.
 - b. Maintains communication and allows for continued functionality of emergency dispatch center after a seismic event.
4. Provide adequate shelter space to assemble and disseminate emergency information to employees, visitors, and guests after a seismic event or emergency.
5. Improve traffic and pedestrian circulation near the Cafeteria.
 - a. Provides safer pedestrian access when traveling from the east to the Cafeteria.
 - b. Allows for segregation of traffic lanes and pedestrian access.
 - c. Provides improved response times for emergency vehicles and mass transit.
6. Improve operational efficiencies including reduction in deferred maintenance costs.

2.3 Project Location and Surrounding Uses

LBNL is situated in the eastern hills of the cities of Berkeley and Oakland in Alameda County on approximately 200 acres that are owned by the University of California (see **Figure 1, Regional Location**). The LBNL hill site is surrounded by open space, institutional uses, and residential and neighborhood commercial areas. UC Berkeley’s main campus and its Hill Campus, including the Strawberry Canyon open space areas, lie south of the LBNL hill site. Residential neighborhoods and a small neighborhood commercial area in the City of Berkeley lie to the west, and regional open space, including the 2,000-acre Tilden Regional Park, lies to the northeast.

The proposed SSM Program would be located on two sites on the LBNL hill site (see **Figure 2, Project Sites**), which are described below.

2.3.1 Building 54 Site

The first project site is an approximately 45,000 square foot (sf) area that comprises the existing Building 54 and a number of asphalt parking areas that include the Building 54 Lot to the northeast of the building, Big ‘C’ Lot to the southeast, Seaborg Road and parking lot between Buildings 70 and 70A to the west. The site generally slopes from the north east to south-west.

Building 54 is located at the head of a small canyon that slopes towards Cafeteria Creek. The existing building is a one-and-a-half-level structure located between Buildings B70, B70A, and Lawrence Road with approximately 14,850 square feet of building space. The main level consists of a cafeteria wing with access from the patio adjacent to Building 70A, and a conference room wing extending south west roughly parallel to Lawrence Road. A basement level contains a

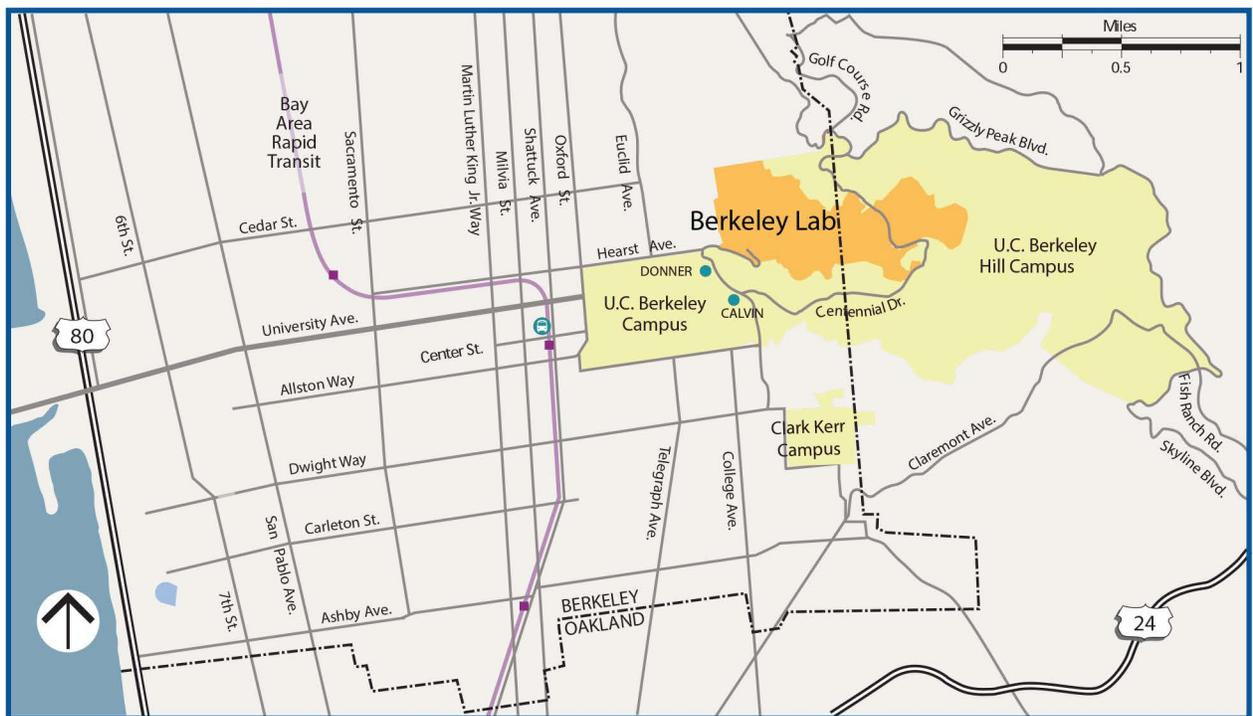
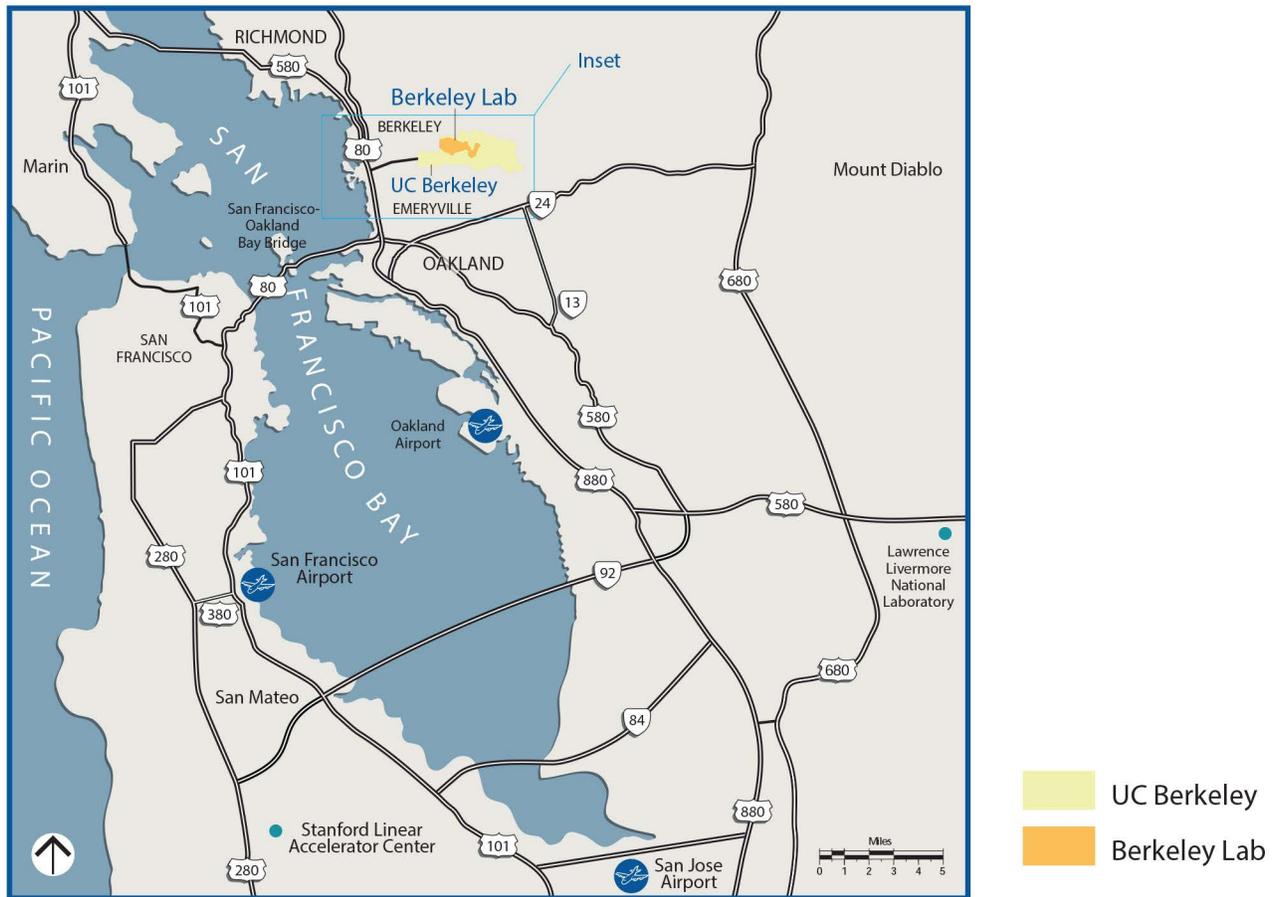


Figure 1: Regional Location



Figure 2: Project Sites

reading room and mechanical spaces. The long axis of the existing structure follows the elevation contour near the top of the canyon. Views from the building are oriented to the south-west across the canyon and toward the San Francisco Bay.

Vehicular access includes a one-way entry on Lawrence Road to parking areas near the building entrance, and a two-way parking entry on the northern end of the Building 54 Parking Lot. There are 62 spaces available in the Building 54 Parking Lot, and two spaces are ADA compliant.

Pedestrian access to Building 54 is currently via a series of stairs and/or ramps from Lawrence Road, the Building 54 Parking Lot, Building 70A, and the access route around Building 70. Many paths in the area feature one or more flights of stairs to address elevation changes. Paths run from Building 23 and Lawrence Road to the building entry and parking areas, and to the southeast end of the building. Paths and sidewalks to a shuttle stop along the one-way parking lot driveway also connect to the building's main entry and far southeast entry, as well as to Lawrence Road. A gently sloping walk follows the approximate slope contours along the front, east side of the building. Paths also connect from the building entry to the exterior patio; around the west side of the building paths follow along a tall retaining wall to Building 70A. A smaller path runs northward from the exterior patio along the northeast face of Building 70 to an ATM machine and, further to the north, to McMillan Road.

The existing loading dock is located at the northeast side of the building. Pedestrians must cross the loading dock in order to access the main entry, presenting a safety hazard.

Major facilities surrounding the Building 54 site include the Building 70 complex to the west and northwest, and Buildings 23 (Guest House), 2, and 6 (Advanced Light Source) to the east. Land to the south and southeast of Building 54 is undeveloped and slopes down to Cafeteria Creek.

2.3.2 Building 48 Site

The second project site is Building 48, located in the south-central portion of the hill site. LBNL buildings adjacent to the Firehouse include Buildings 45 and 35 to the west and Building 30 to the north. Land to the south and east of Building 48 is undeveloped.

2.4 Proposed Welcome Center Building

The proposed project includes a new Welcome Center building at the site of the current Building 54 which would be demolished, and access and circulation improvements to the Central Commons area that lies between the proposed building and other surrounding buildings. The project is shown on **Figure 3, Welcome Center Building Project Site Plan**.

2.4.1 Departments

The proposed Welcome Center building would house Health Services, Human Resources, Cafeteria, and conference functions. These are detailed below.

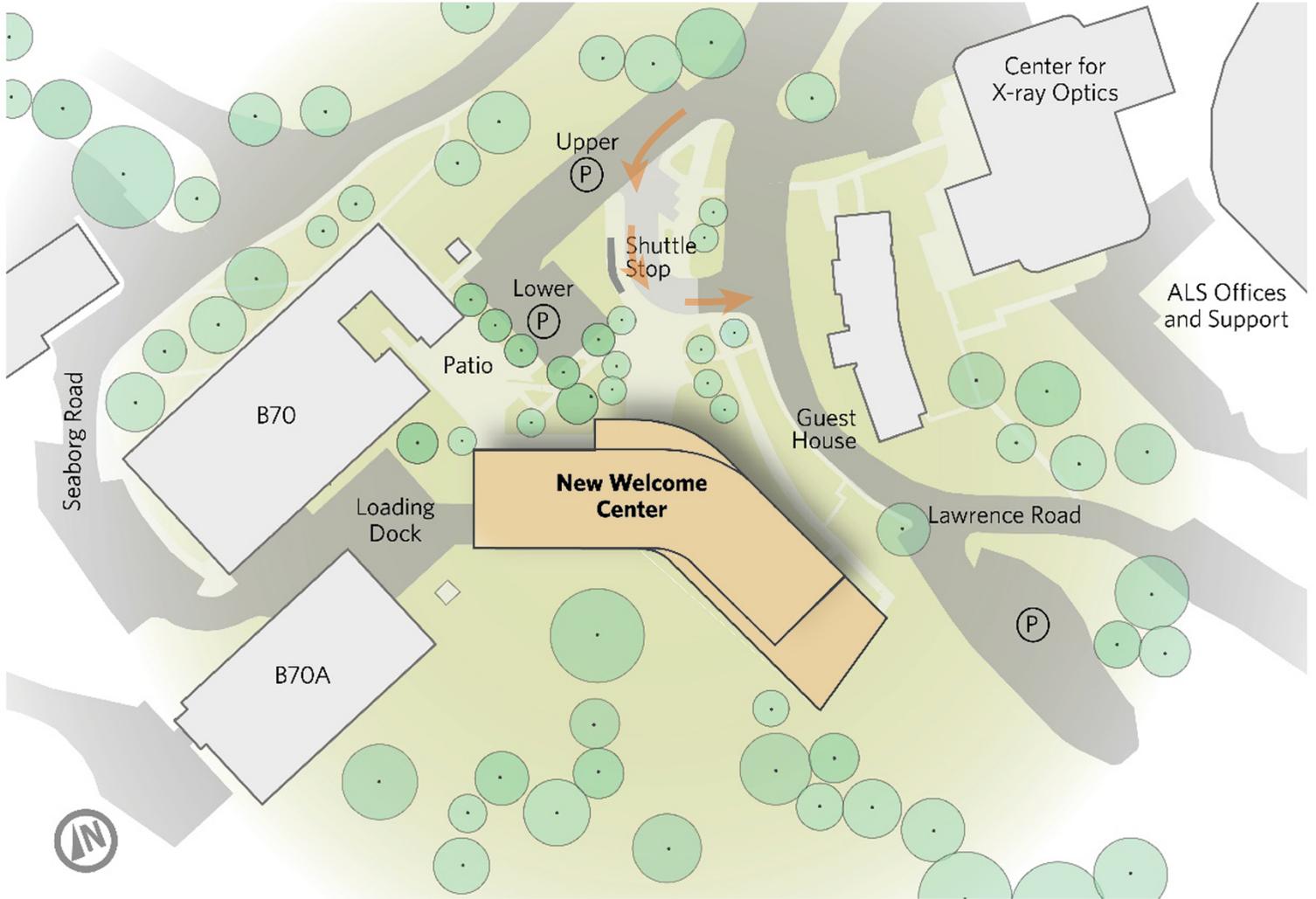


Figure 3: Welcome Center Building Site Plan
 Welcome Center Building, Parking Lot, and Transit Hub

Health Services

Health Services offers a series of clinical programs and services that are available to the benefit of Berkeley Lab employees as well as in support of Berkeley Lab research projects. These include exams and assessments, first aid and wellness, and worker assistance and accommodation. Health Services is currently in Building 26, a seismically deficient structure, and will be relocated to the new Welcome Center building. Health Services also provides initial triage of patients in the event of an accident or emergency and requires exterior access for a gurney to arrive from a nearby Ambulance drop off point.

Human Resources

Human Resources' mission is to foster the recruitment, retention, and development of exceptional and diverse scientific, engineering, and operational talent through customer focused and efficient human resources support. Members of the department, currently in Buildings 90 and 65, would be relocated into the new Welcome Center building. The department would consist of administration functions, Visa Services, and Onboarding.

Cafeteria

As discussed above, the Central Cafeteria is currently located in Building 54, a seismically deficient building. The Cafeteria contains 234 dining seats and serves breakfast and lunch for employees and visitors. The new program would grow in size to 325 interior dining seats to accommodate the growing campus population plus additional exterior dining seats on an adjoining roof patio. A Coffee Bar would provide additional beverages and grab-n-go food until late afternoon. In addition to a Dining Hall, the Cafeteria program consists of a Servery, Kitchen, Cold Food Storage and Dry Food Storage.

Conference Center

The Conference Center would feature two large, adjoining conference rooms totaling 1,980 square feet and accommodating about 120 people. Alongside these would be a number of smaller, specialized meeting spaces: two modest-sized "executive" conference rooms, a training room, two small private meeting rooms, and some ancillary spaces for kitchen, storage, and technical/administrative use. Altogether, these spaces could accommodate up to 200 people if all were fully occupied at the same time.

The Conference Center would provide a unique Berkeley Lab campus space dedicated to accommodating large meetings and gatherings; it also would feature movable walls and a diversity of room sizes and types to maximize utilization. Conferences that might be held off-site due to size and space constraints would have a viable option to be kept on-site at the Welcome Center; this would save travel time and expense while likely reducing Berkeley Lab's traffic burden on local roads and intersections. Moreover, the Conference Center would help alleviate a severe campus-wide shortage of meeting and gathering space: conference rooms at Berkeley Lab tend to be undersized, overbooked, lacking in proper accommodations, and far flung throughout the 203-acre

Lab site. This will be especially important with the demolition of Perseverance hall (part of Building 54) and the loss of its 75-person conference room capacity.

Information Technology & Shared Space

A centrally located IT space would be centrally located in the building. Shared Space would include spaces to be utilized by building occupants, such as the Main Lobby, Building Storage, Loading Dock, Lactation Room, and Showers.

2.4.2 Proposed Demolition of Building 54 and New Welcome Center Building

The project would demolish existing Building 54 (about 14,848 gsf of space, including the “Perseverance Hall” meeting area) and construct a new 47,500 gsf building, the Welcome Center, which would comprise two full levels and a partial basement (**Figure 4, Building Elevation**). The new Welcome Center building would occupy the excavated zone that would remain after demolition of Building 54.

The new lower level, which would house Health Services and Conferencing facilities, would be located at or near the same elevation as the main level of the demolished Building 54. This would allow for access to Health Services from the existing lower parking zone via a new entry at the north-west corner of the new building.

The upper level, which would house the Cafeteria, would correspond to the roof of the demolished Building 54, bringing it in approximate vertical alignment with the existing shuttle stop, thereby providing accessible and nominally level access from the upper parking and shuttle to the main entry of the Welcome Center via an improved paved entry patio. The main entry of the new facility would be located at the closest possible point to the campus shuttle stop. The upper level would include a roof terrace at the south-east that extends the dining to the outdoors at a location with excellent San Francisco Bay views.

A partial basement level would be set at or near the existing elevation of the Building 70A loading dock and gas storage area and would contain the building’s loading dock and trash storage facilities.

The footprint of the new building would be larger than the existing Building 54: at the west end, the new building would extend within approximately 25 feet of the existing Building 70A loading area; at the east end the new Welcome Center would extend further to the south-east along a line roughly parallel to Lawrence Road.

2.4.3 Building Design and Sustainability Features

The site offers extraordinary views to the San Francisco Bay and vistas beyond, including the City of San Francisco, the Golden Gate Bridge, and the Marin hills. The proposed Welcome Center design highlights these views through a well-designed entry and extensive window placement. Furthermore, program areas of the Welcome Center are arranged within the building to maximally expose occupants to the most spectacular views: the cafeteria with its adjacent roof terrace and conferencing facilities are located in the building’s south-east wing, where distant views are least obstructed by Building 70A and other natural features.

Similar to the existing Building 54, the new Welcome Center's long facades would be oriented roughly south-west / north-east. This orientation would result in higher exposure of cafeteria dining and conferencing spaces to afternoon and evening sun. Therefore, the south-west façade of the new building would include features to mitigate solar gain and glare.

The building location and orientation, combined with the temperate Berkeley climate and the steady prevailing winds on site, would provide an opportunity to incorporate passive natural ventilation into the building design. The Welcome Center would include features that would take advantage of prevailing winds to reduce building energy use.

The Welcome Center would be sited and designed to provide daylighting opportunities in all the major program spaces, including the kitchen, which would reduce hours of electric illumination and help reduce whole building energy loads.

2.4.4 Other Sustainable Features

All projects at LBNL are required to comply with LBNL sustainability standards, which are designed to achieve compliance with both the federal sustainability goals and the University of California Sustainable Practices Policy. The Welcome Center would comply with the following requirements:

- Meet LBNL Sustainability Standards for New Construction, April 29, 2019
- Follow LBNL Implementation Guide to the Berkeley Lab Sustainability Standards for New Construction, March 2019
- Achieve LEED Gold Certification

Sustainability features in the proposed project include but are not limited to the following:

All Electric Building. In order to avoid an increase in greenhouse gas emissions, no new building or major renovation on the LBNL campus shall use onsite fossil fuel combustion for space or water heating. To meet this target, an all-electric design is proposed for the Welcome Center. The one exception would be the Cafeteria kitchen which could potentially be fully electric or could include natural gas cooktops.

Energy Use. The proposed project includes numerous features to reduce energy use. As discussed above, the project is implementing design strategies that would take advantage of the mild Berkeley climate and minimize the use of refrigerant based cooling. Measures would include mixed mode natural ventilation, daylighting, glare control, ceiling fans, economizer mode in non-naturally ventilated spaces and optimal envelope design. The project is targeting a very low lighting power density and the project would use efficient HVAC systems that are specific to each program space type.

On-Site Renewable Energy. New buildings at LBNL must be designed to generate at least 7.5 percent of the project's energy use from on-site renewable sources. At a minimum, the project would be solar ready to accommodate future renewable energy. The project would provide a solar ready area that allows for the largest, simplest, and most cost-effective PV system, while also

maintaining daylight access to the cafeteria and servery spaces. The concept design includes a solar ready area totaling approximately 8,750 GSF.

Water Use Reduction. The proposed project would reduce indoor water use by 30-40 percent over the LEED baseline, reduce appliance and process use where possible, and implement landscaping that does not require a permanent irrigation system. Low flow plumbing fixtures would be used throughout the building to reduce indoor water use by over 40 percent from the LEED baseline. Further, the majority of the landscaping would be native/adaptive and would not require any permanent irrigation systems. There would be some areas of ornamental landscaping, which would be designed as drought tolerant, but for which irrigation would be needed.

Zero Waste. A Zero Waste Plan would be developed by LBNL to help implement campus zero waste goals. In addition to identifying waste management and other practices for daily operations, space would be provided throughout the Welcome Center to facilitate proper sorting and collection of anticipated waste streams.

2.4.5 Access and Circulation Improvements

Automobile access to Berkeley Lab is via Cyclotron Road (Blackberry entrance), McMillan Road (Grizzly Peak entrance), and Lawrence Road (Strawberry Canyon entrance). Direct access to the Welcome Center would be via Lawrence Road that provides access to the Building 54 Parking Lot.

A welcoming new entry patio and improved accessible pathways would be developed to link the Building 54 Parking Lot and the campus shuttle to the new Welcome Center main entry at the upper level and the secondary entry at the lower level. The patio design would support the mission the new Welcome Center as the “social heart” of the LBNL campus with planting, seating, lighting, paving, and material choices that would combine to create a welcoming “front door” to the new facility. An improved network of accessible stairs, ramps, and sloped pathways would link the new Welcome Center to the main pedestrian and vehicle routes that would link the new Welcome Center to the remainder of the LBNL campus.

Ambulance access would be directed to the lower parking area, near the secondary building entry. A sloped pathway (slope of less than 5 percent) would connect the lower parking to the building entry on the lower level adjacent to the Health Services.

A new loading dock for loading/unloading and waste material storage/disposal would be provided near and adjacent to the existing loading dock at Building 70A, which would be accessed via Seaborg Road.

The project would include long-term and short-term bike storage. Long-term bike storage requires a minimum of 4 bicycle lockers and/or covered, secured bicycle racks. Short-term bike storage requires a minimum of 15 bike racks. The project would also include showers and changing rooms for staff.

As part of the Welcome Center project, the Building 54 Parking Lot and associated driveways and pathways would be redesigned to improve access and circulation, and a shuttle transit hub would be located centrally within the reconfigured Building 54 Lot. The shuttle transit hub would comprise a shuttle stop shelter that would be metal-framed with translucent sides and roof.

Shuttles would likely enter the main parking lot driveway but then turn into a dedicated shuttle lane circling counter-clockwise around a pedestrian island. Shuttles would stop and load/unload passengers at the shuttle stop shelter, which would be close to the Welcome Center main entrance. The reconfigured lot would include 40 regular parking spaces, 3 new accessible parking stalls, and 2 parking spaces with electric vehicle supply equipment (EVSE) to charge electric vehicles. Parking lot, transit hub, and other related foundation work is expected to take place prior to construction of the new Welcome Center.

2.4.6 Landscaping

The landscape that currently provides the immediate setting to the existing Building 54 is a combination of a low maintenance rustic canyon area dominated by eucalyptus, pine, and oak trees, framing dramatic views of San Francisco Bay, and a relaxed, but more directly managed, landscape of perennials, shrubs, and ornamental trees.

Approximately 27 trees would be removed (and later replaced) to construct the proposed Welcome Center. These include 14 trees that are located along the sides of Building 54 Parking Lot, eight trees between Buildings 70 and 70A and Building 54, and four trees to the southeast of Building 54. Landscaping of the project site will follow LBNL standards. Per the LBNL Site Design Guidelines, the entry and parking area of the site is a designated Significant Ornamental Zone, and the southern side of the site is a Rustic Zone. Within the Ornamental Landscapes Zone, landscaping would present a more densely planted palette intended to convey identity and sense of place. Within the Rustic Zone, landscape planting will conform to the guidelines for grasses and trees, and carefully planned to protect views and provide screening, where needed. Replacement landscaping would include native, drought-tolerant, fire-resistant plant varieties.

As discussed under Stormwater Management below, stormwater would be managed by collecting, detaining, and then routing runoff through a series of “flow-through” planters and rain gardens. To achieve this, flatter areas of landscape would be needed for water to collect and flow slowly through. Because plantings in these areas must be able to tolerate seasonal inundation, suitable species would be from wetland and wet meadow plant communities. These plantings may need supplemental summer irrigation.

2.4.7 Utilities

As part of the Welcome Center Building project, LBNL would locally improve the utilities that currently serve Building 54. The proposed improvements are described below.

Potable and Fire Suppression Water

The annual demand for water at the Welcome Center would include demand for domestic water and fire water. The increase in water use at the site would be negligible compared to existing conditions because the proposed Welcome Center would house 55 employees who are already on the LBNL hill site in existing buildings. Furthermore, the proposed project includes high-efficiency fixtures and low-flow urinals, which would further reduce water demand. To provide redundancy in the potable water service (including water for fire suppression), in addition to the existing 6-inch domestic water pipeline that serves Building 54, a second water pipeline line would be

installed that would tie into an existing 6-inch domestic water pipeline adjacent to the project site. A dedicated fire water line and two hydrants would also be installed.

Wastewater

Wastewater flows from the western portion of the LBNL hill site are received in the City of Berkeley's sewer lines below Hearst Avenue (sanitary sewer sub-basin 17-013); this sanitary sewage then flows westward to the East Bay Municipal Utility District wastewater treatment plant. The project site would connect into the existing sanitary sewer located to the southwest of the project near Building 70 via a short new wastewater lateral. The project also includes an underground concrete grease interceptor for kitchen grease waste. It would be located outside near the loading dock where it would be accessible for cleaning.

Solid Waste

In accordance with UC Sustainability Policy,³ the Welcome Center would be designed and operated to meet waste diversion goals: by 2020, send 90 percent of municipal solid waste to recycling and compost facilities, and by 2030, reduce the per capita generation of municipal solid waste by 50 percent from 2016 levels. The Center would also include sufficient space for diversion of organic waste (see Cal Green Building Code Section 4.410.2 & Section 5.410.1). Adequate facilities would be included in the building for the collection and disposal of recyclables and landfill-bound solid waste.

Hazardous Materials and Wastes

No hazardous materials or hazardous wastes would be stored, used or produced at the Welcome Center. Regular cleaning and maintenance-related chemicals that are currently used in Building 54 and other LBNL buildings would be used in the new Welcome Center.

Stormwater

The site comprises two watersheds: The Cafeteria Creek Watershed (including Building 54 and landscaped zones) and the Northfork Strawberry Creek Watershed Boundary (Building 54 Parking Lot). The Cafeteria Creek Watershed drains to Cafeteria Creek and then to the south fork of Strawberry Creek. The Northfork Strawberry Creek Watershed drains to the north fork of Strawberry Creek. The Northfork Strawberry Creek Watershed area is sloped generally west and southwest towards the Cafeteria Creek Watershed area, but the storm drain system directs flows to the north. There are no stormwater management facilities, also called best management practices (BMPs), currently on the project site.

As the Welcome Center is a federal project, UC LBNL is required to implement, as technically feasible, stormwater quality and quantity management practices that maintain or restore the predevelopment hydrology of the property with regard to the temperature, rate, volume, and duration of flow, in accordance with EPA 841-B-09-001: Technical Guidance on Implementing the Stormwater Runoff Requirements for Federal Projects, Section 438 of the Energy Independence and

³ <https://ucop.edu/sustainability/policy-areas/waste-reduction-and-recycling/index.html>

Security Act (EISA). As each project site presents its own unique constraints, EISA 438 is performance based, allowing a range of best practices to be utilized to achieve results. These practices are intended to be used in combination, as appropriate, to the maximum extent technically feasible (METF). The METF language provides agencies with compliance flexibility in recognition that not all projects and project sites are capable of fully meeting EISA 438's predevelopment hydrology targets.

LBNL also holds a National Pollutant Discharge Elimination System (NPDES) Industrial General Permit issued by the State Water Resources Control Board (SWRCB). The NPDES permit program aims to limit runoff flows and reduce pollution from development project's stormwater runoff. To achieve these goals, the guidelines require the implementation of post-construction stormwater Best Management Practices (BMP) to treat and manage the proposed peak flow of stormwater runoff prior to discharge into the local stormwater system.

LBNL is a federal facility operated by the University of California and conducting work within the University's mission on land that is owned or controlled by The Regents of the University of California. As such, LBNL is generally exempted by the federal and state constitutions from compliance with local land use regulations, including general plans and zoning. However, LBNL seeks to cooperate with local jurisdictions to reduce any physical consequences of potential land use conflicts to the extent feasible.

The proposed site would be graded to direct stormwater runoff from all impervious surfaces into localized BMPs to capture and detain stormwater runoff generated from impervious surfaces. The proposed BMPs include flow-through planters, bioretention facilities (rain gardens), and detention facilities (stormwater storage tanks). All stormwater management facilities would be lined to limit onsite infiltration. Onsite infiltration is not feasible as a stormwater management strategy due to concern about slope instability, steep terrain, shallow bedrock, sensitive infrastructure, and potential risk of soil contamination.

The BMPs would provide improved water quality and decrease the peak discharge rate compared to existing conditions before ultimately discharging into the City of Berkeley storm drain system. The BMPs would be sized using the County "4-percent method," which is a simplified method for sizing stormwater treatment facilities and recommends that the surface area of the treatment area should be 4 percent of the impervious area that drains to it for treatment.

Stormwater from the Building 54 Parking Lot would be directed via new and existing stormwater pipes to the north to the North Fork of Strawberry Creek. Stormwater from the Welcome Center building and surrounding landscaped areas would be redirected around the new building. An existing storm drain is currently located under the existing building near the center. This storm drain would be redirected to the west of the building to discharge to Cafeteria Creek. A new below-grade storm drain would also be required from the new stormwater storage tank located at the southeast corner of the building required as part of the stormwater management for the project. The storm drain would be aligned along the length of the canyon and would discharge stormwater at the bottom of the canyon.

Heating and Cooling Systems

Consistent with the UC Sustainable Practices Policy,⁴ natural gas would not be used in the Welcome Center for space and water heating. Chilled water that would be used for cooling the building space would be produced in a heat recovery chiller and an air-cooled chiller. Heating water would be produced in the heat recovery chiller and an air source heat pump.

With the exception of the cooktops, all appliances in the Cafeteria kitchen would be electric. Regarding the cooktops, electric induction and natural gas-based cooktops are both being considered as options. (As natural gas-based cooktops would result in greater emissions, that option is analyzed in this environmental analysis).

Domestic Hot Water

Domestic hot water for the kitchen would be generated by recovering the heat from the chilled water generating heat recovery chiller by running the water through a heat exchanger and into a storage tank. Domestic hot water for the support spaces would be provided from the heat recovery chillers.

Electricity

In FY 2018, Building 54 currently used about 395,820 kilowatt hours (kWh) of electricity. The annual electricity consumption of the Welcome Center is estimated at about 718,121 kWh per year. Electrical power at the LBNL hill site is purchased from the Western Area Power Administration and delivered by the Pacific Gas and Electric (PG&E) transmission system to the Lab's Grizzly Peak Substation located adjacent to Building 77. The Grizzly Peak Substation consists of two DOE-owned transformers with a sustained service capacity of 50 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 Peak Substation. There is currently sufficient electrical capacity at LBNL to serve the proposed project.

Berkeley Lab *Sustainability Standards for New Construction* require new buildings to be designed to generate at least 7.5 percent of the estimated project energy consumption from a renewable energy source. The project would set aside area on the roof for installation of photovoltaic panels that could be installed at a later date.

Standby electrical power would be provided through a back-up generator located in Building 70A.

Natural Gas

As noted above, cooktops involving natural gas are one of two options being considered for Cafeteria kitchen as part of the Welcome Center. Natural gas would not be used for any other purpose in the proposed building.

⁴ <https://ucop.edu/sustainability/policy-areas/climate-change-and-clean-energy/index.html>

2.8 Parcel 21 Lease Extension

Building 54 and its parking area are located on leased Parcel 21, which is owned by the University of California Regents and leased to the DOE through May 31, 2020. The proposed project involves a renewal of the Parcel 21 lease for a 50-year term.

2.9 Building 48 Seismic Retrofit

Building 48, circa 1981, is used as residential quarters for the adjacent Fire Station building. The original 2-story building consisted of reinforced concrete masonry unit (CMU) walls on four sides with plywood floor and roof diaphragms. The building was remodeled and enlarged in 1992 with two one-story additions, a lobby addition and a rear L-shaped structure that partially wraps around the original building. The additions both rely on the original CMU walls for vertical and lateral support. The lateral load resisting system is composed of the CMU walls and steel braced frames in the 1992 addition. Seismic modifications were made in 2005 which primarily consist of improvements to the floor-to-CMU wall anchorage ties at the second-floor level.

To address seismic deficiencies that were identified in Building 48 in 2019, the following retrofit measures would be installed: (1) wall anchors around the roof perimeter; (2) reinforcement at sawcut CMU opening; and (3) a plywood shear wall or steel braced frame to enhance the performance of the lobby structure.

2.10 Project Population and Daily Vehicle Trips

The Welcome Center building would be occupied by a likely maximum of 55 employees. There would be no increase in on-site population due to the project, because all of those 55 Welcome Center employees are already working at the Berkeley Lab in Buildings 26, 65, 90, the existing Building 54, and other locations on the hill site (Building 26 would become vacant and would not be backfilled).

There is a severe shortage of meeting and gathering space on the Berkeley Lab campus. Almost all of LBNL's large conference rooms are overbooked on a regular basis. In addition, the majority of attendees of LBNL-hosted conferences are typically members of Berkeley Lab's on-site population. For these reasons, the overwhelming majority of Conference Center users are expected to be people who are already on the Berkeley Lab campus.

On an annual basis, 10 additional LBNL conferences that otherwise might have been held off site are expected to be held at the Welcome Center. Such conferences may draw some off-site visitors to the site (some of whom would drive; some of whom would use the Lab shuttle or other modes of transport). The relatively small number of new automobile trips would likely be more than offset by the trips not taken by Berkeley Lab's on-site population to attend those 10 conferences if they were to have occurred off site.

Building occupants by department are presented in **Table 1** below. Building 48 seismic retrofit would not result in an increase in the firehouse staff.

Table 1
Welcome Center Building Occupants

Department	FTE Staff	Visitors	Peak Times for Visitors
Human Resources	16	30-50	8AM – 11:30 AM
Health Services	20	20-60	8AM – 1:30 PM
Conference Center	4	125-400	9 AM – 5 PM
Cafeteria	15	618+	11:30 AM – 1:30 PM (435 visitors)
Total	55		

As the SSM Program would not increase the number of employees and visitors present on the Berkeley Lab, there would be no increase in the number of daily and peak hour vehicle trips to the hill site over existing conditions due to the SSM Program.

2.11 Project Construction

Construction Schedule

The construction of the Welcome Center Building project would occur over a period of approximately 2 years and 9 months (33 months). Construction of site retaining walls would start in September 2021 and demolition of Building 54 would start in October 2021. Construction of the new building would start in April 2022 and would be completed by June 2024. Site utilities would be constructed between July 2022 and March 2024.

The seismic retrofit of Building 48 would take approximately 1 year and would occur between July 2022 and July 2023.

Construction would take place Monday through Friday and would involve typical construction hours that extend from early morning through mid-afternoon. Consistent with **LRDP Mitigation Measure NOISE-1a** (construction noise), which is a standard project feature incorporated into the project, Welcome Center Building project construction hours are expected to be consistent with those identified in the City of Berkeley Noise Ordinance.

Construction Workforce

Welcome Center construction is expected to involve 50-75 onsite workers, on average, with a peak of up to 150 workers. Building 48 seismic retrofit would involve approximately 5 workers on site at any one time.

Construction Access and Staging

Construction access to both project sites would be via Chu Road and the Blackberry Canyon Gate entrance on Cyclotron Road. A staging area would be set up in the Building 54 Parking Lot. The staging area would be fenced and enclosed.

Demolition, Site Grading Activities, and Construction Traffic

Building 54 would be demolished to construct the new Welcome Center. Demolition would likely encounter small amounts of asbestos and lead-based paints; these would be handled in accordance with applicable legal and regulatory requirements and the terms of a Bay Area Air Quality Management District demolition permit. Debris is expected to be transported to a permitted Class-2 landfill.

Slopes vary significantly across the approximately 2.3-acre project site. To improve both pedestrian and vehicle access, numerous areas within the project site would be graded. A portion of the new building site would be excavated to construct the partial basement.

Truck trips – mainly to haul debris and transport in building materials, concrete, and equipment – are expected to number around 1,800; averaged over the lifetime of the project, this would be approximately 2-3 truck trips per workday. In general, heavy and slow-moving trucks would not be allowed between 7:00 AM and 8:30 AM. Haul trucks would travel on Chu Road exit via the Blackberry Canyon gate to Cyclotron Road, and then to the City of Berkeley designated truck routes to dispose of the material off site. Project construction activities would also generate daily construction worker commute trips.

In the 2006 LRDP EIR, UC LBNL committed to minimizing construction traffic impacts on Berkeley city streets (LBNL 2006). Pursuant to LRDP Best Practice TRANS-6c, and as further modified by subsequent traffic studies and management tools, UC LBNL has instituted a program to manage project construction schedules in aggregate so as to keep construction truck trips below impact threshold levels. In particular, the total number of construction truck trips on the Hearst-Oxford-University Avenue truck route are managed below the impact threshold of 96 round trips per day (Fehr and Peers 2012). LBNL's Site Construction Coordinator, with assistance from its Environmental Planner, manages these trips and administers other best management practices for ensuring that construction vehicle traffic does not contribute to a substantial increase in volumes or degradation in the level of service on surrounding roadways. Construction-related truck trips associated with the proposed SSM Program would be managed under this program.

Construction Phase Stormwater and Groundwater Controls

The project site is served by a stormwater collection system that drains into the North Fork of Strawberry Creek. The proposed project would apply for coverage under the California National Pollutant Discharge Elimination System (NPDES) General Permit for Storm Water Discharges Associated with Construction and Land Disturbance Activities (Order 2009-0009-DWQ) (Construction General Permit). In compliance with the permit process, UC LBNL would file a Notice of Intent with the State Water Resources Control Board, and a construction-phase Stormwater Pollution Prevention Plan (SWPPP) would be developed and implemented during project construction in order to avoid the discharge of pollutants into surface waters. The SWPPP

would include BMPs appropriate for construction activity on hillside locations. Discharge monitoring would be conducted as required by the permit.

Any groundwater encountered during project construction or water accumulated during rain events would be tested and, if found to be contaminated, would be treated and appropriately disposed. Treated contaminated groundwater and/or stormwater may be discharged to the sanitary sewer system if a Special Wastewater Discharge is obtained from the East Bay Municipal Utility District.

2.12 2006 LRDP EIR Mitigation Measures

LBNL's 2006 LRDP projected future growth and development at the Berkeley Lab that was analyzed in the corresponding LRDP EIR. Mitigation measures adopted by the UC Regents in conjunction with the 2006 LRDP Final EIR are carried forward as "standard project features" (SPFs) in all subsequent LBNL projects, as applicable. As an element of that projected 2006 LRDP growth and development, the proposed SSM Program is subject to all applicable SPFs.

In 2010, the Supplementation of the LBNL 2006 LRDP EIR with respect to Traffic Impacts at One Intersection (henceforth referred to as the 2010 Supplement) was prepared as part of the Seismic Life Safety, Modernization and Replacement of General Purpose Buildings, Phase 2 Project EIR (SCH#2008112030). The 2010 Supplement updated the LRDP EIR traffic analysis based on new information and, in doing so, identified a significant impact at one additional intersection. A new mitigation measure was adopted to address that impact.

A second Supplement to the LBNL 2006 LRDP EIR (henceforth referred to as the 2017 Supplement) was prepared in 2017 as part of the Building 59 Upgrade & Installation and Operation of NERSC – 9 Focused EIR (NERSC-9 Project EIR). The 2017 Supplement updated the analysis of the potential impacts from GHG emissions and found that emissions from LBNL growth under the 2006 LRDP would exceed applicable thresholds. Mitigation measures were adopted to address impacts regarding GHG emissions.

In **Section 5.0**, the analysis considers potential environmental impacts that would result from the proposed SSM Program with inclusion of all applicable SPFs. These SPFs are an intrinsic part of the proposed project and therefore will not be readopted as mitigation measures. However, the SPFs applicable to and included in the proposed project would be monitored as specified in the Mitigation Monitoring and Reporting Plan adopted as part of the LBNL 2006 LRDP Final EIR and two Supplements. All applicable SPFs are presented in **Appendix A**.

2.13 Project Approvals

The SSM Program, which includes the proposed Welcome Center Building project and related parking and transit improvements, and Building 48 seismic retrofit project, would be located on the LBNL main site on land owned by the University of California. The Board of Regents is the University's decision-making body and is responsible for making decisions pursuant to CEQA and approving projects to be implemented on University-owned land. The Regents will review and consider this environmental analysis document in conjunction with the Regents' decision-making on the Welcome Center Building project. Parcel 21 ground lease extension will be reviewed and considered by the Regents Real Estate Committee for approval, and the Building 48 seismic retrofit

project will be considered for approval at the Berkeley Lab under authority delegated by the Regents.

Other potential permits or approvals that may be required include the following:

- Coverage under the Statewide Construction General Permit to be obtained by filing a Notice of Intent with the Regional Water Quality Control Board (RWQCB).
- A wastewater discharge permit from the East Bay Municipal Utility District to manage accumulated ground and rainwater during construction.
- Coordination with the Environmental Services Group's, Environmental Management Systems (EMS) Manager, to certify that the project meets LBNL EMS requirements at phase CD-4 (DOE Order 413.3B)

3.0 ENVIRONMENTAL FACTORS POTENTIALLY AFFECTED:

The environmental resources, if checked below, would be potentially affected by this proposed project and would involve at least one impact that is a significant or potentially significant impact that has not been previously addressed in the 2006 LRDP EIR and cannot be reduced to a less than significant level as indicated by the checklist on the following pages.

	Aesthetics		Agricultural and Forestry Resources
	Air Quality		Biological Resources
	Cultural Resources		Energy
	Geology/ Soils		Greenhouse Gas Emissions
	Hazards & Hazardous Materials		Hydrology/Water Quality
	Land Use/Planning		Mineral Resources
	Noise		Population/Housing
	Public Services		Recreation
	Transportation		Tribal Cultural Resources
	Utilities/Service Systems		Wildfire
	Mandatory Findings of Significance		

4.0 DETERMINATION

On the basis of this initial evaluation:

I find that the proposed project could have a "potentially significant impact" or "potentially significant unless mitigated" impact on the environment, and that these effects have not been adequately analyzed by an earlier EIR. A TIERED ENVIRONMENTAL IMPACT REPORT will be prepared.

I find that although the proposed project could have a significant effect on the environment, all potentially significant effects (1) have been addressed adequately in an earlier environmental document pursuant to applicable standards, (2) no substantial changes to the project are proposed, and (3) no substantial changes in circumstances or new information of substantial importance has been identified. Applicable mitigation measures from the 2006 LRDP EIR are incorporated into the project as standard project features. The project is within the scope of the LRDP and no further environmental documentation is required. FINDINGS will be prepared.

Signature:  Date: 08/21/2020

Printed Name: Jeff Philliber, UC LBNL Site & Environmental Planner

5.0 EVALUATION OF ENVIRONMENTAL IMPACTS

The University stated in the LBNL 2006 LRDP Final EIR (page III-48) that in addition to disclosing the environmental impacts from the adoption of the 2006 LRDP, the Program EIR would also be used by the University in connection with the consideration of certain specific projects pursuant to the 2006 LRDP, as well as for later modifications of such projects. The 2006 LRDP EIR further provided that pursuant to *State CEQA Guidelines* Section 15168, some of those projects might be approved as within the scope of the Program EIR and other projects would be approved after preparation of a second-tier CEQA document.

The 2006 LRDP Final EIR also noted that any use of the EIR in connection with subsequent approval would be subject to two additional restrictions that resulted from consultations with the City of Berkeley. First, the 2006 LRDP Final EIR would not be used as the first-tier EIR for any project exceeding the net development totals projected in the 2006 LRDP: 980,000 gsf of new occupiable space construction and 320,000 gsf of demolition. Second, an updated traffic study would be prepared at the earliest occurrence of either of two milestone events following 2006 LRDP Final EIR certification: the passing of 10 years, or when 375 net new parking spaces were added to the LBNL main site. The first restriction does not apply in the case of the SSM Program because the proposed Welcome Center Building project will add only 32,652 gsf of occupiable/assignable space and the Building 48 Seismic Retrofit would not increase assignable space. The second restriction is applicable and was satisfied when an updated LRDP EIR traffic study was prepared in 2010 as part of the Seismic Life Safety, Modernization, and Replacement of General Purpose Building, Phase 2 Project EIR. This update to the 2006 LRDP EIR traffic study was prepared to address new information related to the assessment of operational impact standards as reported in the 2006 LRDP EIR analysis. The total number of parking spaces at the LBNL main site has not changed substantially since 2007.

As noted earlier, this document has been prepared pursuant to Section 15168(c)(2) to demonstrate that the proposed project is within the scope of the 2006 LRDP EIR. A checklist utilizing the *State CEQA Guidelines* Appendix G list of questions has been used (consistent with *State CEQA Guidelines* Section 15168(c)(4)) to document the evaluation of the site- and project-specific information to determine whether the environmental impacts of the proposed project were covered in the Program EIR. The column headings in the checklist in this document are as follows:

- “Additional Project-level Impact Analysis Required” applies where the project may result in a new significant environmental impact that was not evaluated in the earlier program document, a substantial increase in the severity of a significant impact previously evaluated in the program document, or a requirement for new mitigation measures, due to substantial project changes, substantial changes in circumstances, or new information of substantial importance, since certification of the program document.
- “No Further Environmental Document Required” applies where there are no new significant environmental effects not considered in the program document, there are no substantial increases in the severity of a significant environmental effect previously evaluated in the program document, and no new mitigation measures are required.

Scope of 2006 LRDP EIR

The 2006 LRDP Final EIR analyzed the overall effects of implementation and full development of the Berkeley Lab under the 2006 LRDP. The 2006 LRDP sets forth plans and policies that are intended to guide Berkeley Lab's physical development at the LBNL hill site, including the construction of new buildings, roads, parking lots, and infrastructure systems, while protecting significant natural resources at the site. The proposed LBNL hill site analyzed in the 2006 LRDP Final EIR included the development of approximately 980,000 gross square feet of new research and support space construction and 320,000 gross square feet of demolition of existing facilities, for a total of approximately 660,000 gross square feet of net new occupiable space for the site through 2025. The 2006 LRDP Final EIR analyzed an increase in Adjusted Daily Population of the LBNL hill site from 3,650 to 4,650 persons, a net increase of 1,000 persons.

The 2006 LRDP Final EIR included a thorough analysis of a project description option called the "Project Variant," wherein the contemporaneous Lab population occupying off-site leased space (about 350 people) would be consolidated on the Lab hill site by 2025. Under the Project Variant, the full realization of the 2006 LRDP would result in Adjusted Daily Population at the hill site of 5,000 persons, an increase of 1,350 persons. This Environmental Analysis and Checklist conservatively analyzes the proposed project against both the 2006 LRDP Project and Project Variant scenarios, both of which were analyzed in the 2006 LRDP Final EIR.

2006 LRDP EIR Mitigation Measures

As noted in **Section 2.12**, because the proposed project is an element of the growth projected under the LBNL 2006 LRDP, relevant mitigation measures in the 2006 LRDP Final EIR and the two Supplements are standard project features that have been included in and are a part of the proposed project. The analysis presented in this document evaluates environmental impacts that would result from project implementation following the application of the standard project features.

Cumulative Projects

The proposed project is an element of 2006 LRDP-projected growth and development, so this SSM Program analysis incorporates the evaluation of cumulative operational impacts from the 2006 LRDP EIR, as updated by the two Supplements prepared in 2010 and 2017.

In addition, this analysis also considers nearby near-term projects currently planned at Berkeley Lab and its surroundings that could potentially result in construction-phase cumulative impacts with the proposed project. These projects are listed in **Table 2, Near-Term Cumulative Projects (Construction Phase)** and comprise the proposed project's "cumulative context" for construction impacts. Near-term projects are defined to include approved-but-not-built projects and planned-but-not-approved projects expected to be completed in the same timeframe as the proposed project.

**Table 2
Near-Term Cumulative Projects (Construction Phase)**

Project Name	Description	Construction Information	Building Space/Population
Old Town Demolition	Remove approx. 7 one- and two-story buildings and foundations from prior buildings in the "Old Town" area. Remediate area.	In progress. Completion expected in 2021.	Approximately 56,000 gsf of buildings to be demolished and removed.
Bayview Site Utility Replacement Project (SURP)	Replace outdated utility lines that serve Bayview and other west-campus facilities.	Construction expected mid-2019 through late 2019, to be resumed late-2020 through mid-2021.	N/A
Bayview Parcel 1 Cleanup project	Remove (Bevatron era) Building 51B foundation slabs and tunnels in the Bayview Planning Area.	Project scheduled to commence in late 2019 and be completed in early 2022.	N/A
NERSC-9 Project	Install next generation high-performance computing system, called "NERSC-9," in existing Building 59.	Construction from late 2018 to late 2020.	N/A
BioEPIC Project	Construct and operate approximately 73,000 gsf, four-story multi-disciplinary research and office building in the Bayview Planning Area.	Construction from mid-2021 to mid-2023.	Approximately 73,000 gsf Approximately 210 occupants
Upper Hearst Project	Construct a 37,000 gsf academic building and a separate residential building on top of the Upper Hearst Parking Structure.	The project is currently in the planning and design stage. Pending litigation, the project is anticipated to be delivered in fall 2021. Construction schedule is not known at this time.	Approximately 19,440 sf + 225 bedrooms Approximately 1,176 occupants

5.1 Aesthetics

5.1.1 Background

Section IV.A of the 2006 LRDP Final EIR addresses the aesthetic effects of Lab growth under the 2006 LRDP and is incorporated by reference in this document for this proposed project pursuant to *State CEQA Guidelines*, Section 15150. The following discussion summarizes the information presented in the 'Setting' subsection of Section IV.A of the 2006 LRDP EIR and describes the project site and relevant aspects of the proposed project.

LBNL

The LBNL hill site is located on the steeply sloping hillsides of the Berkeley-Oakland hills, rising from elevation 500 feet near the Blackberry Canyon Gate to about 1,000 feet at the northern border of the site. The hills provide a semi-natural, vegetated open space backdrop to the LBNL hill site. The hills are wooded with native stands of oaks and California bay and introduced eucalyptus and conifers. The entire LBNL hill site cannot be viewed from any single on- or off-site vantage point. However, portions of the LBNL hill site are visible from residential neighborhoods, public roadways, and public vantage points in the areas that adjoin LBNL. Views of individual buildings or groups of buildings are available from public vantage points such as the Memorial Stadium, the Lawrence Hall of Science, Grizzly Peak Road, and Hearst Avenue. As described in the 2006 LRDP Final EIR, portions of the LBNL hill site are visible in medium range views (less than 1 mile) from nearby elevated off-site locations such as the residential neighborhoods in the north and northwestern portions of the City of Berkeley. Long-range views (greater than 1 mile) are available from downtown Berkeley and the Berkeley Marina.

The visual character of LBNL's built environment is eclectic. Many buildings display an industrial look and utilitarian quality. Many buildings are painted in neutral colors to blend with the natural setting. Some of the buildings are recognizable landmarks, including Building 50 and the Advanced Light Source, both of which are also visible from off-site locations.

Some amount of nighttime lighting is produced on the site as a result of interior and exterior lighting associated with LBNL buildings, roadways, and parking lots. All buildings and parking areas are equipped with downward-directed light fixtures for nighttime lighting.

Project Sites

The two project sites are located in the southern portion of the LBNL hill site. The Building 54 site is in the southwestern portion of the hill site at the head of a canyon. Due to the extensive tree growth to the south and east, and the presence of other Berkeley Lab buildings such as the Building 70 complex to the west and north-west, the project site is not visible from most off-site areas near the LBNL hill site.

The Building 48 site is located in the south-central portion of the hill site. Due to the absence of intervening topography, trees or structures, the building is visible from areas in Strawberry Canyon to the south.

5.1.2 2006 LRDP EIR Analysis

The 2006 LRDP EIR evaluated visual impacts of Lab growth and development under the 2006 LRDP utilizing an Illustrative Development Scenario (IDS), which was a conceptual portrayal of potential development under the 2006 LRDP. The scenario depicts conceptual siting and dimensions of new buildings, parking garages, roadway changes, and demolition of existing buildings consistent with the 2006 LRDP goals and objectives, the 2006 LRDP Land Use Map, the LBNL Design Guidelines, and the LRDP’s proposed development uses and square footages; the LRDP EIR noted that the actual IDS features would vary over time as specific projects were proposed and considered for approval. The IDS is intended to provide a conservative basis for the analysis of environmental impacts.

Although the redevelopment of Building 54 is not specifically included in the IDS, the proposed project is within the scope of analysis of the 2006 LRDP Final EIR because the proposed Welcome Center is within the amount of space that the Berkeley Lab is authorized to demolish and develop under the 2006 LRDP, the land use is consistent with the site zoning, and the new building’s elevation complies with the height limitations included in the 2006 LRDP. Further, relevant mitigation measures in the 2006 LRDP Final EIR, as supplemented (now standard project features for projects under the 2006 LRDP) have been incorporated as part of the planning and design of the proposed project and would be implemented during project construction and operations consistent with LRDP mitigation monitoring requirements. A list of 2006 LRDP EIR mitigation measures, including the mitigation measures added under the 2010 and 2017 Supplements, is provided in **Appendix A**.

5.1.3 Environmental Checklist and Discussion

AESTHETICS	Additional Project-Level Impact Analysis Required	No Further Environmental Document Required
Would the project...		
a) Have a substantial adverse effect on a scenic vista?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
b) Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
c) In non-urbanized areas, substantially degrade the existing visual character or quality of public views of the site and its surroundings? (Public views are those that are experienced from publicly accessible vantage point). If the project is in an urbanized area, would the project conflict with applicable zoning and other regulations governing scenic quality?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
d) Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?	<input type="checkbox"/>	<input checked="" type="checkbox"/>

DISCUSSION:

SSM Project Analysis

a. **Have a substantial adverse effect on a scenic vista? No Further Environmental Document Required.**

The 2006 LRDP Final EIR evaluated temporary impacts on scenic views of the LBNL hill site from construction activities under the 2006 LRDP, under LRDP Impact VIS-1 (page IV.A-11). The analysis concluded that because construction activities would occur over a limited period of time, limited geographical area, and generally would not involve the extensive removal of vegetation, the temporary impact of construction activities on scenic views, scenic resources, and the existing visual character or quality of the LBNL hill site would be less than significant. The proposed project is within the scope of construction activities described and evaluated in the 2006 LRDP EIR. The proposed Welcome Center would be located on the site of the existing Building 54. It would be seated more deeply into the downward-trending slope, resulting in a finished roof elevation that is the same as the current building. Furthermore, due to its location in the southwestern portion of the LBNL hill site, construction activities associated with the proposed project would not be visible from most locations outside of the LBNL hill site, particularly due to distance and intervening terrain, foliage, and structures. The seismic retrofit improvements to Building 48 under the SSM Program would involve very limited construction which would occur inside the building. The project's temporary construction-phase impacts on scenic views, scenic resources, and the existing visual character of the LBNL hill site are adequately addressed under LRDP Impact VIS-1. Consistent with the 2006 LRDP EIR, impacts would be less than significant.

The 2006 LRDP Final EIR addressed long-term impacts to views of the LBNL hill site from nearby areas and scenic resources under LRDP Impact VIS-2 (page IV.A-13). Visual simulations were provided in the analysis to illustrate how LRDP implementation could affect views. Although the redevelopment of Building 54 was not specifically evaluated under the Illustrative Development Scenario in the 2006 LRDP Final EIR, the visual simulations demonstrate that the existing Building 54, and therefore the new Welcome Center, would not be visible from most of the key off-site viewpoints in downtown Berkeley, including viewpoints on Shattuck Avenue, Hearst Avenue, and San Pablo Avenue, as shown in Figures IV.A-4, IV.A-5, and IV.A-6, and would be only slightly visible from areas to the northeast and east of the Lab, including the Lawrence Hall of Science (LHS) (Figure IV.A-2). The 2006 LRDP Final EIR concluded that the impact on scenic vistas and scenic resources from individual projects in the Illustrative Development Scenario would not be significant. However, the 2006 LRDP Final EIR did conservatively conclude that the overall aesthetic impact of aggregate LRDP development would be significant and unavoidable. Due to its location, the proposed project would not be visible from most viewpoints off of the LBNL hill site; of the few viewpoints from where it would be visible, the proposed project would appear only well below the panoramic view plane and in an area of similar development. Therefore, the proposed project would not affect scenic views. In addition, no scenic resources are present at the project site that could be affected by the Welcome Center. Building 48 seismic retrofit would not make any exterior changes or additions to the existing building or its surroundings and would, therefore, not affect scenic vistas or scenic resources. The proposed project's impact on scenic vistas and scenic resources is adequately addressed under LRDP Impact VIS-2. Consistent with the 2006 LRDP EIR, the impact would be less than significant.

- b. **Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway? No Further Environmental Document Required.**

See item “a” above for analysis.

- c. **In non-urbanized areas, substantially degrade the existing visual character or quality of the site and its surroundings? In urbanized areas, conflict with applicable zoning and other regulations governing scenic quality? No Further Environmental Document Required.**

The 2006 LRDP EIR addressed long-term impacts associated with degradation of visual character or quality under LRDP Impact VIS-3 (page IV.A-21). The EIR concluded that some of the development under the 2006 LRDP would alter the visual character of the LBNL hill site as viewed from certain viewpoints in the Strawberry Canyon, the Panoramic Hill neighborhood, University land upslope of LBNL, and the Northside residential neighborhood, resulting in a significant and unavoidable impact. Visual simulations from these key viewpoints were included in the 2006 LRDP EIR. Due to its location and low profile, the Welcome Center would not be visible from any of the viewpoints analyzed in the 2006 LRDP EIR. The proposed project’s impact on visual character and quality is adequately addressed by the 2006 LRDP Final EIR. Consistent with the 2006 LRDP EIR, the proposed project’s impact would be less than significant.

The 2006 LRDP Building Height Map in the 2006 LRDP Final EIR (page III-24) displays the maximum number of stories/heights of existing and future buildings on the LBNL hill site. Among the constraints considered regarding building heights are aesthetic considerations involving how different building heights and scales might affect the visual character of LBNL. Accordingly, and to support the aesthetic principles put forth in the LBNL Design Guidelines, the Height Zoning Map is used to guide placement and height of buildings under the 2006 LRDP. The project site is in an area that is designated for a six-story maximum height. The project would include only two stories and a partial basement. Additionally, project design and implementation would be consistent with the 2006 LRDP Design Guidelines as the proposed project would use materials, colors, textures, and hardscaping schemes appropriate for the specific purpose of the building which is to serve as a hub for the Berkeley Lab. Consistent with the 2006 LRDP EIR, the proposed project’s impact on visual character would be less than significant.

- d. **Create a new source of substantial light or glare, which would adversely affect day or nighttime views in the area? No Further Environmental Document Required.**

The 2006 LRDP Final EIR addressed long-term impacts associated with light and glare under LRDP Impact VIS-4 (page IV.A-28). Development of a two-story building at the Building 54 site would create increased sources of light and glare, including expansive windows and metal materials, in a developed portion of the LBNL hill site. During the day, sunlight could reflect off the glass and metallic portions of the building exterior, which could result in glare. Portions of the project site would be lit for nighttime operations and security considerations; this could result in nighttime illumination in the project vicinity. However, **LRDP Mitigation Measures VIS-4a** and **VIS-4b** (light and glare measures) are standard project features of the proposed project. These measures require shielding to minimize light spillage, light fixtures to be compatible with existing fixtures, and reflective surfaces to be limited to reduce glare. The proposed project also includes as a standard project feature **LRDP Mitigation Measure VIS-4c** (light and glare measure), which

requires all new buildings on the LBNL hill site constructed pursuant to the 2006 LRDP to incorporate design standards that preclude or limit the use of reflective exterior wall materials or reflective glass. In addition, **LRDP Mitigation Measure VIS-4c** also limits the use of white surfaces for roofs, roads, and parking lots, except in specific instances when required for energy conservation. As stated in the 2006 LRDP Final EIR concerning projects under the 2006 LRDP, the potential impact from light and glare would be less than significant with implementation of **LRDP Mitigation Measures VIS-4a** through **VIS-4c** as part of the proposed project. Building 48 seismic retrofit would not make any exterior changes to Building 48 and would therefore result in no change related to light and glare. The impact related to light and glare from the proposed SSM Program is adequately addressed under LRDP Impact VIS-4. Consistent with the 2006 LRDP EIR, the proposed project's impact related to light and glare would be less than significant with standard project features.

5.1.4 Analysis of Cumulative Impacts in 2006 LRDP EIR

Cumulative visual impacts of LBNL development under the 2006 LRDP are addressed under LRDP Impact VIS-5 (page IV.A-30) in the Final EIR. The 2006 LRDP Final EIR concluded that implementation of the 2006 LRDP, in conjunction with cumulative development, would alter the visual character of, and change views of, the Oakland-Berkeley hills in the vicinity of LBNL. The EIR concluded that because the 2006 LRDP development (with mitigation) would not result in significant visual or light and glare impacts, because little other development is expected that could result in overlapping (cumulative) visual impacts, and because the 2006 LRDP would not result in adverse visual impacts that would occur in combination with impacts from UC Berkeley projects, the cumulative aesthetic effects of the 2006 LRDP would be less than significant. The proposed project is within the scope of the development analyzed in the 2006 LRDP Final EIR. Therefore, the proposed SSM Program's cumulative aesthetic effects are adequately addressed under LRDP Impact VIS-5 and would be less than significant. Taking into consideration the present-day setting and the current cumulative context, this analysis finds that no conditions have changed and no new information has become available since certification of the 2006 LRDP EIR that would alter the previous analysis.

5.1.5 Changes in Circumstances or New Information that could affect the Earlier Environmental Analysis

There are no changes in circumstances and no new information related to visual resources has become available since the certification of the 2006 LRDP Final EIR, including the two Supplements, that would alter the previous analyses and change its conclusions.

5.2 Agriculture and Forestry Resources

5.2.1 Background

The LBNL hill site does not contain any designated or actively farmed land or forest land. The LBNL hill site, including the project site, is mapped as “Urban and Built-Up” by the Farmland Mapping and Monitoring Program (FMMP) (California Department of Conservation 2012).

Project Sites

The two project sites are located in areas that have previously been graded and disturbed in conjunction with prior development.

5.2.2 2006 LRDP EIR Analysis

Agricultural and forest resources were scoped out of the 2006 LRDP EIR based on an analysis in an Initial Study prepared to accompany the NOP.

5.2.3 Environmental Checklist and Discussion

AGRICULTURE AND FORESTRY RESOURCES	Additional Project-Level Impact Analysis Required	No Further Environmental Document Required
Would the project...		
a) Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
b) Conflict with existing zoning for agricultural use, or a Williamson Act contract?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
c) Conflict with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code Section 12220(g)) or timberland (as defined by Public Resources Code Section 4526)?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
d) Result in the loss of forest land or conversion of forest land to non-forest use?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
e) Involve other changes in the existing environment, which, due to their location or nature, could result in conversion of Farmland to non-agricultural use or conversion of forest land to non-forest use?	<input type="checkbox"/>	<input checked="" type="checkbox"/>

DISCUSSION:

SSM Project Analysis

- a.- e. **Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use? Conflict with existing zoning for agricultural use, or a Williamson Act contract? Conflict with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code Section 12220(g)) or timberland (as defined by Public Resources Code Section 4526)? Result in the loss of forest land or conversion of forest land to non-forest use? Involve other changes in the existing environment, which, due to their location or nature, could result in conversion of Farmland to non-agricultural use or conversion of forest land to non-forest use? No Further Environmental Document Required.**

The project sites are located in developed areas. According to the FMMP, there are no Williamson Act contracts for any land within the boundaries of LBNL or its vicinity. The proposed project would not result in the conversion of farmland to a non-agricultural use on-site and off-site because there is no farmland within the LBNL hill site or in the vicinity of the Lab. There is also no forest land on the project sites. Therefore, implementation of the proposed SSM Program would not impact agricultural and forest resources.

5.2.4 Analysis of Cumulative Impacts in 2006 LRDP EIR

Because there would be no project impact on agricultural and forest resources, the proposed project would not contribute to any cumulative impacts on these resources.

5.2.5 Changes to Circumstances or New Information that could affect the Earlier Environmental Analysis

There are no changes in circumstances and no new information related to agricultural or forestry resources has become available since the certification of the 2006 LRDP Final EIR, including the two Supplements, that would alter the previous analyses and change its conclusions.

5.3 Air Quality

5.3.1 Background

Section IV.B of the 2006 LRDP Final EIR addresses the air quality effects of LBNL growth under the 2006 LRDP and is incorporated by reference in this document for this proposed project pursuant to *State CEQA Guidelines* Section 15150. The following discussion summarizes the information presented in the ‘Setting’ subsection of Section IV.B of the 2006 LRDP Final EIR.

The project area is subject to air quality planning programs developed in response to both the Federal Clean Air Act (CAA) and the California Clean Air Act (CCAA). Within the San Francisco Bay Area, air quality is monitored, evaluated, and regulated by the US Environmental Protection Agency (EPA), the California Air Resources Board (CARB), and Bay Area Air Quality Management District (BAAQMD).

Air pollution is a major public health concern. Studies conducted in various parts of the world, including the United States, have documented a wide range of adverse effects of ambient air pollution on human health. Adverse health effects from short-term and long-term exposure to air pollution include, but are not limited to, increased respiratory illnesses (asthma incidence, asthma severity, hospital care for asthma, infections, and other symptoms); exacerbation of symptoms in sensitive patients with respiratory or cardiovascular disease; decreased lung function and lung inflammation; increased mortality, including increased risk of premature death from heart or lung diseases in the elderly and people with potentially predisposing conditions (such as chronic obstructive pulmonary disease, diabetes, congestive heart failure, and myocardial infarction); declines in pulmonary function growth in children; and potential immunological changes. Although numerous air pollutants are emitted by both natural and anthropogenic sources and contribute to adverse human health effects, ozone and particulate matter have been identified as the pollutants of greatest concern.

LBNL

The LBNL hill site is located in Alameda County, which, along with eight other counties, is within the San Francisco Bay Area Air Basin (SFBAAB or Air Basin).

Air pollutants are emitted by a variety of sources, including mobile sources such as automobiles; stationary sources such as manufacturing facilities, power plants, and laboratories; and area sources such as homes and commercial buildings. While some of the air pollutants that are emitted need to be examined at the local level, others are predominantly an issue at the regional level. For instance, ozone (O₃) is formed in the atmosphere in the presence of sunlight by a series of chemical reactions involving oxides of nitrogen (NO_x) and reactive organic gases (ROG). Because these reactions are broad scale in effects, the effects of ozone typically are analyzed at the regional level (i.e., in the Air Basin) rather than the local level. On the other hand, other air pollutants such as sulfur dioxide (SO₂), respirable particulate matter (PM₁₀), fine particulate matter (PM_{2.5}), carbon monoxide (CO), lead (Pb), and toxic air contaminants (TAC) are a potential concern in the immediate vicinity of the pollutant source because the pollutants are emitted directly or are formed close to the source. TACs are also known as hazardous air pollutants. Therefore, the study area for emissions of SO₂, PM₁₀, PM_{2.5}, CO, Pb, and TACs is the local area nearest the source, such as in the

vicinity of congested intersections or near construction sites, whereas the study area for regional pollutants such as NO_x and ROG is the entire Air Basin.

Air pollutants typically are categorized as either criteria pollutants or TACs. The criteria pollutants are those regulated at the federal level by U.S. EPA and at the state and regional level by CARB and BAAQMD, respectively. These include O₃, PM₁₀, PM_{2.5}, CO, nitrogen dioxide (NO₂), SO₂, and Pb. O₃ is a secondary pollutant formed during photochemical reactions with precursor pollutants. As such, O₃ is analyzed by assessing emissions of its precursors, ROG and NO_x. The primary sources of criteria pollutants at the LBNL hill site include automobiles and heating equipment.

TACs are known to have adverse human health effects and therefore are regulated. Examples include aromatic and chlorinated hydrocarbons, certain metals, and asbestos. Adverse health effects can be carcinogenic, short-term (acute) noncarcinogenic, and long-term (chronic) noncarcinogenic. TACs are generated by a number of sources, including stationary sources such as dry cleaners, gas stations, combustion sources, and laboratories; mobile sources such as automobiles and heavy-duty construction equipment, particularly diesel-fueled vehicles; and area sources, such as farms, landfills, construction sites, and residential areas. Sources of TACs at and around the LBNL hill site include diesel trucks, laboratory vent emissions, emergency generators, and painting operations.

Air quality in the Air Basin is monitored by the BAAQMD and CARB. Based on pollutant concentrations measured at monitoring stations within the Air Basin, the SFBAAB is classified as being either in attainment or non-attainment of federal and state air quality standards. Air quality of a region is considered to be in attainment of the state standards if the measured ambient air pollutant levels for O₃, CO, SO₂ (1- and 24-hour), NO₂, PM₁₀, PM_{2.5}, and visibility reducing particles are not exceeded, and all other standards are not equaled or exceeded at any time in any consecutive three-year period. The SFBAAB is currently designated as a nonattainment area with respect to the state standards for O₃, PM₁₀, and PM_{2.5}, and is designated as attainment or unclassified for all other pollutants.

Some groups of people are considered more sensitive to adverse effects from air pollution than the general population. These groups are termed "sensitive receptors." Sensitive receptors include children, the elderly, and people with existing health problems, who are more often susceptible to respiratory infections and other air quality-related health problems. Locations where these groups of people are found, such as schools, childcare centers, hospitals, and nursing homes, are all considered sensitive receptors. Air pollution impacts are assessed, in part, based on potential effects on sensitive receptors.

Project Sites

The Building 54 project site is currently developed with Building 54 and the associated parking lot and circulation area. The Building 48 project site is developed with Building 48. Vehicles are the primary sources of air pollution in the vicinity of both project sites. Other sources of emissions in the vicinity of the project sites include emergency generators associated with various existing Lab buildings, and fume hoods located in laboratories, which are vented to the roofs of laboratory buildings. There are no receptors on the Berkeley Lab site that meet the criteria of sensitive receptors as defined by CARB. The nearest off-site sensitive receptors are single-family residences

approximately 1,500 feet to the west of the Building 54 project site and approximately 1,900 feet east of Building 48 project site.⁵

5.3.2 2006 LRDP EIR Analysis

The 2006 LRDP Final EIR evaluated air quality impacts of Lab growth and development under the 2006 LRDP. The 2006 LRDP Final EIR analysis determined that development on the LBNL hill site pursuant to the 2006 LRDP could result in significant impacts associated with criteria air pollutant emissions from construction activities and TACs, but that mitigation measures would reduce these impacts to a less than significant level. The 2006 LRDP Final EIR analysis also concluded that there would not be a significant impact related to operational criteria air pollutant emissions or odors, increases in carbon monoxide concentrations, or cumulative increase in criteria air pollutants. However, there would be a significant and unavoidable impact from cumulative emissions of TACs.

The proposed project is within the scope of analysis of the 2006 LRDP Final EIR. Relevant mitigation measures in the 2006 LRDP Final EIR (now standard project features for projects under the LRDP) have been incorporated as part of the planning and design of the proposed project and would be implemented during project construction and operations consistent with LRDP mitigation monitoring requirements.

5.3.3 Environmental Checklist and Discussion

AIR QUALITY	Additional Project-Level Impact Analysis Required	No Further Environmental Document Required
Would the project...		
a) Conflict with or obstruct implementation of the applicable air quality plan?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
b) Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is in non-attainment under an applicable federal or state ambient air quality standard?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
c) Expose sensitive receptors to substantial pollutant concentrations?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
d) Result in other emissions (such as those leading to odors) adversely affecting a substantial number of people?	<input type="checkbox"/>	<input checked="" type="checkbox"/>

⁵ These distances were estimated using Google Earth Pro and reflect the distance between the nearest residence and the point on the project site boundary closest to that residence.

DISCUSSION:

SSM Project Analysis

a. **Conflict with or obstruct implementation of the applicable air quality plan? No Further Environmental Document Required.**

The 2006 LRDP Final EIR analyzed potential impacts related to emissions of criteria pollutants from construction activities on the LBNL hill site under LRDP Impact AQ-1 (page IV.B-31), and evaluated the impact based on the BAAQMD's recommended approach at that time that emphasizes the implementation of effective and comprehensive control measures. The 2006 LRDP Final EIR concluded that an individual activity under the LRDP would affect local air quality in the vicinity of the project as a result of short-term emissions of fugitive dust and criteria air pollutants, but that with the implementation of **LRDP Mitigation Measures AQ-1a and AQ-1b** (construction-related emissions measures) (included in **Appendix A**) that were adopted as part of the 2006 LRDP, the impact would be less than significant.

The 2006 LRDP Final EIR also evaluated potential impacts related to operational emissions of criteria pollutants from Lab growth and development under LRDP Impact AQ-2 (page IV.B-35). The 2006 LRDP EIR evaluated the operational impacts both in terms of a plan-level analysis which evaluated the 2006 LRDP against regional air quality plans and a project-level analysis which estimated the total emissions and compared them to BAAQMD project-level thresholds. Both analyses concluded that the impact associated with operational emissions from Lab growth and development under the 2006 LRDP would be less than significant.

Since the certification of the 2006 LRDP Final EIR, the *CEQA Air Quality Guidelines* were updated and adopted by the BAAQMD in 2010 and were updated most recently in 2017. These provide additional guidance on the evaluation of a proposed project's construction-phase and operational air quality impacts, including new methodologies and thresholds for Bay Area lead agencies to use in the impact assessment. The construction and operational emissions associated with the proposed SSM Program are estimated and reported below using the current methodologies and thresholds provided by the BAAQMD.

Construction

The 2017 *CEQA Air Quality Guidelines* call for the quantification of construction emissions. CalEEMod was used to estimate the emissions of criteria pollutants that would be generated during construction of the two projects under the SSM Program. CalEEMod is a program that calculates air pollutant emissions from construction and operation of land development projects. It incorporates the California Air Resources Board EMFAC2014 model for on-road vehicle emissions and the OFFROAD2011 model for off-road vehicle emissions. The model also incorporates factors specific to the project region, such as vehicle fleet mix. The model can estimate emissions that would occur during different phases of construction, such as grading and building construction, concurrently or separately. The construction duration of 2 years and 9 months and a start date of September 2021 were used in the model. The project equipment usage was based on CalEEMod default for a project of this size and type. Modeling output is presented in **Appendix B**.

Based on information for the proposed project, the estimated construction-phase criteria pollutant emissions are provided below in **Table 3, Estimated Construction Emissions**. No dust or other emissions control measures were assumed to be part of the proposed project, although the site would be watered two times per day as is standard practice for construction sites in the Bay Area per BAAQMD recommendations. Additionally, **LRDP Mitigation Measures AQ-1a and AQ-1b** would be implemented as standard project features of the proposed project. As the results in the table show, construction of the proposed project would not result in emissions that would exceed the applicable BAAQMD thresholds of significance for construction-phase criteria pollutant emissions. Therefore, the impact from the proposed project’s construction-phase criteria pollutant emissions would be less than significant. No further environmental evaluation is required.

**Table 3
Estimated Construction Emissions**

Scenario	ROG	NOx	PM₁₀ Exhaust	PM_{2.5} Exhaust
Total Construction Emissions (tons)	0.49 tons	2.09 tons	0.10 tons	0.09 tons
Average Daily Emissions (pounds/day) ¹	3.8 lbs./day	16.1 lbs./day	0.8 lbs./day	0.7 lbs./day
BAAQMD Thresholds (pounds per day)	54 lbs./day	54 lbs./day	82 lbs./day	54 lbs./day
Exceed Threshold?	No	No	No	No
<i>Source: Illingworth & Rodkin 2020</i> Note: ROG = reactive organic gases, NOx = nitrogen oxides, PM ₁₀ = course particulate matter or particulates with an aerodynamic diameter of 10 micrometers (µm) or less, PM _{2.5} = fine particulate matter or particulates with an aerodynamic diameter of 2.5µm or less.				

Operation

An increase in operational emissions of criteria pollutants is not anticipated. This is because there would be no increase in the LBNL hill site population due to the SSM Program, and therefore no increase in vehicle emissions from employees or visitors traveling to and from the project sites. Further, the new Welcome Center would be an electric building and would not involve the combustion of natural gas for space and water heating and cooling, and natural gas use, if used, would be limited to the Cafeteria kitchen cooktops. In fact, due to the change to an electric building, the area source emissions from the site would decline compared to current conditions. As under existing conditions, some operational emissions of criteria pollutants would result from natural gas use in the kitchen cooktops, landscape maintenance, and building maintenance. However, the increase in emissions from these sources would be small and would be offset by the emissions reduction due to the replacement of Building 54 with an electric building.

- b. Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is in non-attainment under an applicable federal or state ambient air quality standard? No Further Environmental Document Required.**

See item “a” above for analysis. Because the proposed project would result in construction emissions well below the thresholds put forth by the BAAQMD, and would not result in new operational emissions, it would not result in a cumulatively considerable net increase of O₃, PM₁₀, and PM_{2.5}, which are the criteria pollutants for which the project region is in non-attainment under the federal or state ambient air quality standards.

- c. Expose sensitive receptors to substantial pollutant concentrations? No Further Environmental Document Required.**

Project construction would involve diesel-fueled equipment that would emit diesel particulate matter (DPM), which is a known TAC. The BAAQMD has provided a screening approach to conduct an initial evaluation of potential health risks from exposure to TACs, including DPM and PM_{2.5}, from construction activities (BAAQMD May 2017). The construction health risk screening table provided by the BAAQMD as part of this screening approach contains offset distances between the project construction site and the nearest sensitive receptor at which it can be conservatively assumed that the health risks (cancer and non-cancer) from the construction project would be less than significant and a construction-phase health risk analysis is not necessary. The *BAAQMD CEQA Guidelines* state that the zone of influence for risk and hazards for new sources or receptors is 1,000 feet from the source to the receptor. As noted above, the nearest sensitive receptors are single-family homes located approximately 1,500 feet from the Building 54 project site. Since the nearest sensitive receptors to the project site are further than 1,000 feet from the site, no construction-phase health risk assessment is required. Furthermore, since PM_{2.5} emissions from the construction of the proposed project are well below BAAQMD thresholds and since standard project feature **LRDP Mitigation Measure AQ-1b** would include measures to reduce criteria air pollutant emissions, the impact from construction-phase TAC and PM_{2.5} emissions would be less than significant. All of the seismic retrofit work at the Building 48 project site would occur inside Building 48 and would not expose off-site receptors to TAC or PM_{2.5} emissions. Furthermore, the nearest off-site receptors are more than 1,900 feet from the Building 48 project site.

The proposed SSM Program does not include any operational sources of TACs.

- e. Result in other emissions (such as those leading to odors) adversely affecting a substantial number of people? No Further Environmental Document Required.**

There is no history of odor complaints from LBNL and the Lab site is fairly distant from off-site receptors. The 2006 LRDP Final EIR therefore concluded that growth and development under the 2006 LRDP would not involve activities expected to create nuisance or objectionable odors affecting substantial numbers of people, particularly off site. The proposed projects under the SSM Program would not be located in close proximity of any sensitive receptors and is not anticipated to generate offensive odors. Similar to existing conditions, the new Cafeteria kitchen will be fitted with a kitchen exhaust system and odors are not expected to result from cafeteria operations. There would be no impact. No further environmental evaluation is required.

5.3.4 Analysis of Cumulative Impacts in 2006 LRDP EIR

Construction Phase Cumulative Impacts

The Welcome Center construction would occur over a period of approximately 33 months, from Fall 2021 through 2024, while Building 48 seismic retrofit would occur over a period of one year from Summer 2022 to Summer 2023. All ongoing and future construction projects at and near the Berkeley Lab are listed in **Table 2** in **Section 5.0**. With the exception of two, all projects on the LBNL site or at nearby UC Berkeley that are currently under construction or planned to be under construction would be completed before the construction of the proposed project would commence. The two exceptions are the Bayview Parcel Cleanup and the BioEPIC projects which would be under construction at the same time as the proposed Welcome Center Building project and would be about 500 feet to the north from the edge of the Building 54 project site. However, there are no sensitive receptors within 1,000 feet of either the Building 54 project site or the Bayview Parcel Cleanup and the BioEPIC projects. Therefore, even though the construction activities of the proposed Welcome Center Building project would overlap with those of two other construction projects on the LBNL hill site, there would not be a potential for significant cumulative construction-phase air quality impacts on any sensitive receptors, including impacts related to emissions of TACs and PM_{2.5}.

Operational Cumulative Impacts

The 2006 LRDP Final EIR evaluated the cumulative effects on air quality from LBNL growth and development under the 2006 LRDP, together with anticipated future cumulative development in Berkeley and the Bay Area in LRDP Impact AQ-5 (page IV.B-47). The EIR concluded that the LRDP's contribution to the cumulative criteria air pollutant emissions from regional growth would not be "cumulatively considerable" and the cumulative effect would be less than significant. The proposed project is within the scope of the growth and development evaluated in the 2006 LRDP EIR (see **Section 5.11** below). Therefore, the proposed project's cumulative air quality effects are adequately addressed under LRDP Impact AQ-5 and are determined to be less than significant. Taking into consideration the present-day setting and the current cumulative context, this analysis finds that no conditions have changed, and no new information has become available since certification of the 2006 LRDP EIR that would alter this previous analysis. No further environmental evaluation is required.

LRDP Impact AQ-6 evaluated cumulative human health impacts from the implementation of the 2006 LRDP in combination with other contributing projects to determine whether the TAC emissions would result in an exceedance of the BAAQMD significance threshold (cancer risk in excess of 10-in-a-million) used at the time for the evaluation of both project-level and cumulative impacts.⁶ The 2006 LRDP Final EIR analysis concluded that, although the cumulative emissions of TACs would decrease as a result of new regulations and improved technologies, the cumulative emissions of TACs associated with the 2006 LRDP (including the proposed project), combined with toxic air contaminant emissions from sources on the UC Berkeley campus under the UC Berkeley 2020 LRDP, would result in a maximum off-site cancer risk of 22-in-a-million, exceeding the

⁶ Since the LBNL 2006 LRDP EIR was prepared, the threshold has changed. If the new threshold were applied, the cumulative TAC impact from LBNL growth and development under the 2006 LRDP would be less than significant.

significance threshold in use at that time. Using the standard, the cumulative impact was deemed to be significant in the LBNL 2006 LRDP Final EIR. The 2006 LRDP Final EIR noted that even with the implementation of **LRDP Mitigation Measure TRANS-1c** (TDM program measure) to reduce vehicular TAC emissions, the impact would not be reduced to a less than significant level. Therefore, the EIR concluded that the impact would be significant and unavoidable. As noted earlier in this section, although the SSM Program is within the scope of development envisioned under the 2006 LRDP and analyzed in the 2006 LRDP EIR for environmental impacts, the SSM Program would not generate on-site TAC emissions or traffic TAC emissions which would contribute to this significant cumulative impact of TAC emissions from other existing and future TAC sources on the hill site.

5.3.5 Changes to Circumstances or New Information that could affect the earlier Environmental Analysis

As noted above under item **a**, in 2010, the BAAQMD updated the CEQA *Air Quality Guidelines*, including new thresholds and approaches for the evaluation of air quality impacts. The *CEQA Air Quality Guidelines* were updated most recently in 2017. As the evaluation above shows, the analysis of project-level and cumulative impacts from construction and operational activities in the 2006 LRDP EIR is still valid and the conclusions remain unchanged. The one exception is the cumulative cancer risk impact from TAC emissions which is less than significant under the current cumulative threshold of 100 in 1 million. The changes in the thresholds and analytical methods do not alter the significance of the previously analyzed impacts other than with regard to the cumulative cancer risk impact from TAC emissions, which is less than significant based on the new BAAQMD guidance, and therefore does not constitute significant new information.

Because of increased concern regarding human health effects from exposure to diesel particulate matter emissions from LBNL-related construction truck traffic generally, in 2009 LBNL conducted an evaluation of the potential cancer and non-cancer risk to sensitive receptors located along the truck routes between the Berkeley Lab site and the nearest freeway (I-80). This risk assessment included all construction truck trips associated with reasonably foreseeable construction projects on the Lab site and reasonably foreseeable construction projects on the UC Berkeley campus. The study concluded that the maximum lifetime excess cancer risk to receptors along the truck routes from exposure to construction truck diesel particulate matter from all truck trips combined would be 2 in one million, which is well below the BAAQMD's project-level cancer risk threshold of 10 in one million and substantially below the BAAQMD's cumulative cancer risk threshold of 100 in one million. Similarly, the study estimated the non-cancer chronic hazard index (HI) to be 0.003 which is also substantially below the BAAQMD threshold of an HI of 1.0 (Golder Associates 2009). Therefore, the cumulative impact from construction truck trips on human health would be less than significant. This analysis, which was done since the certification of the 2006 LRDP Final EIR, does not present a new or substantially more severe significant impact as compared to the 2006 LRDP Final EIR, which concluded, under LRDP Impact AQ-4, that with implementation of LRDP Mitigation Measure AQ-4 the risks of potential exposure of people to TACs from implementation of the LRDP and individual projects under the LRDP would be less than significant; it does not constitute significant new information.

5.4 Biological Resources

5.4.1 Background

Section IV.C of the 2006 LRDP Final EIR addresses the effects on biological resources from LBNL growth and development under the 2006 LRDP and is incorporated by reference herein pursuant to *State CEQA Guidelines* Section 15150. The following discussion summarizes the information presented in the 'Setting' subsection of Section IV.C of the 2006 LRDP Final EIR as it relates to the proposed project.

LBNL

Similar to other developed areas in the Berkeley-Oakland hills, the LBNL hill site is characterized by clusters of development interspersed with open space that contains a mosaic of vegetation types and wildlife habitats, including oak and mixed hardwood forests, native and non-native grasslands, chaparral, coast and riparian scrub, marsh and wetland communities, and forests. Grasslands are the predominant plant community and make up approximately 67 acres of the LBNL hill site. Grasslands consist mostly of annual grasses either as open grassland or as an understory in relatively open eucalyptus and pine stands. Eucalyptus stands are the second most dominant plant community with approximately 22 acres under such stands. Oak-Bay woodland is found on about 12 acres of the LBNL hill site and consists of a mix of coast live oak and California bay. Coast live oak woodland occurs on over 9 acres at LBNL. California bay woodland occurs on 5.5 acres of the hill site and is concentrated mainly in drainages. Coastal scrub occurs on approximately 8.5 acres of the LBNL hill site and includes both California sagebrush scrub and coyote brush scrub. Developed areas at the LBNL hill site have been landscaped with non-native ornamentals in the past and native and drought resistant plants in recent years.

The 2006 LRDP Final EIR evaluated the potential for the LBNL hill site to support special-status plant and wildlife species. Based on the evaluated species, the EIR noted that five special-status plant species and 21 special-status wildlife species had at least a moderate potential to occur on the LBNL hill site. The EIR also determined that four habitats at the LBNL hill site qualified as sensitive habitats, including known habitat of Lee's micro-blind harvestman, potential Alameda whipsnake habitat, critical Alameda whipsnake habitat, and riparian and wetland habitat.

Project Sites

A majority of the Building 54 project site is developed with buildings, parking lots, paths and driveways, and other than mature trees, natural habitats are not present. However, the southeast portion of the site is undeveloped and supports ruderal grassland. Four large trees are also present in the southeastern portion of the site. The canyon slopes, which lie to the south and southwest of the site, are under grasslands and scrub. Building 48 site is fully developed with a building and does not contain any natural habitat.

5.4.2 2006 LRDP EIR Analysis

Impacts on biological resources from LBNL hill site growth under the 2006 LRDP are evaluated in Section IV.C of the 2006 LRDP Final EIR, which is incorporated herein by reference. The 2006 LRDP

Final EIR analysis concluded that all impacts to biological resources would either be less than significant or would be reduced to a less than significant level with mitigation.

The proposed project is within the scope of analysis of the 2006 LRDP Final EIR. Relevant mitigation measures in the 2006 LRDP Final EIR (now standard project features for projects under the LRDP) have been incorporated as part of the planning and design of the proposed project and will be implemented during project construction and operations consistent with LRDP mitigation monitoring requirements.

5.4.3 Environmental Checklist and Discussion

Would the project...	Additional Project-Level Impact Analysis Required	No Further Environmental Document Required
a) Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
b) Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations or by the California Department of Fish and Wildlife or US Fish and Wildlife Service?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
c) Have a substantial adverse effect on state or federally protected wetlands (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
d) Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
e) Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
f) Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan?	<input type="checkbox"/>	<input checked="" type="checkbox"/>

DISCUSSION:

SSM Project Analysis

- a. **Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service? No Further Environmental Document Required.**

Potential impacts to nesting raptors and special-status bats from construction activities are addressed under LRDP Impacts BIO-3 and BIO-4 (pages IV.C-44 through IV.C-49). Although the Building 48 project site does not contain any natural habitat, including trees that would be suitable for nesting birds, it contains an existing structure that could provide habitat for special-status bat species and mature trees are present in proximity of the site that could be used by nesting birds. With regard to the Building 54 project site, while that site is also developed with a building, parking lots and driveways, it includes land that is currently undeveloped and under annual grasslands, as well as trees that are both naturally occurring as well as ornamental. Tree removal activities as well as noise and vibration generated by demolition and construction activities could adversely affect nesting raptors that may be present in the trees on and/or adjacent to the project sites. **LRDP Mitigation Measure BIO-3** (nesting bird measure) was adopted as part of the 2006 LRDP and would be implemented as a standard project feature of the proposed project. Therefore, the proposed project's impact on nesting birds would be less than significant. Similarly, special-status bats potentially roosting in the on-site buildings and in trees adjacent to the project site could be directly affected by demolition of Building 54 or by noisy construction activity at both sites. **LRDP Mitigation Measure BIO-4** (roosting bat measure) was adopted as part of the 2006 LRDP and would be implemented as a standard project feature of the proposed project, and the proposed project's impact on special-status bats would be less than significant. Therefore, the proposed project's impacts on nesting birds and bats are adequately addressed under LRDP Impacts BIO-3 and BIO-4. Consistent with the 2006 LRDP EIR, the proposed project's impact would be less than significant with standard project features.

Potential impacts on the Alameda whipsnake and special-status plant species are addressed under LRDP Impact BIO-5 (page IV.C-49) and Impact BIO-6 (page IV.C-54) respectively. The Building 48 project site does not contain any natural habitat that could support Alameda whipsnake or special-status plant species. Although potential habitat for Alameda whipsnake is present to the south of Building 48, it is separated from the building by Lawrence Road. Furthermore, all of the seismic retrofit work would take place inside the building and adjacent lands would not be affected. No impact would occur to these species.

The footprint of project disturbance at the Building 54 project site would likely encroach into a narrow band of steep grassland that is included in the "High Potential for Alameda Whipsnake" area identified in the 2006 LRDP EIR (the area immediately southwest and downslope of the existing Building 54 footprint). However, whipsnake have never been observed in this general area and the species tends to avoid human activity, so it is unlikely that whipsnake would be encountered during construction. Nevertheless, standard project features (**LRDP Mitigation Measures BIO-5b** through **5f**) would be implemented as part of the proposed project. These include having pre-construction surveys and fencing placement carried out by qualified wildlife biologists; training all workers involved in Alameda whipsnake awareness and avoidance; clearing

vegetation prior to work commencement; having designated monitors on site during ground disturbing activities; observing off-road speed limits; working only during daylight hours; and having equipment and stockpiles on the site inspected every morning prior to work commencement. These measures were developed at LBNL in consultation with the USFWS. As concluded in the 2006 LRDP EIR, implementation of the mitigation measures would reduce this potential impact to Alameda whipsnake to a less than significant level. Consistent with the 2006 LRDP EIR, the proposed project's impact on Alameda whipsnake would be less than significant with standard project features.

- b. Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service? No Further Environmental Document Required.**

LRDP Impact BIO-2 (page IV.C-41) discusses the potential for the 2006 LRDP development to affect drainages or riparian habitat. There are no existing drainages or other sensitive communities on both project sites that could be affected by the proposed project. There would be no impact.

- c. Have a substantial adverse effect on state or federally protected wetlands (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means? No Further Environmental Document Required.**

LRDP Impact BIO-2 (page IV.C-41) discusses the potential for the 2006 LRDP development to affect wetlands. There are no state or federally protected wetlands on the project sites. There would be no impact.

- d. Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites? No Further Environmental Document Required.**

The project sites are in developed portions of the Berkeley Lab and are not part of a migratory corridor or nursery site to any native resident or migratory species. There would be no impact.

- e. Conflict with any applicable policies protecting biological resources? No Further Environmental Document Required.**

Policies protecting biological resources applicable to the proposed SSM Program are contained in the LBNL 2006 LRDP within the Open Space Framework. There is no designated or natural open space on or adjacent to the project sites. Although the development of the Welcome Center would require the removal of up to 27 trees, an equal number of replacement trees would be planted on the project site or elsewhere on the Berkeley Lab. The proposed project would have no impact related to conflict with policies protecting biological resources.

- f. Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan? No Further Environmental Document Required.**

No Habitat Conservation Plans or Natural Community Conservation Plans have been adopted that encompass the project sites. Therefore, no impact would occur.

5.4.4 Analysis of Cumulative Impacts in 2006 LRDP EIR

As concluded in the 2006 LRDP Final EIR, LBNL growth and development pursuant to the 2006 LRDP, when combined with development under the UC Berkeley LRDP as well as surrounding (primarily residential) development in the Oakland-Berkeley hills, would contribute to a reduction of open space and, consequently, habitat for native plants and wildlife, including special-status species (LRDP Impact BIO-7, page IV.C-57), but the impact would be less than significant. The construction of the new Welcome Center would require the removal of a narrow band of open space grassland habitat and four mature trees in the area to the south and southeast of the existing Building 54 (23 other trees that would also be removed are located in the parking lot and many are ornamental). This small reduction in habitat is well within the reduction in open space habitat analyzed in the 2006 LRDP Final EIR. Taking into consideration the present-day setting and the current cumulative context, this analysis finds that no conditions have changed, and no new information has become available since certification of the 2006 LRDP Final EIR that would alter this previous analysis.

5.4.5 Changes to Circumstances or New Information that could affect the Earlier Environmental Analysis

There are no changes in circumstances and no new information related to biological resources has become available since the certification of the 2006 LRDP Final EIR that would alter the previous analyses and change its conclusions.

5.5 Cultural Resources

5.5.1 Background

Section IV.D of the 2006 LRDP Final EIR addresses the effects on cultural resources from LBNL growth and development under the 2006 LRDP and is incorporated by reference herein pursuant to *State CEQA Guidelines* Section 15150. The following discussion summarizes the information presented in the 'Setting' subsection of Section IV.D of the 2006 LRDP Final EIR.

LBNL hill site history presented in the 2006 LRDP Final EIR was based on information from technical studies prepared for the project area, including archival research at the California Historical Resources Information System's Northwest Information Center; a cultural resources evaluation and survey; an archaeological survey report; and the first of a series of reports being prepared as part of an inventory and evaluation of potential historically significant buildings and structures at the LBNL hill site.

Previous Site-Wide Studies

As part of the environmental analysis for the 1987 LRDP Final EIR, as amended, all undeveloped land and then-proposed building locations were examined for potential historical and archaeological resources. All reasonably accessible parts of the LBNL hill site area were examined. Special attention was given to areas of relatively flat land or rock outcrops. The steep hillsides were not examined intensively, although transects were made through accessible areas. Based on the findings of the archaeological resources survey, no indications of prehistoric archaeological resources were encountered in any location on the LBNL hill site. Preliminary findings of the historic resources survey suggest that Building 71, located north of the project site, and Building 88, located southwest of the project site, may be eligible for listing in the National Register of Historic Places (NRHP).

Recent Studies of Archaeological Resources

Field surveys and archival research at the California Historical Resources Information System's Northwest Information Center have been undertaken a number of times since 2006 to determine whether any archaeological resources are present on the LBNL hill site. The Northwest Information Center has indicated there is a "low potential for Native American sites in the project area" and thus "a low possibility of identifying Native American or historic-period archaeological deposits in the project area." Additionally, field studies conducted at various times at the LBNL hill site have not encountered any archaeological resources. Native American archaeological sites in this portion of Alameda County tend to be situated on terraces along ridgetops, mid-slope terraces, alluvial flats, near ecotones, and near sources of water, including springs. LBNL is situated on a steep slope adjacent to Strawberry Creek. Therefore, there is a low-to-moderate potential for Native American sites to be present on the LBNL hill site.

Project Sites

Both project sites are located in areas that have previously been graded and disturbed. At the Building 48 project site, there would be no excavation or ground disturbance. At the Building 54 project site, there would be some excavation to build the basement and some grading as the

footprint of the new building would be larger and extend beyond the footprint of the current building. Excavation and grading would also be needed to install utilities and reconfigure the parking lot and access facilities.

5.5.2 2006 LRDP EIR Analysis

Impacts on cultural resources from LBNL growth and development under the 2006 LRDP are evaluated in Section IV.D of the 2006 LRDP Final EIR and incorporated herein by reference.

The proposed project is within the scope of analysis of the 2006 LRDP Final EIR. Relevant mitigation measures in the 2006 LRDP Final EIR (now standard project features for projects under the LRDP) have been incorporated as part of the planning and design of the proposed project and would be implemented during project construction and operations consistent with LRDP mitigation monitoring requirements.

5.5.3 Environmental Checklist and Discussion

CULTURAL RESOURCES	Additional Project-Level Impact Analysis Required	No Further Environmental Document Required
Would the project...		
a) Cause a substantial adverse change in the significance of a historical resource pursuant to Section 15064.5?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
b) Cause a substantial adverse change in the significance of an archaeological resource pursuant to Section 15064.5?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
c) Disturb any human remains, including those interred outside of formal cemeteries?	<input type="checkbox"/>	<input checked="" type="checkbox"/>

DISCUSSION:

SSM Project Analysis

- a. **Cause a substantial adverse change in the significance of a historical resource pursuant to §15064.5? No Further Environmental Document Required.**

As described under LRDP Impact CUL-2 (page IV.D-15), implementation of the 2006 LRDP would involve demolition of buildings and structures that have been found to be ineligible for listing on the NRHP, individually or as a historic district. The 2006 LRDP Final EIR also evaluated the potential for adverse changes to the significance of historical resources (including making conservative assumptions about potential historical resources that had not yet been discovered or evaluated for their historical significance) under LRDP Impact CUL-1 (page IV.D-13) and found the impact to be significant and unavoidable. The proposed project involves demolition of the existing Building 54 (Cafeteria) and alteration of the existing Building 48 (Firehouse). Building 54 was constructed in 1950 and was substantially altered, added onto, and/or remodeled in 1961, 1966, 1994, 1998, and 2005; it was evaluated by a certified historian in 2012 and was found not to meet eligibility requirements for listing on the NRHP, and by extension the California Register of

Historical Resources (CRHR). Building 48 was constructed in 1981 and has been found, with State Historic Preservation Officer concurrence in 2003, to be ineligible for listing on the NRHP and by extension CRHR. There would be no impact on historical resources.

b. Cause a substantial adverse change in the significance of an archaeological resource pursuant to §15064.5? No Further Environmental Document Required.

LRDP Impact CUL-3 analyzes the potential that undiscovered archaeological resources could be disturbed or destroyed during grading and excavation under the 2006 LRDP (LRDP Impact CUL-3, page IV.D-16). To minimize impacts to undiscovered archaeological resources, **LRDP Mitigation Measure CUL-3**, which requires work stoppage and archaeological assessment in the event of a discovery, was adopted as part of the 2006 LRDP. The proposed project is within the scope of the 2006 LRDP and **LRDP Mitigation Measure CUL-3** (archaeological artifacts measure) would be implemented as a standard project feature of the proposed project. Furthermore, there is a very low potential that undiscovered archaeological resources could be discovered during construction of the proposed Welcome Center building because the vast majority of the project site has been previously disturbed. Building 48 seismic retrofit would not involve any ground disturbance. The proposed project's impact is adequately addressed under LRDP Impact CUL-3. Consistent with the 2006 LRDP EIR, the proposed project's impact would be less than significant with the implementation of standard project features.

c. Disturb any human remains, including those interred outside of formal cemeteries? No Further Environmental Document Required.

LRDP Impact CUL-4 analyzes the potential that previously unknown human remains could be disturbed or destroyed during an activity under the 2006 LRDP (LRDP Impact CUL-4, page IV.D-18). The potential for such encounters at LBNL is considered low per the cultural resources analysis in the 2006 LRDP Final EIR; it is even less likely at the Welcome Center Building project site because the vast majority of the project site has been previously disturbed. As stated under LRDP Impact CUL-4, in the unlikely event that human remains are discovered during project construction, **LRDP Mitigation Measure CUL-4** (human remains measure), which provides for work stoppage and appropriate treatment and Native American involvement, would be implemented. The proposed project is within the scope of the 2006 LRDP, and **LRDP Mitigation Measure CUL-4** would be implemented as a standard project feature of the proposed project. Therefore, the proposed project's impact is adequately addressed under LRDP Impact CUL-4. Consistent with the 2006 LRDP EIR, the proposed project's impact would be less than significant with the implementation of standard project features.

5.5.4 Analysis of Cumulative Impacts in 2006 LRDP EIR

As concluded in the 2006 LRDP Final EIR (page IV.D-20), implementation of the 2006 LRDP would not combine with other cumulative projects to change to the significance of historical resources at the LBNL hill site. Furthermore, 2006 LRDP implementation would not adversely affect historic resources that exist either independently or in combination with other historic resources at or around the LBNL hill site (LRDP Impact CUL-5). Taking into consideration the present-day setting and the current cumulative context, this analysis finds that no conditions have changed, and no new information has become available since certification of the 2006 LRDP Final EIR that would

alter this previous analysis. As noted above, the proposed project would not affect any historical resources. Therefore, it would not contribute to any cumulative impact on historic resources.

5.5.5 Changes to Circumstances or New Information that could affect the Earlier Environmental Analysis

There are no changes in circumstances and no new information related to cultural resources has become available since the certification of the 2006 LRDP EIR that would alter the previous analyses and change its conclusions.

5.6 Energy

5.6.1 Background

Although the 2006 LRDP Final EIR did not explicitly analyze impacts from wasteful consumption of energy resources, Section IV.M of the 2006 LRDP Final EIR addresses the effects of LBNL growth under the 2006 LRDP on utility systems, including energy use, that serve the LBNL hill site and is incorporated by reference herein pursuant to *State CEQA Guidelines* Section 15150.

As part of the NERSC-9 Project EIR, the 2017 Supplement reevaluated energy impacts that would result from growth under the 2006 LRDP. The following discussion summarizes the information presented in the 2006 LRDP Final EIR and the 2017 Supplement.

Electricity: UC LBNL purchases electricity from the Western Area Power Administration. Electricity is delivered to the LBNL's Grizzly Peak Substation via the PG&E transmission system. The total electrical power consumption in 2019 at LBNL hill site was 129,115 megawatt hours (MWh). LBNL also has a number of stationary and portable emergency power generators that are powered by diesel or natural gas.

Natural Gas: Natural gas is used on the LBNL hill site for heating all buildings, to operate certain equipment, and also in some experimental uses. Natural gas is delivered to the site by the PG&E system via a 6-inch line. The point of delivery is located above Cyclotron Road and below Building 88. Natural gas is distributed from this point of delivery to all buildings on the site. Two buildings (Buildings 73 and 73A) in the eastern portion of LBNL are served by another PG&E line located along Centennial Drive.

5.6.2 2006 LRDP EIR Analysis, including the 2017 Supplement

Impacts on energy resources from LBNL growth and development under the 2006 LRDP are evaluated in Section IV.M of the 2006 LRDP EIR and incorporated herein by reference. In 2017, LBNL prepared a Supplement to the 2006 LRDP EIR that recalculated the amount of energy resources (electricity and natural gas) that would be used by new buildings on the LBNL hill site, as well as a projected increase in petroleum-based fuel use under the 2006 LRDP through 2025, and reevaluated energy impacts of the 2006 LRDP. The analysis concluded that implementation of the 2006 LRDP would increase the use of energy resources at the Berkeley Lab, but would not result in wasteful, inefficient, or unnecessary consumption of energy resources. No mitigation measures were identified in the 2017 Supplement.

The proposed project is within the scope of analysis of the 2006 LRDP EIR and the 2017 Supplement. Relevant mitigation measures in the 2006 LRDP EIR (now standard project features for projects under the LRDP) have been incorporated as part of the planning and design of the proposed project and will be implemented during project construction and operations consistent with LRDP mitigation monitoring requirements.

5.6.3 Environmental Checklist and Discussion

Energy Would the project...	Additional Project-Level Impact Analysis Required	No Further Environment al Document Required
a) Result in potentially significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources, during project construction or operation?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
b) Conflict with or obstruct a state or local plan for renewable energy or energy efficiency?	<input type="checkbox"/>	<input checked="" type="checkbox"/>

DISCUSSION:

SSM Project Analysis

- a. **Result in potentially significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources, during project construction or operation?**

Construction Impacts

Construction of the proposed Welcome Center would require demolition, site preparation, grading, building construction, paving, and architectural coating. All construction would be typical for the region and building type. During construction, energy would be consumed in the form of petroleum-based fuels (i.e., gasoline and diesel) used to power off-road construction vehicles and equipment on the project site, for construction worker travel to and from the project site, as well as for delivery truck trips; and to operate generators to provide temporary power for lighting and electronic equipment. The manufacturing of construction materials used by the proposed project would also involve energy use. Due to the large number of materials and manufacturers involved in the production of construction materials (including manufacturers in other states and countries), upstream energy use cannot be reasonably estimated. However, it is reasonable to assume that manufacturers of building materials such as concrete, steel, etc., would employ all reasonable energy conservation practices in the interest of minimizing the cost of doing business. Furthermore, UC LBNL does not have control over or the ability to influence energy resource use by the manufacturers of construction materials. Therefore, this analysis does not evaluate upstream energy use.

The average annual and total consumption of gasoline and diesel fuel during project construction was estimated using the same assumptions and factors from CalEEMod that were used in estimating construction air emissions in **Section 5.2, Air Quality**. A total of approximately 11,830 gallons of diesel fuel and about 1,800 gallons of gasoline would be consumed over the project's construction horizon, or approximately 4,300 gallons of diesel fuel, and 655 gallons of gasoline annually (see **Appendix B** for calculation details).

The estimated amounts of energy resources reported above would be consumed over a period of about 33 months and would represent a small percentage of the total energy used in the state. More importantly, for reasons presented below, this consumption would not represent a wasteful and inefficient use of energy resources.

There is growing recognition among developers and retailers that sustainable construction is not more expensive than “business as usual” construction methods, and further, that there are long-term significant cost-savings potential in utilizing green building practices and materials. In addition, the proposed project would feature a sustainable design to comply with CALGreen, which would result in the use of sustainable materials and recycled content that would reduce energy consumption during project construction. Construction materials would include recycled materials and products originating from nearby sources to the extent feasible in order to comply with CALGreen and to reduce costs of transportation.

Fuel use due to worker trips, included in the estimates reported above, is expected to vary by phase; however, trips would be temporary and would occur over the 33-month timeframe of construction activity. As these trips would be temporary, they would not be wasteful or inefficient use of energy. CARB has adopted Title 13 Section 2485, an Airborne Toxic Control Measure (ATCM), to limit diesel motor vehicle idling in order to reduce public exposure to diesel particulate matter and other toxic air contaminants. All diesel-fueled commercial heavy- and medium-duty vehicles are required to comply with these measures. The ATCM requires that construction idling times shall be minimized either by shutting equipment off when not in use or limiting the maximum idling time to five minutes. It also requires that all construction equipment shall be maintained and properly tuned in accordance with manufacturer’s specifications and that all equipment shall be checked by a certified mechanic and determined to be running in proper condition prior to operation. Idling restrictions and the use of newer engines and properly maintained equipment would result in less fuel combustion and energy consumption. Furthermore, contractors and owners have a strong financial incentive to avoid wasteful, inefficient, and unnecessary consumption of energy during construction.

Construction activities would not consume measurable amounts of electricity or natural gas. Although construction would consume fuel energy resources, construction activities would be temporary and would cease at the end of construction. Therefore, there would be no long-term energy impacts associated with construction activities and the proposed project would not involve the inefficient, wasteful, and unnecessary use of energy during construction.

Operational Impacts

Electricity would be used for the operation of the Welcome Center building; natural gas use would be limited to use in the Cafeteria kitchen cooktops. The seismic retrofit of Building 48 would not result in any change in energy use in that building from existing conditions. There would be no increase in gasoline and diesel fuel use as the two projects included in the SSM Program would not result in an increase in the total number of persons employed at the Berkeley Lab or in the total number of visitors to the Lab, and therefore there would be no increase in daily vehicle trips due to the project.

Electricity

Electricity would be used for lighting, space, and water heating in the Welcome Center building. Only a limited amount of natural gas would be used in the Cafeteria kitchen cooktops. In compliance with the Berkeley Lab’s sustainability policy, the Welcome Center building would attain a minimum of a Gold rating within the LEED v4 program. The Welcome Center building design strategy includes daylighting to save energy by reducing or eliminating the need for electric

lighting systems during daylight hours. Other energy efficiency components include use operable windows to ensure sufficient local air movement, to help expand the thermal comfort range and facilitate the creation of a thermally comfortable environment with only passive and low-energy technology. Furthermore, the proposed project would comply with the applicable Green Building Design portions of the UC Sustainable Practices Policy, and a percentage of electricity utilized would be renewable energy generated on-site.

In order to confirm as-operated building performance and to achieve a high-performing building, meters would be installed for each building utility use such as electricity, water, chilled water, and hot water. Major energy using systems would have metering and monitoring for all energy flows and associated sensor points to verify these flows. End-use metering for electrical systems would also be used for all major energy end-uses such as HVAC, lighting, lab versus office plug-loads, and utility corridors. Renewable energy systems such as photovoltaic systems would also have associated metering and monitoring capabilities.

The annual electricity consumption of the Welcome Center is estimated at 718,121 kilowatt hours (kWh). If the existing usage of about 408,070 kWh/year is deducted, the net increase in electricity use to operate the Welcome Center Building would be approximately 310,051 kWh/year. This increase does not take into account the reduction in electricity use in Building 26 which would occur when the Health Services employees that are currently located in that building relocate into the Welcome Center; that building would remain empty and not reoccupied. Finally, this net increase in electricity use would have been lower if the new Welcome Center were to have used natural gas for space and water heating; however, to minimize GHG emissions, the new Welcome Center would not use natural gas for space and water heating.

This increase in annual usage is well within the increase in electricity use for the Lab that was estimated and analyzed in the 2017 Supplement. As set forth in the updated energy analysis in the 2017 Supplement, the electricity use associated with Lab development under the 2006 LRDP would not involve inefficient, wasteful, or unnecessary use of energy resources. As the proposed project is within the scope of the previous analysis, the proposed SSM Program's impact on energy resources would also be less than significant.

For the reasons listed above, the proposed project would not involve the inefficient, wasteful, and unnecessary use of energy during operation and the operation-phase energy impact would be less than significant.

b. Conflict with or obstruct a state or local plan for renewable energy or energy efficiency?

The proposed project would comply with the applicable Green Building Design portions of the UC Sustainable Practices Policy and would therefore comply with Title 24. Title 24 represents the state policy on building energy efficiency. The goals of the Title 24 standards are to improve energy efficiency of residential and non-residential buildings, minimize impacts during peak energy-usage periods, and reduce impacts on state energy needs. Furthermore, the proposed project would include features to minimize energy consumption overall, many of which are mandated by CALGreen. These features would further reduce the amount of electricity and natural gas consumed as a result of the proposed project. Consistent with the characteristics of other buildings on the LBNL site, the Welcome Center building would also include a number of additional energy

efficient features as detailed above. Because the proposed project would be consistent with Title 24, this impact would be less than significant.

5.6.4 Analysis of Cumulative Impacts in the 2006 LRDP EIR

The 2006 LRDP Final EIR analyzed the cumulative impact on energy resources under LRDP Impact UTILS-6. According to that analysis, other foreseeable development in the City of Berkeley and in the area surrounding the Lab hill site would contribute to cumulative increases in energy demand; however, new development would occur within a largely built-out urban area where utilities and service systems generally are provided. Additionally, these increases in demand attributed to other development would be addressed on a site-by-site basis by the service providers prior to approval of new development, and through CEQA review of each development project. The incremental increase in demand for energy resources associated with the 2006 LRDP would not be expected to represent a substantial increase in demand, and existing energy systems would be expected to handle growth anticipated under the 2006 LRDP. Taking into consideration the present-day setting and the current cumulative context, this analysis finds that the cumulative effect of 2006 LRDP development in combination with other foreseeable development would not be significant, nor would the LRDP development's contribution to any cumulative effects be cumulatively considerable. Because the proposed project is within the scope of growth and development under the 2006 LRDP, the proposed project's cumulative effects are adequately addressed under LRDP Impact UTILS-6 and its contribution to any cumulative impacts would also not be considerable.

5.6.5 Changes to Circumstances or New Information that could affect the Earlier Environmental Analysis

Changes to the *State CEQA Guidelines* have occurred since the 2006 LRDP Final EIR. The new guidelines released in 2018, in recognition of the state's need to specifically address energy resources, have separated energy into its own focused section to be analyzed separately. However, the 2006 LRDP Final EIR, under Section IV.M, and the 2017 Supplement fully address the impacts of the 2006 LRDP related to energy resources. None of the guideline changes have altered the previous analyses or changed the conclusions.

5.7 Geology/Soils

5.7.1 Background

Section IV.E of the 2006 LRDP Final EIR addresses the effects related to geology and soils from LBNL growth and development under the 2006 LRDP and is incorporated by reference herein, pursuant to *State CEQA Guidelines* Section 15150. The following discussion summarizes the information presented in the 'Setting' subsection of Section IV.E of the 2006 LRDP Final EIR.

LBNL

The LBNL hill site is located on the western slopes of the Berkeley-Oakland hills within the central region of the Coast Range Geomorphic province. The Miocene Orinda Formation, composed of poorly indurated non-marine mudstone and sandstone, underlies most of the hill site. The western and southern portions are underlain by older marine mudstone and sandstone deposits. Some of the higher elevation portions of the hill site and a portion of the eastern part of the hill site are underlain by Moraga Formation rocks, and a small portion of the eastern extent of the hill site is underlain by shallow marine sandstones of the Claremont Formation. The entire hill site is mapped by the California Department of Conservation, Geologic Survey (CGS) as MRZ-1, an area where no significant mineral or aggregate deposits are present. The majority of the hill site soils are Xerorthents-Millsholm complex, 30 to 40 percent slope. These soils are well-drained and susceptible to erosion. Other soil types on the hill site include Altamont Clay, Mayhem loam, and Mayhem-Los Gatos complex, all soil types highly susceptible to erosion.

The Hayward fault and associated Earthquake Fault Zone traverses the western edge of the LBNL hill site near the Blackberry Canyon Gate. The San Andreas Fault Zone is approximately 19 miles southwest of the LBNL hill site. According to the USGS Working Group on California Earthquake Probabilities estimates, there is a 27 percent chance of an earthquake of Magnitude 6.7 on the Hayward-Rodgers Creek Fault system by 2032 and a 21 percent chance of an earthquake of Magnitude 6.7 on the San Andreas fault by 2032. The LBNL hill site is expected to experience strong ground shaking from a seismic event on any of the Bay Area major faults. CGS has designated much of the LBNL hill site as a Seismic Hazard Zone for earthquake-induced landslides. The CGS has not designated any portion of the LBNL hill site as a Seismic Hazard Zone for liquefaction.

Project Sites

The Building 54 project site is located in the south-western part of the LBNL hill site along an east-west trending ridgeline that separates the Blackberry Canyon and Strawberry Canyon watersheds. The site is near the head of a small northeast-southwest trending swale, the lower portion of which contains Cafeteria Creek (A3GEO 2018).

The site is graded and developed with Building 54 and associated parking lot. Logs of previous borings drilled within the project site mostly show Great Valley Complex rock at relatively shallow depths. The rock materials include claystone, siltstone, sandstone and shale. A soil-filled swale is located in the central portion of the Building 54 site. This is mapped as Quaternary Colluvium which is generally representative of areas of slope instability. Two borings drilled directly downslope of the central portion of Building 54 encountered shale below the colluvium at depths of about 23 and 18 feet (A3GEO 2018).

Groundwater levels at the site are expected to vary seasonally, with higher groundwater levels expected during the winter months following heavy and prolonged rainfall. Due to the nature of the subsurface conditions, perched groundwater may also exist in some areas across the site. Three hydraugers exist in the slope south west of the existing Building 54 building. These discharge to a fire trail in the canyon. It is understood that these were previously installed to increase local slope stability, however according to recent geotechnical studies it is unlikely that these are having a significant effect on groundwater conditions near the existing Building 54 site (HDR 2019).

Building 48 project site is located in the south-central portion of the Berkeley Lab site. All improvements would be internal to the building and no ground disturbance is planned at that site.

5.7.2 2006 LRDP EIR Analysis

Impacts related to geology and soils from LBNL growth and development under the 2006 LRDP are evaluated in Section IV.E of the 2006 LRDP Final EIR and incorporated herein by reference. The 2006 LRDP Final EIR analysis concluded that all impacts related to geology and soils would either be less than significant or would be reduced to a less than significant level with mitigation. Section IV.D of the 2006 LRDP EIR discusses impacts with regards to paleontological resources and is also incorporated herein by reference. The analysis concludes that no paleontological resources have been discovered on the LBNL hill site and there would be no impact on such resources from development under the 2006 LRDP.

The proposed SSM Program is within the scope of analysis in the 2006 LRDP EIR. Relevant mitigation measures in the 2006 LRDP Final EIR (now standard project features for projects under the 2006 LRDP) have been incorporated as part of the planning and design of the proposed SSM Program and would be implemented during project construction and operations consistent with LRDP mitigation monitoring requirements.

5.7.3 Environmental Checklist and Discussion

GEOLOGY and SOILS	Additional Project-Level Impact Analysis Required	No Further Environment al Document Required
Would the project...		
a) Directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving:		
i) Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? Refer to Division of Mines and Geology Special Publication 42.	<input type="checkbox"/>	<input checked="" type="checkbox"/>
ii) Strong seismic ground shaking?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
iii) Seismic-related ground failure, including liquefaction?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
iv) Landslides?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
b) Result in substantial soil erosion or the loss of topsoil?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
c) Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
d) Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial direct or indirect risks to life or property?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
e) Have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems where sewers are not available for the disposal of wastewater?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
f) Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?	<input type="checkbox"/>	<input checked="" type="checkbox"/>

DISCUSSION:

SSM Project Analysis

- a. i-iv. **Directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving: Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? Strong seismic ground shaking? Seismic-related ground failure, including liquefaction? Landslides? No Further Environmental Document Required.**

The 2006 LRDP Final EIR evaluated the potential for seismic-related impacts to life and property from the growth and development under the 2006 LRDP (LRDP Impacts GEO-1 and GEO-2, pages IV.E-21 and IV.E-23). The 2006 LRDP Final EIR concluded that individual projects under the 2006 LRDP would have the potential to expose people and structures to seismic hazards.

The closest known active fault near the LBNL hill site is the Hayward fault. The various other faults that have been mapped closer to the hill site (including the contact between Great Valley Sequence and Orinda Formation rocks) are not considered active. The Building 54 project site is about 850 feet northeast of nearest active AP fault trace. The CGS prepares official Seismic Hazard Zone Maps² delineating “Zones of Required Investigation” for surface fault rupture, liquefaction and earthquake-induced landsliding. Both project sites are not within an AP Earthquake Fault Zone as delineated under the Alquist-Priolo Earthquake Fault Zoning Act (1972), nor are the sites within a Seismic Hazard Zone for liquefaction or earthquake-induced landsliding, as delineated under the Seismic Hazards Mapping Act (1990).

The Berkeley Lab is located within the seismically active San Francisco Bay Area and it is virtually certain that both project sites will experience strong earthquake shaking during the project’s useful life. The direct effects of earthquake ground motions on Building 48 will be addressed by the proposed seismic retrofit which is specifically designed to improve building safety. With regard to the new Welcome Center, effects of seismic ground shaking on that new building shall be addressed through compliance with the structural design provisions of the California Building Code (CBC). Furthermore, as noted above, the site is not in a zone mapped with potential for seismic related ground failure, including liquefaction. **LRDP Mitigation Measure GEO-2** (seismic hazards measure), which requires a site-specific, design-level geotechnical investigation to be completed during the design of any proposed building and for geotechnical recommendations to subsequently be incorporated into building design, was adopted as part of the 2006 LRDP and is a standard project feature of the proposed project. While a preliminary geotechnical evaluation has already been completed, pursuant to **LRDP Mitigation Measure GEO-2**, a design-level geotechnical investigation will be completed, and its recommendations will be incorporated into project design and construction. In summary, the proposed project’s impact is adequately addressed under LRDP Impact GEO-2. Consistent with the 2006 LRDP EIR, the proposed project’s impact would be less than significant with standard project features.

b. Result in substantial soil erosion or the loss of topsoil? No Further Environmental Document Required.

LRDP Impact GEO-3 (page IV.E-25) analyzed erosion associated with excavation, grading, and construction under the 2006 LRDP. The 2006 LRDP Final EIR concluded that individual construction projects under the 2006 LRDP would involve excavation and grading that could result in soil erosion, which would be a significant impact. Although the vast majority of the Building 54 project site has been previously disturbed, project construction activities (i.e., excavation, grading) could result in increased rates of erosion. The construction of the proposed Welcome Center would disturb approximately 2.3 acres and, therefore, the project would be required by state law to obtain coverage under the State Construction General Permit prior to construction. As required by the NPDES program, a Storm Water Pollution Prevention Plan (SWPPP) must be developed and implemented during construction to minimize sedimentation and contamination of stormwater runoff generated by the project. The SWPPP would specify Best Management Practices to prevent erosion and sedimentation of runoff and to keep construction pollutants from coming into contact with stormwater. **LRDP Mitigation Measures GEO-3a** (construction erosion measures) and **GEO-3b** (revegetation measures), which were adopted as part of the LRDP and would be implemented as standard project features of the proposed project, include construction management practices to minimize erosion impacts to a less than significant level. Building 48 seismic retrofit would not involve any excavation or grading outside the existing building and a SWPPP would not be required for that project site. The proposed SSM Program's impact is adequately addressed under LRDP Impact GEO-3. Consistent with the 2006 LRDP EIR, the proposed project's impact would be less than significant with standard project features.

c. Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse? No Further Environmental Document Required.

LRDP Impact GEO-3 (page IV.E-25) also includes a discussion of potential impacts related to unstable soils resulting from implementation of the 2006 LRDP. As discussed, implementation of the 2006 LRDP could lead to development on areas of unstable or unsuitable soils. The 2006 LRDP Final EIR concluded that compliance with California Building Code standards and **LRDP Mitigation Measures GEO-2, GEO-3a, and GEO-3b** would reduce potential impacts on new development from expansive and unstable soils to a less than significant level.

As discussed above, Great Valley Complex bedrock is interpreted to be present at the bottom of the area that would be excavated or graded to construct the new building. Based on the preliminary geotechnical evaluation, where bedrock is present at/near the excavation bottom, the future structure could be supported on conventional shallow spread footing foundations embedded in rock. In the central portion of the building site, there is a colluvium-filled area which extends downslope beyond the building footprint. Where colluvium is present, foundation support could be provided by spread footings that are deepened to bear directly on rock, or by drilled piers that extend into bedrock. As noted above, a design-level geotechnical report prepared in compliance with **LRDP Mitigation Measure GEO-2** would provide specific recommendations for that area and any impacts related to unstable soils or geologic units would be less than significant.

The soils encountered in previous borings drilled at the Building 54 project site consist predominantly of clays containing varying amounts of silt, sand and gravel. A log of a boring

drilled in the southeastern portions of the project site shows near-surface soils consisting of stiff clay, some of which is logged as having high plasticity. Highly plastic clays generally include expansive materials that will shrink and swell with changes in moisture (A3GEO 2018). To address the risk from expansive soils, it is anticipated that those areas would be over-excavated and the expansive materials would be removed per the recommendations of the design-level geotechnical investigation. Furthermore, **LRDP Mitigation Measures GEO-3a** and **GEO-3b**, which require hydroseeding to establish grasses for erosion control, primarily during construction, and revegetation to stabilize disturbed areas, would be implemented as standard project features of the proposed project. Therefore, the proposed project's impact is adequately addressed under LRDP Impact GEO-3. Consistent with the 2006 LRDP EIR, the proposed project's impact would be less than significant with standard project features.

- d. Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial risks to life or property? No Further Environmental Document Required.**

See item "c" above for analysis.

- e. Have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems where sewers are not available for the disposal of wastewater? No Further Environmental Document Required.**

The Initial Study prepared as part of the 2006 LRDP Final EIR scoping process concluded that development on the LBNL hill site would have no impact related to septic systems. Both project sites are served by a sanitary sewer system and would not require the use of septic tanks or alternative wastewater disposal systems. There would be no impact related to septic disposal systems.

- f. Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?**

The LRDP Initial Study found that growth and development under the 2006 LRDP would not have a significant impact on a unique paleontological resource or site or a unique geologic feature at LBNL. During the course of development at the LBNL hill site, extensive excavation for buildings and infrastructure has not revealed the presence of unique paleontological or geologic resources, and thus implementation of the 2006 LRDP, including the proposed project, would not affect such resources. There would be no impact.

5.7.4 Analysis of Cumulative Impacts in 2006 LRDP EIR

The 2006 LRDP Final EIR concluded that growth and development under the 2006 LRDP, when combined with cumulative growth, would increase the population exposed to geologic and seismic hazards (LRDP Impact GEO-4, page IV.E-27). Construction in conformance with the California Building Code, local building codes, where applicable, and other pertinent regulations and guidelines would reduce the risks of injury and structural damage from ground shaking, earthquake-induced landsliding, and other seismic and geologic hazards to a less than significant level. The 2006 LRDP Final EIR concluded that individual projects under the 2006 LRDP would expose people and structures to seismic hazards, but that their cumulative impact would be less than significant for the same reasons. Taking into consideration the present-day setting and the

current cumulative context, this analysis finds that no conditions have changed, and no new information has become available since certification of the 2006 LRDP Final EIR that would alter this previous analysis. The proposed Welcome Center Building project, which involves the construction of a two-story building, would potentially expose additional people and structures at the project site to geologic or seismic hazards; however, this impact was previously analyzed in the 2006 LRDP Final EIR. Furthermore, all of the employees that would be present in the Welcome Center are already exposed to similar hazards at their existing on-site LBNL locations and would not be subject to substantially increased hazards at this site. They would, in fact, be in a new building that is designed to perform much better than existing Buildings 54, 26, and 65 during a seismic event. Similarly, following the seismic retrofit, Building 48 would be expected to perform better under seismic conditions. The proposed building and population associated with the SSM Program are within the scope of the 2006 LRDP. Furthermore, with implementation of standard project features **LRDP Mitigation Measures GEO-2, GEO-3a, and GEO-3b**, and with the Lab's compliance with regulations related to emergency response and construction worker and employee safety, the proposed project's contribution to the cumulative impact would not be considerable and the proposed project's cumulative impact would be less than significant.

5.7.5 Changes to Circumstances or New Information that could affect the Earlier Environmental Analysis

There are no changes in circumstances and no new information related to geology and soils has become available since the certification of the 2006 LRDP Final EIR that would alter the previous analyses and change its conclusions.

5.8 Greenhouse Gas Emissions

5.8.1 Background

Section IV of the 2006 LRDP Final EIR addresses the greenhouse gas (GHG) emissions associated with LBNL growth under the 2006 LRDP and is incorporated by reference herein, pursuant to *State CEQA Guidelines* Section 15150. The 2006 LRDP Final EIR evaluated the increase in GHG emissions associated with the 2006 LRDP in response to a comment raised on the 2006 LRDP Draft EIR.

As part of the NERSC-9 Project EIR, in 2017 the Berkeley Lab prepared a Supplement (2017 Supplement) to the 2006 LRDP EIR which reevaluated the impact from GHG emissions that would result from growth under the 2006 LRDP. The following discussion summarizes the information presented in the 2006 LRDP Final EIR and the 2017 Supplement.

Definition of Greenhouse Gases

“Greenhouse gases” (so called because of their role in trapping heat near the surface of the earth), including those emitted by human activity, are implicated in global climate change, commonly associated with global warming. These greenhouse gases trap heat in the earth’s atmosphere by reflecting solar energy (i.e., long wave radiation) back toward the earth’s surface. The greenhouse effect is responsible for maintaining a habitable climate on earth, but human activity has caused increased concentrations of these gases in the atmosphere. Increasing concentrations of GHGs are considered to contribute towards increasing global temperatures as well as increasing variability in regional and global weather patterns.

The principal GHGs are carbon dioxide, methane, nitrous oxide, ozone, and water vapor. Of GHGs generated by human activities, carbon dioxide and methane are generated in the largest quantities. Emissions of carbon dioxide are largely by-products of fossil fuel combustion, whereas methane results from off-gassing associated with agricultural practices and landfills. There is general international scientific agreement that human-caused increases in GHGs have resulted in and will continue to contribute to global warming.

While water vapor and carbon dioxide (CO₂) are the most abundant GHGs, other trace GHGs have a greater ability to absorb and re-radiate long-wave radiation. To gauge the potency of GHGs, scientists have established a Global Warming Potential (GWP) for each GHG based on its ability to absorb and re emit long-wave radiation over a specific period. The GWP of a gas is determined using CO₂ as the reference gas, which has a GWP of 1 over 100 years (IPCC 2007). For example, a gas with a GWP of 10 is 10 times more potent than CO₂ over 100 years. The use of GWP allows GHG emissions to be reported using CO₂ as a baseline. The sum of each GHG multiplied by its associated GWP is referred to as “carbon dioxide equivalents” (CO₂e). This essentially means that 1 metric ton (MT) of a GHG with a GWP of 10 has the same climate change impacts as 10 metric tons of CO₂. To standardize emissions data across all geographies, the convention is to report GHG emissions in MTCO₂e.

LBNL GHG Emissions

Berkeley Lab conducts a wide variety of unclassified scientific research for the U.S. Department of Energy (DOE) Office of Science. Berkeley Lab has approximately 3,200 employees and several

thousand affiliates, annual facility users, and visiting researchers. Organized into six research areas (Computing Sciences, Biosciences, Environmental and Earth Sciences, Energy Sciences, Physical Sciences, and Energy Technologies), Berkeley Lab addresses the world's most urgent scientific challenges, advancing sustainable energy, protecting human health, creating new materials, and revealing the origin and fate of the universe. Berkeley Lab includes approximately 2.3 million gross square feet of research and support space located at its main 200-acre site in the hills above UC Berkeley and in leased laboratory and office space at other locations in the San Francisco Bay Area.

Berkeley Lab strives to extend its leadership in sustainability-related research to the sustainability of its operations. Sustainable Berkeley Lab, the team leading these efforts at the Lab, works collaboratively with partners across LBNL to reduce the Lab's environmental footprint, engage research to meet sustainability challenges, and improve institutional practices. With this approach, Berkeley Lab engages broadly to advance sustainability while considering environmental, social and institutional, and economic factors.

. The Lab prepares an annual Site Sustainability Plan (SSP). Performance data are reported in the SSP for fiscal year 2019, covering the period from October 2018 through September 2019. The SSP also includes a summary of sustainability accomplishments and initiatives underway, plans for the upcoming year to support federal sustainability goals, and responses to several additional sustainability-related information requests from the DOE (LBNL 2019).

Project Sites

Motor vehicles and heating and cooling systems are the primary sources of GHG emissions on and in the vicinity of the project sites. Other sources of GHG emissions in the vicinity of the project sites include emergency generators associated with various existing buildings.

5.8.2 2006 LRDP EIR Analysis

The 2006 LRDP Final EIR evaluated the increase in GHGs associated with the 2006 LRDP in response to a comment raised on the Draft EIR. The Final EIR explained that while the 2006 LRDP would result in "incremental increases" in GHGs, they would be neither substantial nor significant due to the LRDP's numerous features that would reduce overall emissions:

Qualitatively... the proposed LRDP includes numerous provisions that will substantially lessen the LBNL's contribution to global climate change. The proposed LRDP would encourage use of transit and alternative transportation modes...New construction at the Lab would also be required to meet California Energy Efficiency Standards in the state Building Code...Moreover, subsequent individual projects under the 2006 LRDP would implement GHG emission reduction strategies through compliance with the UC Policy on Sustainable Practices and the Guidelines for implementation of this policy. Emission reduction strategies instituted under this policy include practices related to green building design, clean energy, climate protection, transportation, operations, recycling and waste management, and environmentally preferable procurement.

The Final EIR explained that these LRDP features support the EIR's conclusion that the 2006 LRDP's contribution to climate change "would not be cumulatively considerable, and the cumulative impact of the project would therefore be less than significant."

Since the approval of the 2006 LRDP, Berkeley Lab has adopted a policy that sets sustainability standards for new construction, which further reduces GHG emissions associated with projects at the Berkeley Lab.

In 2017, LBNL reevaluated the impacts from GHG emissions from growth and development under the 2006 LRDP. The 2017 Supplemental analysis replaced the previous 2006 LRDP Final EIR analysis and concluded that that impacts would be less than significant after mitigation measures were incorporated.

The proposed project is within the scope of analysis of the 2017 Supplement. Relevant mitigation measures in the 2017 Supplement that are standard features of the 2006 LRDP have been incorporated as part of the planning and design of the proposed project and will be implemented during project construction and operations consistent with LRDP mitigation monitoring requirements.

5.8.3 Environmental Checklist and Discussion

GREENHOUSE GAS EMISSIONS	Additional Project-Level Impact Analysis Required	No Further Environmental Document Required
Would the project...		
a) Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
b) Conflict with an applicable plan, policy, or regulation adopted for the purpose or reducing the emissions of greenhouse gases?	<input type="checkbox"/>	<input checked="" type="checkbox"/>

DISCUSSION:

SSM Project Analysis

- a. **Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment? No Further Environmental Document Required.**

The SSM Program includes the construction of the new Welcome Center Building and seismic retrofit of Building 48. The former would add new building space to the Berkeley Lab site whereas the Building 48 improvements would not increase the building space. Both improvements would not increase the number of persons working at the Berkeley Lab, and therefore there would be no increase in commuting emissions. The additional building space that would be built as part of the Welcome Center is within the scope of development envisioned under the 2006 LRDP and analyzed in the 2017 Supplement for its potential to generate increased GHG emissions both during construction and operations, and therefore a project-level analysis is not required. Nonetheless, a project-level analysis has been completed to demonstrate that the emissions from the SSM Program would be low and would be well within the estimates included in the 2017 Supplement analysis.

Construction Emissions

During construction, the proposed Welcome Center would directly contribute to climate change through the GHG emissions that would be emitted from the exhaust of construction equipment, construction trucks, and construction workers' vehicles. Upstream emissions generated during the manufacture of products used for construction (e.g., cement, steel, and transport of materials to the region) would also indirectly contribute to climate change. However, the upstream GHG emissions for the proposed project, which may also include perfluorocarbons and sulfur hexafluoride, are not estimated in this impact analysis because they are not within the control of the Berkeley Lab and a lack of data precludes their quantification without speculation.

The CalEEMod forecast model was used to estimate the potential emissions from the construction of the Welcome Center. Construction GHG emissions would occur only during construction activities for a period of almost three years. The *Bay Area Air Quality Management District (BAAQMD) CEQA Air Quality Guidelines* state that that construction GHG emissions should be estimated and their significance evaluated, without providing a quantitative threshold for evaluating their significance. Construction of the project would emit approximately 308 metric tons of CO₂e. Neither the LBNL nor the BAAQMD have set forth numeric thresholds to evaluate GHG emissions resulting from construction activities. However, the emissions would be below the lowest numeric threshold adopted by BAAQMD and could be considered less-than-significant. BAAQMD also encourages the incorporation of best management practices to reduce GHG emissions during construction where feasible and applicable. All new projects at LBNL are required to comply with the Lab sustainability standards, which are consistent with the federal sustainability goals and the goals set forth in the University of California Sustainable Practices Policy. The Welcome Center will comply with the following requirements:

- Meet LBNL Sustainability Standards for New Construction, April 29, 2019
- Follow LBNL Implementation Guide to the Berkeley Lab Sustainability Standards for New Construction, March 2019
- Achieve LEED Gold Certification

Operational Emissions

As noted above, in 2017, in a supplement to the 2006 LRDP EIR, UC LBNL prepared a detailed analysis of the projected GHG emissions from the operation of the Berkeley Lab through full development under the 2006 LRDP. That analysis used the projected increase in building space, energy use, and future population of the Berkeley Lab under the 2006 LRDP to estimate future GHG emissions and evaluated the significance of the impact associated with those emissions. The analysis in LRDP Impact GHG-1 in the 2017 Supplement concluded that implementation of the 2006 LRDP would contribute to long-term cumulative increases in GHG emissions as a result of increases in traffic (mobile sources), building heating (area sources), electricity consumption especially in Berkeley Lab high performance computing facilities, water use, wastewater generation, and solid waste generation. The analysis found that the incremental GHG emissions from new sources added to the Berkeley Lab under the 2006 LRDP would exceed applicable thresholds, and a significant impact would result. The 2017 Supplement included **LRDP Mitigation Measure GHG-1** (GHG monitoring and offset measure), which requires the Berkeley Lab to monitor its total annual GHG emissions and implement measures to control them, including

procurement of offsets if necessary. With **LRDP Mitigation Measure GHG-1**, which was adopted by the Regents, the impact was found to be less than significant.

As discussed in detail in **Section 5.11**, the proposed SSM Program is within the scope of the LRDP development program. The amount of building space that the proposed Welcome Center would add to the Berkeley Lab hill site is within the amount of building space analyzed in the 2017 Supplement for the 2006 LRDP and the project would not increase the number of employees at the Lab. Therefore, the project’s operational emissions, which are directly related to the amount of building space and the number of employees, are accounted for in the analysis contained in the 2017 Supplement, and the project’s GHG impact is also accounted for in that previous analysis. With implementation of **LRDP Mitigation Measure GHG-1**, which is a standard project feature of the LRDP that addresses the Lab’s GHG emissions on a Lab-wide, and not a project-specific, basis, the project’s GHG impact would be less than significant.

Given the above, quantification of the project’s operational emissions is not required. However, the project’s operational emissions were estimated and are reported for informational purposes only. The operational emissions were calculated using CalEEMod and the same project information and assumptions that were used for the air quality calculations. The year 2024 was used for modeling, as this assumed to be the first full year after construction that the project could be operational. Annual emissions occurring after 2024 would be lower as emission rates associated with generation of electricity are anticipated to continually decrease. CalEEMod estimates emissions for mobile, areas sources, electricity consumption, electricity usage associated with water usage and wastewater discharge, and solid waste transport and landfill disposal. Mobile emissions were set at zero as the project would not increase the total number of employees at the LBNL hill site. GHG emissions from the existing Building 54 operations were also calculated. **Table 4** summarizes the change in annual operational GHG emissions from the implementation of the project.

Table 4
Annual Operational GHG Emissions (Metric Tons of CO₂e)

Source	Existing Cafeteria Emissions	Welcome Center Emissions
Area	<1	<1
Energy Consumption	223	300
Mobile	0	0
Solid Waste	89	35
Water and Wastewater	9	15
Total	321	350
Net New Emissions		29

Source: Illingworth & Rodkin 2020.

GHG emissions associated with the new building are anticipated to be only slightly greater than the emissions from the existing Building 54 as there would be greater electricity efficiency, reduction in waste generation, greater water efficiency, and limited natural gas usage. Note that the emissions associated with solid waste generation may be overestimated since the campus policies to reduce waste generation likely apply to this use currently.

The Building 48 seismic retrofit would not change the GHG emissions associated with that building.

In summary, the SSM Program would increase the total annual GHG emissions at the Berkeley Lab by about 29 MTCO_{2e}. These incremental GHG emissions are well below the operational threshold of 1,100 metric tons of CO_{2e} per year recommended by BAAQMD for new projects. The project would have less than significant effect related to GHG emissions.

b. Conflict with an applicable plan, policy, or regulation adopted for the purpose or reducing the emissions of greenhouse gases? No Further Environmental Document Required.

The proposed project would comply with the *Sustainable Practices Policy*⁷ approved by The UC Regents in 2004 and updated most recently in July 2020. New buildings (except acute care facilities) are required to achieve a minimum of LEED Silver, preferably LEED Gold. Additionally, new buildings shall be designed, constructed, and commissioned to outperform the California Building Code (CBC) energy-efficiency standards by at least 20 percent. The Welcome Center building would be designed to achieve LEED Gold certification in compliance specifically with the *Sustainable Practices Policy* and would outperform the CBC energy efficiency standards by at least 20 percent.

Consistent with Energy Independence and Security Act of 2007 and other federal mandates, Berkeley Lab adopted its own policy, the Sustainability Standards for New Construction, which requires that new building designs must demonstrate energy performance 30 percent lower than the maximum allowed by ASHRAE 90.1-2010. Heating and cooling of buildings should be achieved by using alternative methods such as building orientation, design of windows and building envelope, or use of shading and thermal mass, prior to using refrigeration cycle-based cooling. Energy efficient lighting systems must be used. The project would comply with the Berkeley Lab Sustainability Standards for New Construction and includes the principles of sustainability and energy efficiency to the fullest extent possible, consistent with budgetary constraints and regulatory and programmatic requirements.

Berkeley Lab prepares yearly Site Sustainability Plans, most recently for the fiscal year (FY) 2019 (LBNL 2019). The Site Sustainability Plan includes a goal of 30 percent overall reduction in GHG emissions by FY 2025 from a baseline of FY 2015. A variety of sustainable building goals are required under the Site Sustainability Plan. Examples of such goals are:

- Energy intensity reductions
- Potable water intensity reduction
- Water consumption reduction for industrial, landscaping, and agricultural water (from a FY 2007 baseline)
- Diversion of non-hazardous solid waste

⁷ <https://ucop.edu/sustainability/policy-areas/green-building/index.html>

- Reduction in fleet-wide per-mile GHG emissions
- Reduction in annual petroleum consumption
- Increase in annual alternative fuel consumption
- Increase light duty vehicle acquisitions consisting of alternative fuel vehicles
- Procure or produce at least 7.5 percent of electricity from renewable sources
- New buildings meet minimum High Performance Sustainable Building Guiding Principles – similar to a LEED Gold status

As the proposed project would comply with the Site Sustainability Plan, which is the applicable plan for reducing GHG emissions at the Berkeley Lab, this impact is considered less than significant.

5.8.4 Analysis of Cumulative Impacts in 2006 LRDP EIR

As the impact from a project's GHG emissions is essentially a cumulative impact, the analysis presented above provides an adequate analysis of the proposed project's cumulative impact related to GHG emissions. As the analysis above shows, the proposed project would not substantially increase GHG emissions from the Berkeley Lab. Therefore, the project would not contribute substantially to a cumulative impact.

5.8.5 Changes to Circumstances or New Information that could affect the Earlier Environmental Analysis

At the time that the 2017 Supplement to the LRDP EIR was prepared, it utilized the bright line threshold of 1,100 MTCO_{2e} emissions per year set forth by the BAAQMD in its *CEQA Air Quality Guidelines*. The thresholds in the guidelines were designed to control GHG emissions in the Bay Area in compliance with AB 32. Since then, SB 32 and other state laws were enacted which require the state to reduce its GHG emissions to even lower levels than previously targeted under AB 32. To comply with SB 32, the BAAQMD is preparing updated guidance, including new thresholds, that lead agencies in the Bay Area may use to evaluate and control GHG emissions associated with new development projects. The updated guidance has not been published at this time. However, it is considered likely that the BAAQMD will continue to recommend the use of the bright line threshold as it is a conservative threshold. Further, even if this threshold were revised, the impact conclusion in the 2017 Supplement, both before and after mitigation, would remain unchanged. Therefore, there are no changed circumstances that could affect the earlier analysis. Further, the proposed project would decrease and not increase GHG emissions from the Berkeley Lab. Therefore, the project would not result in a significant GHG impact regardless of any change in the numeric threshold that may be set forth by the BAAQMD in response to SB 32 targets.

5.9 Hazards and Hazardous Materials

5.9.1 Background

Section IV.F of the 2006 LRDP Final EIR addresses impacts related to hazards and hazardous materials from the growth of LBNL under the 2006 LRDP and is incorporated by reference herein pursuant to *State CEQA Guidelines* Section 15150. The following discussion summarizes the information presented in the ‘Setting’ subsection of Section IV.F of the 2006 LRDP Final EIR.

Definition of Hazardous Materials

The term hazardous material is defined in different ways for different regulatory programs. The 2006 LRDP EIR uses the definition given in California Health and Safety Code Section 25501(o), which defines hazardous material as:

any material that, because of its quantity, concentration, or physical or chemical characteristics, poses a significant present or potential hazard to human health and safety or to the environment if released into the workplace or the environment.

Hazardous materials include, but are not limited to, hazardous substances, hazardous wastes, and any material which a handler or the administering agency has a reasonable basis to believe would be injurious to the health and safety of persons or harmful to the environment if released into the workplace or the environment.

LBNL Hazardous Materials Plans and Policies

UC LBNL has developed an Integrated Safety Management (ISM) System that establishes environment, safety, and health policies and procedures to ensure all work is performed safely and in a manner that strives for the highest protection for the employees, guests, visitors, the public, and the environment. In addition, UC LBNL has developed an Environmental Management System to implement sound environmental stewardship practices that protect the air, water, land, and other resources that could potentially be affected by facility operations. The UC LBNL Environment/Health/Safety (EHS) Division has the primary responsibility of developing policies programs for compliance with applicable local, state, and federal laws and regulations. EHS has the authority to require abatement of any condition or operation that could endanger people or facilities at the LBNL hill site or result in violations of pertinent federal or state laws or LBNL policies concerning health and safety. EHS develops specific policies and programs in the following areas: industrial hygiene, chemical safety, physical safety, radiation safety, biohazard safety, hazardous waste management, and environmental protection.

Hazardous Materials Storage, Handling, and Disposal

UC LBNL stores fuels, certain chemicals, and other hazardous materials in aboveground tanks, storage drums, and in laboratories in small quantities. Hazardous wastes and radioactive and mixed wastes are stored in designated areas in research and support areas throughout the LBNL hill site. From these locations, they are taken to the permitted Hazardous Waste Handling Facility (Building 85) for temporary storage and permitted treatment. The wastes are hauled off from this facility for treatment and disposal.

Other Hazards

Other potential hazards at the LBNL hill site include the presence of asbestos, lead-based paints, polychlorinated biphenyls, and radioactive materials in structures, and soil and groundwater contaminations in some areas of the hill site due to historical releases of hazardous and radioactive materials.

In 1988, UC LBNL began a rigorous evaluation of historical releases of contaminants to the environment as part of an investigation under the Resource Conservation and Recovery Act (RCRA), which was required for renewal of its Part B hazardous waste facility permit. This process revealed contamination in soil and groundwater due to past site activities. A number of interim corrective measures were undertaken during the 1990s to clean up soil and groundwater that posed an imminent threat to human health or the environment. The remaining contamination that exceeded the DTSC required site cleanup levels was addressed in a Corrective Measures Implementation (CMI) Work Plan, which was approved by DTSC in March 2006. In July 2007, DTSC determined that LBNL had implemented the approved remedies for the remaining soil contamination and that the approved remedies for groundwater had been constructed and were operating successfully. UC LBNL continues to perform monitoring using about 150 groundwater monitoring wells located throughout the hill site and one additional well located off-site. In addition, prior to demolition of older structures, UC LBNL conducts surveys to identify locations where hazardous substances are present and to establish procedures to safely remove the substances.

The LBNL hill site's developed areas are interspersed with grassland areas and groves of native and non-native trees. UC LBNL implements a vegetation management program to minimize the risk of wildland fires. In addition, Alameda County Fire Station 19 is located on the LBNL hill site in Building 45, adjacent to Building 48.

Project Site

Although a Phase 1 site assessment has not been performed, due to the type of land uses at the Building 54 site, it is considered unlikely that any contamination is present in the soils and groundwater underlying the site.

The project site is not listed on the California Environmental Protection Agency Hazardous Waste and Substances Sites List compiled pursuant to Government Code Section 65962.5, also known as the Cortese list. The project site is within 0.25 mile of pre-schools and childcare centers.

5.9.2 2006 LRDP EIR Analysis

Impacts related to hazards and hazardous materials from LBNL growth under the 2006 LRDP are evaluated in Section IV.F of the 2006 LRDP Final EIR and are incorporated herein by reference. The 2006 LRDP EIR analysis concluded that all hazards and hazardous materials related impacts would either be less than significant or would be rendered less than significant with mitigation.

The proposed project is within the scope of analysis of the 2006 LRDP Final EIR. Relevant mitigation measures (now standard project features for projects under the LRDP) have been incorporated as part of the planning and design of the proposed project and will be implemented

during project construction and operations consistent with LRDP mitigation monitoring requirements.

5.9.3 Environmental Checklist and Discussion

HAZARDS & HAZARDOUS MATERIALS	Additional Project-Level Impact Analysis Required	No Further Environmental Document Required
Would the project...		
a) Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
b) Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
c) Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
d) Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard or excessive noise for people residing or working in the project area?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
f) Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
g) Expose people or structures, either directly or indirectly, to a significant risk of loss, injury or death involving wildland fires?	<input type="checkbox"/>	<input checked="" type="checkbox"/>

DISCUSSION:

SSM Project Analysis

- a. **Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials? No Further Environmental Document Required.**

LRDP Impact HAZ-3 addresses impacts associated with hazardous material use, generation, storage, transport, and disposal in conjunction with operation of the LBNL facilities (page IV.F-28). Operation of the SSM Program would not involve any expected increased use, transport, or disposal of hazardous materials because of the nature of proposed land uses (cafeteria and offices for Human Resources Department, and conferencing facilities, in the case of the Welcome Center,

and firehouse uses in case of Building 48 seismic retrofit work. Health Services waste stream volume and characteristics would not change; they would continue to include only sharps, paper waste, gloves, and expired medications; there would be no biopsy or biological tissue products). The handling, storage, and transport of the limited amounts of common hazardous materials used in cleaning and maintenance operations in both buildings would continue to be subject to applicable federal, state, and local requirements. Additionally, the proposed project's impact related to an accidental release of hazardous wastes is adequately addressed under LRDP Impact HAZ-3. Consistent with the 2006 LRDP EIR, the proposed project's impact would be less than significant with incorporation of standard project features **LRDP Mitigation Measures HAZ-3a through -3f** (hazardous waste reporting and handling measures).

- b. Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment? No Further Environmental Document Required.**

See item "a" above for analysis.

- c. Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school? No Further Environmental Document Required.**

LRDP Impact HAZ-4 (page IV.F-31) discusses handling of hazardous materials and wastes within 0.25 mile of an existing school and concludes that while there are no public or private elementary, middle, or high schools with 0.25 mile of the LBNL, there are several day-care centers and preschools. However, the impact on these receptors would be less than significant with the implementation of standard project features **LRDP Mitigation Measures HAZ-3a through HAZ-3f**, which would require appropriate hazardous material handling, storage, shipping, and disposal and adequate emergency preparedness. Further, neither the Welcome Center nor Building 48 include any sources that would emit hazardous emissions. The project's impact is adequately addressed under LRDP Impact HAZ-3. Consistent with the 2006 LRDP EIR, the proposed project's impact would be less than significant with standard project features.

- d. Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment? No Further Environmental Document Required.**

LRDP Impacts HAZ-1 (page IV.F-23) and HAZ-2 (page IV.F-26) address impacts associated with demolition and remediation activities at the LBNL hill site. According to the 2006 LRDP Final EIR, demolition of older structures that may contain lead-based paint, asbestos, and other contamination, and future construction including earth-moving activities such as excavation and grading, could potentially expose workers, the public, and the environment to soil and groundwater that has been affected by hazardous materials. Building 54 was constructed in 1950 and was substantially altered, added onto, and/or remodeled in 1961, 1966, 1994, 1998, and 2005. Due to the age of the original building, demolition would likely encounter small amounts of asbestos and lead-based paints. However, these would be handled in accordance with applicable legal and regulatory requirements and the terms of a Bay Area Air Quality Management District demolition permit. Building 48 was constructed in 1981 and would be unlikely to contain lead-

based paint, asbestos, or other contamination. The project sites are not on a list of hazardous materials site compiled pursuant to Government Code Section 65962.5. There would be no impact.

- e. **For a project located within an airport land use plan or, where such plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard or excessive noise for people residing or working in the project area? No Further Environmental Document Required.**

The Initial Study prepared as part of the 2006 LRDP Final EIR scoping process concluded that growth and development on the LBNL hill site would have no impact related to safety hazards for people within 2 miles of a public airport or a public use airport. The LBNL hill site, including the project sites, is neither within an airport land use plan nor in the vicinity of an airport. There would be no impact.

- f. **Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan? No Further Environmental Document Required.**

LRDP Impact HAZ-5 (page IV.F-32) addresses impacts associated with exposure of people or structures to catastrophic events. Regionally catastrophic events could include earthquakes or fires of sufficient magnitude to impair regional emergency support and service systems such that UC LBNL could not expect to receive aid from external sources. The small increase in building square space associated with the proposed Welcome Center is within the scope of the 2006 LRDP. The proposed project would not increase the number of people that could be exposed to regional, compounded, or terrorist-related catastrophic events. Construction and facility operations at LBNL, including the proposed project, would comply with federal and state laws to ensure that there would be no conflict with emergency response plans. Therefore, the proposed project's impact is adequately addressed under LRDP Impact HAZ-5. Consistent with the 2006 LRDP EIR, the proposed project's impact would be less than significant.

- g. **Expose people or structures, either directly or indirectly, to a significant risk of loss, injury or death involving wildland fires? No Further Environmental Document Required.**

LRDP Impact HAZ-6 (page IV.F-39) addresses impacts associated with exposure of people or structures to wildland fire hazards. The 2006 LRDP Final EIR concluded that continued implementation of the LBNL vegetation management program would limit damage to assets from wildland fires and would reduce potential wildland fire hazards. Development of the proposed Welcome Center would increase facility space at the LBNL hill site. The new building would meet required safety standards and fire codes at the time of facility construction. As discussed in Section 5.4, the southern side of the site slopes down to a canyon that contains grasslands and scrub vegetation; this vegetation presents wildland fire hazard. The landscaping of the project site will follow LBNL standards. Per the LBNL Site Design Guidelines, the southern side of the site is a Rustic Zone, where landscape planting will conform to the guidelines for grasses and trees, and native, drought-tolerant, fire-resistant plant varieties will be used. Therefore, the proposed project would not expose structures or persons to a significant risk from wildland fires. The project's impact is adequately addressed under LRDP Impact HAZ-6. Consistent with the 2006 LRDP EIR, the proposed project's impact would be less than significant.

5.9.4 Analysis of Cumulative Impacts in 2006 LRDP EIR

The 2006 LRDP Final EIR found that implementation of the 2006 LRDP would contribute to cumulative increases in exposure to hazards and hazardous materials (LRDP Impact HAZ-7, page IV.F-41). The 2006 LRDP could result in development that disturbs contaminated soil or groundwater or increases exposure to wildland fire hazards. Compliance by UC LBNL with federal, state, and local regulations and LBNL policies would reduce potential impacts, and compliance with regulations governing hazardous materials and hazardous wastes by UC Berkeley and other institutions would reduce potential cumulative impacts in the vicinity of LBNL to less than significant levels. Therefore, the 2006 LRDP Final EIR concluded that implementation of the 2006 LRDP would not result in a considerable contribution to any cumulative increases in the use of or exposure to hazards or hazardous materials. Taking into consideration the present-day setting and the current cumulative context, this analysis finds that no conditions have changed, and no new information has become available since certification of the 2006 LRDP Final EIR that would alter this previous analysis. The proposed project is within the scope of the growth and development analyzed in the 2006 LRDP Final EIR and as shown above would comply with federal and state laws regulating the use, transport, and disposal of hazardous material during construction and operation. The proposed project's cumulative hazards impacts are adequately addressed under LRDP Impact HAZ-7 and would be less than significant.

5.9.5 Changes to Circumstances or New Information that could affect the Earlier Environmental Analysis

There are no changes in circumstances and no new information related to hazards and hazardous materials has become available since the certification of the 2006 LRDP Final EIR that would alter the previous analysis and change its conclusions.

5.10 Hydrology and Water Quality

5.10.1 Background

Section IV.G of the 2006 LRDP Final EIR addresses the hydrology and water quality effects of LBNL growth and development under the 2006 LRDP and is incorporated by reference herein pursuant to *State CEQA Guidelines* Section 15150. The following discussion summarizes the information presented in the ‘Setting’ subsection of Section IV.G of the 2006 LRDP Final EIR.

LBNL

Surface Water Hydrology

The LBNL hill site is located within the Blackberry and Strawberry Canyons in the East Bay Hills, with the majority of the hill site in the Strawberry Canyon. The northwestern portion of the LBNL hill site drains to the North Fork of Strawberry Creek in Blackberry Canyon whereas the majority of the site drains to the main fork of Strawberry Creek in Strawberry Canyon (herein identified as simply Strawberry Creek). The total watershed area of the Strawberry Creek North and main forks pertinent to LBNL is 878 acres, of which about 202 acres are within the LBNL hill site. A number of smaller drainages discharge into the main fork, including Ravine Creek, Ten-Inch Creek, Chicken Creek, No Name Creek, and Botanical Garden Creek. Runoff from the easternmost portion of the LBNL hill site (including Chicken, No-Name, and Botanical Garden Creeks) is routed into the Strawberry Creek main fork via a mid-canyon detention basin, from where water may be released downstream at flow rates consistent with the design parameters of the storm drainage systems of UC Berkeley and the City of Berkeley. LBNL site runoff that drains into the North Fork exits the site at the bottom of Blackberry Canyon from where it flows through a series of check dams and settlement basins before entering the City’s storm water system.

Groundwater Resources

Groundwater at the LBNL hill site occurs at depths ranging from near the surface to approximately 100 feet below ground surface. Groundwater flow patterns generally reflect the site topography with groundwater tending to flow southward. Groundwater at LBNL is not used for potable or irrigation uses. Because heavy saturation by groundwater can destabilize slopes, LBNL strives to avoid creating obstacles to smooth and to efficient groundwater flow.

Flooding

The LBNL hill site is not located within a 100-year flood plain as determined by the Federal Emergency Management Agency flood hazard mapping.

Surface Water and Groundwater Quality

LBNL has had a stormwater management program in place since 1992. This program is designed to control pollutants from site activities from entering downstream surface waters in accordance with California General Industrial Permit requirements. Groundwater in some portions of the LBNL hill site has been affected by past, accidental releases of hazardous and radioactive materials (See **Section 5.9.1**, above). For a similar period of time, UC LBNL has implemented a remediation and monitoring program to address the groundwater contamination.

Project Sites

There are two sub-watersheds (Northfork Strawberry Creek watershed and Cafeteria Creek watershed) at the Building 54 project site. The Cafeteria Creek watershed (which includes Building 54 and landscaped zones) drains to Cafeteria Creek and then to the south fork of Strawberry Creek. The Northfork Strawberry Creek watershed (which includes Building 54 Parking Lot) drains to the north fork of Strawberry Creek. Most of the project site is currently impervious as it is developed with Building 54, parking lots, paths, and driveways.

Groundwater levels at the site are expected to vary seasonally, with higher groundwater levels expected during the winter months following heavy and prolonged rainfall. Due to the nature of the subsurface conditions, perched groundwater may also exist in some areas across the site (HDR 2019). Three hydraugers are located in the slope south west of the Cafeteria building. These discharge to a fire trail in the canyon. It is understood that these were previously installed to increase local slope stability, however according to recent geotechnical studies it is unlikely that these are having a significant effect on groundwater conditions near the project site (HDR 2019).

Although a Phase 1 site assessment has not been performed, due to the type of land uses at the Building 54 project site, it is considered unlikely that any contamination is present in the soils or groundwater underlying the site.

Building 48 project site is located in the south-central portion of the hill site, within the Ten-Inch Creek watershed. That creek flows to the south and drains into Strawberry Creek.

5.10.2 2006 LRDP EIR Analysis

Impacts on hydrology and water quality from LBNL growth and development under the 2006 LRDP are evaluated in Section IV.G of the 2006 LRDP Final EIR and are incorporated herein by reference. The LRDP EIR analysis concluded that all hydrology and water quality impacts of LBNL growth under the 2006 LRDP would be less than significant. No mitigation measures related to hydrology and water quality impacts are identified in the 2006 LRDP Final EIR. The proposed project is within the scope of analysis of the 2006 LRDP Final EIR.

5.10.3 Environmental Checklist and Discussion

HYDROLOGY & WATER QUALITY	Additional Project-Level Impact Analysis Required	No Further Environmental Document Required
Would the project...		
a) Violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or ground water quality?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
b) Substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the project may impede sustainable management of the basin?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
c) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner which would:		
i) Result in substantial erosion or siltation on- or off-site?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
ii) Substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or offsite?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
iii) Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
iv) Impede or redirect flood flows?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
d) In flood hazard, tsunami, or seiche zones, risk release of pollutants due to project inundation?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
e) Conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan?	<input type="checkbox"/>	<input checked="" type="checkbox"/>

DISCUSSION:

SSM Project Analysis

- a. **Violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or ground water quality? No Further Environmental Document Required.**

Construction

LRDP Impact HYDRO-1 addresses impacts to water quality, including potential to violate water quality standards and waste discharge requirements, from construction activities under the 2006 LRDP (page IV.G-22 of the revised Hydrology and Water Quality section in Appendix A of the LRDP Final EIR). The analysis concluded that individual projects under the 2006 LRDP would not

result in significant impacts with regard to stormwater sedimentation, or construction-related pollution of stormwater. Disturbed areas would be either be paved or landscaped and re-seeded at the earliest practical time during construction so that ground cover would be well-established by the next rainy season, consistent with standard project features (**LRDP Mitigation Measures GEO-3a** and **GEO-3b**). Areas that are not paved or covered with gravel would be landscaped with a network of lined biofiltration planter systems. Implementation of these measures is anticipated to effectively control the discharge of sediment and pollutants into stormwater from small construction sites that encompass less than 1 acre and are therefore not subject to NPDES requirements.

The Building 54 project site is approximately 2.3 acres in size. Under the state Construction General Permit (1 acre or more in size), which is administered by the San Francisco Bay RWQCB, a Stormwater Pollution Prevention Plan (SWPPP) must be developed and implemented during construction to minimize sedimentation and contamination of stormwater runoff. The SWPPP would require a project-specific erosion plan and the use of Best Management Practices to minimize stormwater pollution from sediments and construction-related contaminants. Further, if groundwater is encountered, it would be collected, tested and discharged into the storm drain system or into the sewer system in compliance with the wastewater discharge permit issued to the Berkeley Lab by EBMUD to manage accumulated ground and stormwater. Compliance with NPDES regulations would render the proposed project's impact less than significant.

Building 48 seismic retrofit would involve interior modifications which would not result in erosion or sedimentation. There would be no impact.

Operations/Occupancy

The Building 54 project site would be graded to direct flows to the new stormwater management facilities/BMPs, which would include lined bioretention areas, flow-through planters, and stormwater detention tanks. Ultimately, these BMPs would discharge to the existing stormwater network and City of Berkeley's storm drainage system as per the existing condition. Infiltration is not feasible at the site. Stormwater from the Building 54 Parking Lot would be directed via new and existing stormwater pipes to the north to the North Fork of Strawberry Creek. Stormwater from the new Welcome Center building and surrounding landscaped areas would be redirected around the new building. An existing storm drain is currently located under the existing building near the center. This storm drain would be redirected to the west of the building to discharge to Cafeteria Creek. A new below-grade storm drain would also be required from the new storage tank located at the south east of the building; this storm drain would discharge into Cafeteria Creek at the base of the canyon. The BMPs would provide improved water quality and decrease the peak discharge rate compared to existing conditions. As under existing conditions, the project site will continue to be covered by the LBNL NPDES General Industrial Permit and associated SWPPP and Storm Water Monitoring Plan that apply to the entire Lab site. The proposed Welcome Center Building project would not degrade surface water quality and would therefore result in a less than significant impact, consistent with the conclusion under LRDP Impact HYDRO-2.

As for groundwater, project operations would not involve any activities that could degrade groundwater quality and would therefore result in a less than significant impact.

- b. Substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the project may impede sustainable management of the basin? No Further Environmental Document Required.**

Water used at the LBNL hill site is supplied from the East Bay Municipal Utility District's Shasta Reservoir and Berkeley View Reservoir systems. Groundwater at the site is not used by LBNL, nor would the project require any groundwater withdrawal. The 2006 LRDP Final EIR concluded that LBNL's steep slopes, shallow bedrock, and thin soils presently inhibit significant groundwater recharge of the East Bay Plain. The Welcome Center would slightly increase the amount of impervious surfaces on the project site because the new building would have a footprint that is larger than that of the current Building 54. The increase in impervious surfaces would result in a decrease in infiltration on the project site compared to current conditions. However, the change would not be substantial because even under current conditions, the site is sloping and soils inhibit significant infiltration of stormwater on site. Building 48 seismic retrofit would not involve any increase in impervious surfaces. Therefore, the proposed project would not adversely affect groundwater levels or recharge such that the project may impede sustainable management of the basin. The impact would be less than significant.

- c. i. Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner which would result in substantial erosion or siltation on- or off-site? No Further Environmental Document Required.**

LRDP Impact HYDRO-3 (page IV.G-26 in Appendix A of the LRDP Final EIR) discusses the potential impacts from increases in stormwater volume resulting in erosion of creek channels or downstream flooding under the 2006 LRDP. The 2006 LRDP Final EIR noted that in compliance with NPDES requirements, UC LBNL will design appropriate stormwater control measures into projects to ensure that pre- and post-construction runoff remains approximately the same. In addition to NPDES regulations, Section 438 of the Energy Independence and Security Act (EISA) requires that federal projects above 5,000 square feet maintain or restore the predevelopment hydrology of the property to the maximum extent technically feasible.

As discussed above, the runoff generated at the Building 54 project site would increase above current conditions because the project would increase the amount of impervious area on the project site. However, the site would be graded to direct site stormwater runoff into localized BMPs, including lined bioretention areas, flow-through planters, and stormwater storage tanks. These BMPs would provide improved water quality and decrease the peak discharge rate compared to existing conditions before ultimately discharging into the City of Berkeley storm drain system. Due to the inclusion of stormwater detention tanks in the project design, the proposed project would not cause the capacity of the storm drain system to be exceeded, would not result in hydromodification impacts in the receiving waters, and flooding would also not occur. The impact from the change in the volume of surface water runoff is adequately addressed under LRDP Impact HYDRO-3. Consistent with the 2006 LRDP EIR, the proposed project's impact would be less than significant.

- c. ii. **Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces in a manner which would increase the rate or amount of surface runoff in a manner which would result in flooding on- or offsite? No Further Environmental Document Required.**

See item “c. i” above for analysis.

- c. iii. **Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner which would create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff? No Further Environmental Document Required.**

See item “c. i” above for analysis.

- c. iv. **Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner which would impede or redirect flood flows? No Further Environmental Document Required.**

See item “c. i” above for analysis.

- d. **In flood hazard, tsunami, or seiche zones, risk release of pollutants due to project inundation?**

Active faults within the San Francisco Bay Area have largely horizontal movement and are not expected to generate significant waves in the San Francisco Bay. Given the elevation and distance of the project sites from the bay’s edge, there would be no potential for flooding from a seiche or tsunami. No lakes or open bodies of water are located in the watershed where the project sites are located. Moreover, given the location of the project sites on the top of the canyons, there would be minimal impacts from mudflows. Therefore, implementation of the project would result in no impact related to the risk of inundation from seiche, tsunami, or mudflow.

- e. **Conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan?**

As the SSM Program is a federally funded project, UC LBNL is required to implement stormwater quality and quantity management practices that maintain or restore the predevelopment hydrology of the property with regard to the temperature, rate, volume, and duration of flow, in accordance with EPA 841-B-09-001: Technical Guidance on Implementing the Stormwater Runoff Requirements for Federal Projects, Section 438 of the Energy Independence and Security Act (EISA).

LBNL is not required to meet all state and local hydrology-related regulations. However, UC LBNL’s practice is to operate in a manner consistent with the policies and regulations governing the City of Berkeley. These regulations include Section C.3d of the Municipal Regional Stormwater permit (MRP) under the NPDES permit program. The NPDES permit program aims to limit runoff flows and reduce pollution from a development project’s stormwater runoff. To achieve these goals, the guidelines require the implementation of post-construction stormwater BMPs to treat and manage the peak flow of stormwater runoff prior to discharge into the local stormwater

system. As discussed above, the Welcome Center Building project includes construction and post-construction stormwater BMPs that would treat and manage stormwater prior to discharge into the local stormwater system. Building 48 seismic retrofit would not increase stormwater runoff from that project site. No groundwater extraction would be involved with the proposed project. As such, implementation of the SSM Program would not conflict with or obstruct with implementation of a water quality control plan or sustainable groundwater management plan and no impact would occur.

5.10.4 Analysis of Cumulative Impacts in 2006 LRDP EIR

As discussed under LRDP Impact HYDRO-4, implementation of the 2006 LRDP, when combined with implementation of the UC Berkeley 2020 LRDP and other cumulative development, would not result in significant cumulative hydrologic or water quality impacts (pages IV.G-29 through G-30 in Appendix A of the LRDP Final EIR). LRDP Impact HYDRO-4 concluded that potential hydrologic and water quality impacts associated with the proposed 2006 LRDP would be less than significant. Furthermore, other development in the area and the region that could contribute to water quality impacts (on the San Francisco Bay, for example) would also be subject to NPDES permit regulations, SWPPPs, and other programmatic requirements that would further reduce the potential for cumulative adverse impacts. The 2006 LRDP Final EIR concluded that individual projects would result in cumulative hydrology and water quality impacts that would be less than significant. Taking into consideration the present-day setting and the current cumulative context, this analysis finds that no conditions have changed, and no new information has become available since certification of the 2006 LRDP Final EIR that would alter this previous analysis. The proposed project's cumulative hydrology and water quality impacts are adequately addressed under LRDP Impact HYDRO-4 and would be less than significant.

5.10.5 Changes to Circumstances or New Information that could affect the Earlier Environmental Analysis

There are no changes in circumstances and no new information related to hydrology and water quality has become available since the certification of the 2006 LRDP Final EIR that would alter the previous analysis and change its conclusions.

5.11 Land Use/Planning

5.11.1 Background

Section IV.H of the 2006 LRDP Final EIR addresses the effects of LBNL growth and development under the 2006 LRDP on land use and planning and is incorporated by reference herein pursuant to *State CEQA Guidelines* Section 15150. The following summarizes the information presented in the ‘Setting’ subsection of Section IV.H of the 2006 LRDP Final EIR.

LBNL

The LBNL hill site covers approximately 200 acres in the eastern hills of Berkeley and Oakland. The site is largely buffered by undeveloped land owned by the University of California. The nearest private residential neighborhoods are along the west and northwest edges of the LBNL hill site in the City of Berkeley; the University of California Berkeley (UCB) main campus is adjacent to the south, while UCB-managed “hill campus” space is to the north and east.

Access to LBNL’s hill site is limited to three controlled-access vehicular gates on Cyclotron Road (the main Blackberry Canyon Gate) and Centennial Drive (the Strawberry Canyon and Grizzly Peak gates), all of which are staffed by an on-site security firm contracted by UC LBNL. Visitors primarily use the Blackberry Canyon Gate. The Grizzly Peak Gate is an exit-only gate after the morning commute hours.

The LBNL hill site is land owned by the Regents of the University of California. On the LBNL hill site are research and support buildings and structures that are primarily part of a multi-program national research facility called the Lawrence Berkeley National Laboratory, which is managed and operated by the University of California under contract with the U.S. Department of Energy. The University and its campuses are exempted by the state constitution from compliance with local land use regulations, including municipal general plans and zoning. However, UC seeks to cooperate with local jurisdictions to reduce any physical consequences of potential land use conflicts to the extent feasible. UC campuses, including UC LBNL, are subject to individual, Regent-approved long-range development plans (LRDPs) for land use and development guidance. The western half of the LBNL hill site is within the Berkeley city limits, and the eastern half is within the Oakland city limits.

Project Sites

The Building 54 project site is currently developed with Building 54, parking lots, paths and driveways. The 2006 LRDP designates the project site as within an area designated Central Commons. The project site is located within the Berkeley city limits.

Land uses surrounding the project site include laboratory buildings and offices as well as the Lab Guest House. The project site is distant from surrounding neighborhoods. It is approximately 1,200 feet from the Nyingma Buddhist Institute which is to the west, and the nearest residences are about

1,500 feet further west. Residences to the east are in the Panoramic Hill neighborhood and are at least 2,000 feet from the site.⁸

The Building 54 project site is within an area of UC-owned land that is currently leased to the DOE as Parcel 21. Under the project, the ground lease term of Parcel 21 would be extended for another 50 years.

Building 48 project site is developed with the firehouse building and is designated Research and Academic in the 2006 LRDP land use plan.

5.11.2 2006 LRDP EIR Analysis

Impacts of LBNL growth and development under the 2006 LRDP on land use and planning are evaluated in Section IV.H of the 2006 LRDP Final EIR and incorporated herein by reference. The LRDP EIR analysis concluded that all land use and planning impacts of LBNL growth and development under the 2006 LRDP would be less than significant. The proposed project is within the scope of analysis of the 2006 LRDP Final EIR.

5.11.3 Environmental Checklist and Discussion

LAND USE & PLANNING	Additional Project-Level Impact Analysis Required	No Further Environmental Document Required
Would the project...		
a) Physically divide an established community?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
b) Cause a significant environmental impact due to a conflict with any land use plan, policy, or regulation adopted for the purpose of avoiding or mitigating an environmental effect?	<input type="checkbox"/>	<input checked="" type="checkbox"/>

DISCUSSION:

SSM Project Analysis

a. Physically divide an established community? No Further Environmental Document Required.

LRDP Impact LU-1 (page IV.H-10) concluded that the implementation of the 2006 LRDP would not physically divide an established community as all new construction would be within developed areas of the LBNL hill site and would not introduce substantially new land uses, as the proposed project would be similar to existing land use surrounding the project site. The Building 54 project site is located in the west-southern portion of the LBNL campus in an area currently developed with support uses. The proposed Welcome Center would be similar in use to the current and surrounding uses. Building 48 seismic retrofit would not alter any land use on the site. Implementation of the proposed project would not divide an existing community. Therefore, there would be no impact.

⁸ These distances were estimated using Google Earth and reflect the distance between the nearest residence and center of the project site.

- b. Cause a significant environmental impact due to a conflict with any land use plan, policy, or regulation adopted for the purpose of avoiding or mitigating an environmental effect? No Further Environmental Document Required.

The applicable land use plan for the project site is the LBNL 2006 LRDP. The following discussion describes the proposed project's relationship to and consistency with the development projections, population projections, land use designations, and objectives contained in the 2006 LRDP and LRDP Final EIR.

Consistency with 2006 LRDP Scope of Development

The 2006 LRDP provides for the construction of approximately 980,000 gross square feet (gsf) of additional research and support space and demolition of up to 320,000 gsf of building space, for a net increase of 660,000 gsf of new research and support space on the LBNL hill site through 2025. As a result, the total building space on the LBNL hill site under the 2006 LRDP could increase to 2,420,000 gsf.

LBNL projects that have been approved for implementation since 2006 have added (and in some cases subtracted) research and support space at the LBNL hill site. The proposed Welcome Center Building project would demolish about 14,848 gsf of space that is contained in Building 54 and construct a new 47,500 gsf building and would therefore add approximately 32,652 gsf of new space. The Building 48 Seismic Retrofit project would not add or demolish any building space. As shown in **Table 5, 2006 LRDP Building Space and Approved and Pending Projects**, the LBNL projects approved and/or constructed under the 2006 LRDP, with the addition of the proposed SSM Program, would not exceed the 2006 LRDP's net new research and support space projections.

**Table 5
2006 LRDP Building Space and Approved and Pending Projects**

Project	Research and Support Space Increment (gsf)	Cumulative Total (gsf)
Existing Building Space as of 2006	-	1,760,000
Building Space demolished since 2006 ¹	-196,439	1,563,561
Building Space constructed since 2006 ²	391,000	1,954,561
Old Town demolition	-55,000	1,899,561
Biological & Environmental Program Integration Center (approved)	73,000	1,972,561
SSM Program	32,652	2,005,213
Net New Development	245,122	
2006 LRDP Building Space Projection for 2025	660,000	2,420,000

¹ Square footage of space demolished includes Building 51 (126,500 gsf) and other buildings (69,939 gsf).

² Square footage numbers include the following projects: Guest House (25,000 gsf), User Support Building (30,000 gsf), Solar Energy Research Center Facility (SERC) (90,000 gsf), Seismic Phase 2 (GPL) (43,000 gsf), Computational Research and Theory Facility (CRT) (126,000 gsf), and Integrative Genomics Building (77,000 gsf).

The 2006 LRDP also projects a net gain of up to 500 parking spaces. The proposed Welcome Center Building project would include changes to improve access and circulation in the parking lots that serve the site. As a result of the changes, the total number of parking spaces would decrease from 65 parking spaces at the present time to 43 spaces which include 40 regular parking spaces and three accessible parking spaces. The project would not increase the number of parking spaces on the LBNL hill site. The Building 48 Seismic Retrofit project would not make any changes to parking facilities. Therefore, the proposed SSM Program would not contribute toward the 500 net additional parking spaces allowed under the 2006 LRDP.

Consistency with 2006 LRDP Land Use Designations and Height Restrictions

The Building 54 project site is designated Central Commons, a subset of the Research and Academic zone, in the 2006 LRDP Land Use plan. The Central Commons is an approximately 6-acre area, that would serve as the main location of dining, gathering and event uses, as well as visitor accommodations. The proposed Welcome Center, with its Cafeteria, Human Resources, Health Services, and Conferencing uses, fits within this land use category and is consistent with the 2006 LRDP land use designation for this site. Therefore, the proposed project would be consistent with the 2006 LRDP Land Use plan.

The 2006 LRDP Design Guidelines include a Height Zoning Map for the LBNL hill site; this map establishes height restrictions for new buildings in certain areas of the hill site based on aesthetics and other planning considerations. Per the Height Zoning Map, the project site is in a six-story permitted zone. As the proposed Welcome Center Building would be two stories, with a partial basement, it would comply with the 2006 LRDP’s height restrictions.

Consistency with 2006 LRDP Population Projections

The 2006 LRDP projects that, through 2025, the LBNL hill site’s adjusted daily population (ADP) could increase to 4,650 persons, an increase of 1,000 persons over the 2003 baseline. Under the LRDP EIR Project Variant, the hill site ADP could increase to 5,000 persons. The proposed project would house the employees that already work in the existing Cafeteria and relocate existing Health Services and Human Resources employees from other hill site facilities, including Buildings 26, 65, and 90 into the new Welcome Center. The project would not increase the total number of employees on the LBNL hill site. The project would not increase LBNL’s ADP in excess of 2006 LRDP ADP projections (see **Table 6, 2006 LRDP Hill Site Adjusted Daily Population and Approved and Pending Projects**).

**Table 6
2006 LRDP Hill Site Adjusted Daily Population and Approved and Pending Projects**

Project	Population Increment (FTE)	Cumulative Total
Hill Site ADP in 2006 LRDP	-	3,650
Increase in ADP since 2006	587 ¹	4,237
Biological & Environmental Program Integration Center (approved)	125	4,362
<i>SSM Program</i>	<i>0</i>	<i>4,362</i>

Net Population Increase	712	-
2006 LRDP ADP Projection for 2025	1,000	4,650
2006 LRDP EIR Project Variant ADP Projection for 2025	1,350	5,000

Note: This table reports the net new persons associated with each project and does not include persons who would be relocated from another LBNL building on the hill site to the project site. (updated 2019)

¹ *The total includes the new population added to the hill site by the following projects: Guest House (8 persons), User Support Building (0 persons), Solar Energy Research Center Facility (85 persons), Seismic Phase 2 (30 persons), Computational Research and Theory Facility (131 persons), and Integrative Genomics Building (333 persons).*

Consistency with 2006 LRDP Objectives

The primary objectives of the 2006 LRDP are to revitalize existing facilities and infrastructure at the LBNL hill site and to guide the future development at the site. The 2006 LRDP identifies seven principal objectives:

- Strengthen and expand existing research programs to sustain and grow LBNL’s role as a national research laboratory;
- Expand partnerships and collaborations to enhance LBNL’s scientific and technical base;
- Provide flexibility to return staff from its off-site facilities leased in Berkeley and Oakland to the main site in order to enhance collaboration, productivity, and efficiency;⁹
- Expand the capacity of existing high demand advanced facilities and provide broader functionality;
- Rehabilitate facilities that have outlived their intended purpose and can be cost-effectively adapted for use in new regions of scientific discovery;
- Replace single-purpose facilities with new facilities programmed to accommodate multiple disciplines with advanced infrastructure suitable for future scientific endeavors; and
- Construct new scientific facilities to support future research initiatives and continued growth in existing programs.

The proposed Welcome Center and Building 48 seismic retrofit would indirectly support several of these key objectives of the 2006 LRDP by providing adequate and well-designed facilities to support the scientific research mission of the Berkeley Lab. The proposed project is consistent with the objectives of the 2006 LRDP.

Consistency with LBNL 2006 Design Guidelines

In addition to the 2006 LRDP, the proposed project would also be consistent with LBNL Design Guidelines. As mentioned above, the LBNL Design Guidelines were developed as a supporting

⁹ This objective is relevant to the proposed project because it relates to the relocation of off-site programs to the LBNL hill site.

document to the 2006 LRDP and are the basis for several impact assumptions and conclusions in the 2006 LRDP Final EIR.

The guidelines applicable to land use are separated into three main categories: Land, Topography, and Views; Research Clusters; and Linkages. Due to the topography of the hill site and the intervening buildings which include the Building 70 complex and NERSC, the proposed Welcome Center (including the shuttle transit shelter) would not be visible from residences to the west. Although some of the residences to the east within the Panoramic Hill neighborhood would be able to see the new building, due to intervening distance and the two-story design of the Welcome Center, it would not appear prominently to a viewer in that area. With respect to the Research Clusters portion of the LBNL Design Guidelines, that guideline is applicable mainly to research buildings. However, the proposed project would be consistent with that guideline in that it would locate the Welcome Center in the Central Commons area and consolidate complimentary support programs into one building. The Building 48 Seismic Retrofit project would not develop a new building or use on the hill site and therefore the guidelines would not apply to that element of the SSM Program. Projects that cluster similar uses and minimize the visibility of new developments would be considered consistent with the LBNL Design Guidelines. Therefore, the proposed SSM Program would be consistent with the LBNL Design Guidelines and no impact would occur. (See further discussion under **Section 5.1**, above.)

As the proposed Welcome Center and related transit and utility improvements would be consistent with the 2006 LRDP and the LBNL 2006 Design Guidelines, implementation of the proposed Welcome Center Building project and the extension of the Parcel 21 ground lease for a 50-year term would result in a less than significant impact related to land use and planning.

5.11.4 Analysis of Cumulative Impacts in 2006 LRDP EIR

LRDP Impact LU-3 found that LBNL growth and development under the 2006 LRDP, when combined with cumulative growth in the project vicinity, would increase the intensity of existing land uses in the area but would not physically divide an established community, conflict with applicable land use regulations, or cause conflicts with existing uses (page IV.H-13). Therefore, implementation of the 2006 LRDP, together with the cumulative impacts of regional growth, would not conflict with local land use regulations such that an incompatibility would occur among local land uses, and the 2006 LRDP would not result in a significant cumulative effect. Taking into consideration the present-day setting and the current cumulative context, this analysis finds that no conditions have changed, and no new information has become available since certification of the 2006 LRDP EIR that would alter this previous analysis.

The building space proposed as part of the SSM Program and the population associated with the program are within the analyzed 2006 LRDP increase in LBNL population and building space. Therefore, the proposed project's cumulative impacts are adequately analyzed in LRDP Impact LU-3 and would be less than significant.

5.11.5 Changes to Circumstances or New Information that could affect the Earlier Environmental Analysis

There are no changes in circumstances and no new information related to land use and planning has become available since the certification of the 2006 LRDP Final EIR that would alter the previous analysis and change its conclusions.

5.12 Mineral Resources

5.12.1 Background

According to the State of California Department of Mines and Geology, Mineral Resource Zones and Resource Sectors map, the LBNL hill site is located in an area designated as MRZ-1. This designation refers to an area “where adequate information indicates that no significant mineral deposits are present, or where it is judged that little likelihood exists for their presence.” Therefore, development at the LBNL hill site would not impede extraction or result in the loss of availability of mineral resources.

5.12.2 2006 LRDP EIR Analysis

Mineral resources were addressed in the Initial Study prepared for the NOP and were scoped out of the analysis in the 2006 LRDP Final EIR.

5.12.3 Environmental Checklist and Discussion

MINERAL RESOURCES	Additional Project-Level Impact Analysis Required	No Further Environmental Document Required
Would the project...		
a) Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
b) Result in the loss of availability of a locally-important mineral resource recovery site delineated on a local general plan, specific plan or other land use plan?	<input type="checkbox"/>	<input checked="" type="checkbox"/>

DISCUSSION:

SSM Project Analysis

- a. **Result in the loss of availability of a known mineral resource that would be of future value to the region and the residents of the State? No Further Environmental Document Required.**

According to the State of California Department of Mines and Geology, Mineral Resource Zones and Resource Sectors map, the project sites are located in an area designated as MRZ-1. Therefore, implementation of the proposed SSM Program would not impact mineral resources, and there would be no impact.

- b. **Result in the loss of availability of a locally important mineral resource recovery site delineated on a local general plan, specific plan or other land use plan? No Further Environmental Document Required.**

See item “a” above for analysis.

5.12.4 Analysis of Cumulative Impacts in 2006 LRDP EIR

Because the proposed project would not result in any impact on mineral resources, it would not contribute to a cumulative impact on mineral resources.

5.12.5 Changes to Circumstances or New Information that could affect the Earlier Environmental Analysis

There are no changes in circumstances and no new information related to minerals has become available since the certification of the 2006 LRDP Final EIR that would alter the previous analysis and change its conclusions.

5.13 Noise

5.13.1 Background

Section IV.I of the 2006 LRDP Final EIR addresses the noise effects of LBNL growth and development under the 2006 LRDP and is incorporated by reference herein pursuant to *State CEQA Guidelines* Section 15150. The following discussion summarizes the information presented in the 'Setting' subsection of Section IV.I of the 2006 LRDP Final EIR that is relevant to the proposed project.

As a federal facility managed and operated by the University of California, LBNL is generally exempt from local land use regulations, including the noise ordinances of the Cities of Berkeley and Oakland. Nevertheless, Berkeley Lab seeks to cooperate with local jurisdictions to the extent feasible to meet municipal goals and standards -- such as those established in noise ordinances-- intended to reduce potential land use conflicts.

Characterization of Noise

Sound is mechanical energy transmitted by pressure waves through a medium such as air. Noise is defined as unwanted sound. Technically, sound is described in terms of amplitude (loudness) and frequency (pitch). The standard unit of sound amplitude measurement is the decibel (dB), and the decibel scale adjusted for A-weighting (dB(A)) is a special frequency-dependent rating scale that relates to the frequency sensitivity of the human ear.

Community noise usually consists of a base of steady "ambient" noise that is the sum of many distant and indistinguishable noise sources, as well as more distinct sounds from individual local sources. A number of noise descriptors are used to analyze the effects of community noise on people, including the following:

- Leq, the equivalent sound level, which is used to describe noise over a specified period of time, typically 1 hour.
- DNL, the energy average of the A-weighted sound levels occurring during a 24-hour period, with a 10 dB(A) "penalty" added to noise occurring during the hours of 10:00 PM to 7:00 AM to account for greater nocturnal noise sensitivity.
- CNEL, the Community Noise Equivalent Level, which is a 24-hour-average Leq with a "penalty" of 5 dB added to evening noise occurring between 7:00 PM and 10:00 PM, and a "penalty" of 10 dB added to nighttime noise occurring between 10:00 PM and 7:00 AM.

LBNL

Noise Sources

Within the boundaries of the LBNL hill site, ambient noise levels are generated by vehicular traffic on the road network; heating, ventilation and air conditioning equipment associated with buildings; and other stationary equipment such as pumps, cooling towers, generators, and machine shop equipment. Ongoing construction projects also raise noise levels in the vicinity of the construction sites.

Sensitive Receptors

Sensitive receptors are noise-sensitive locations, where noise from a project's construction activities or operations could be experienced and could detract from or interfere with normal activities. Some land uses are considered more sensitive to ambient noise levels than others due to the amount of exposure and the types of activities involved. Typically, sensitive receptors include residences, schools, medical facilities, parks, and outdoor recreation areas. The LBNL hill site does not immediately border residential areas, except in specific locations along its western and northwestern boundaries.

Project Sites

The primary existing noise sources in the vicinity of the project sites are vehicular traffic on roadways within the LBNL hill site and stationary sources associated with nearby buildings. Secondary, intermittent sources of noise include distant aircraft noise and sounds from parking lots. There are no noise-sensitive receptors in the immediate vicinity of the project sites. The nearest residential receptors are the Nyingma Buddhist Institute on Cyclotron Road about 1,200 feet to the west of the Building 54 project site, and homes further west of the Buddhist Institute are approximately 1,500 feet from the project site. However, there are numerous LBNL buildings between the Building 54 project site and the Buddhist Institute and the residences. Residences to the east are in the Panoramic Hill neighborhood and are at least 2,000 feet from the Building 54 project site.¹⁰ The nearest residential receptors to the Building 48 project site are residences in the Panoramic Hill neighborhood, about 1,900 feet east of the site.

5.13.2 2006 LRDP EIR Analysis

Impacts of LBNL growth and development under the 2006 LRDP related to noise are evaluated in Section IV.I of the 2006 LRDP Final EIR, and that analysis is incorporated herein by reference. The 2006 LRDP Final EIR concluded that all noise impacts except two would be either less than significant or less than significant following implementation of mitigation measures. The 2006 LRDP Final EIR concluded that LRDP Impact NOISE-1 related to construction noise would be significant and unavoidable even after mitigation and LRDP Impact NOISE-5 related to cumulative construction noise would also be significant and unavoidable after mitigation.

For reasons set forth in **Section 5.11**, the proposed project is within population and building space projections of the 2006 LRDP and therefore, is within the scope of analysis of the 2006 LRDP Final EIR. Relevant mitigation measures in the 2006 LRDP Final EIR (now standard project features for projects under the LRDP) have been incorporated as part of the planning and design of the proposed project and would be implemented during project construction and operations consistent with LRDP mitigation monitoring requirements.

¹⁰ These distances were estimated using Google Earth and reflect the distance between the nearest residence and the edge of the project site towards the residence.

5.13.3 Environmental Checklist and Discussion

NOISE	Additional Project-Level Impact Analysis Required	No Further Environmental Document Required
Would the project result in...		
a) Generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
b) Generation of excessive groundborne vibration or groundborne noise levels?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
c) For a project located within the vicinity of a private airstrip or an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?	<input type="checkbox"/>	<input checked="" type="checkbox"/>

DISCUSSION:

SSM Project Analysis

- a. **Generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies? No Further Environmental Document Required.**

Construction Noise

Temporary noise increases related to construction activities under the 2006 LRDP are discussed under LRDP Impact NOISE-1 (page IV.I-13). The EIR analysis conservatively concluded that construction activities in some portions of the Lab site could exceed the City of Berkeley's maximum allowable receiving noise standard at the nearest off-site receptors, resulting in a significant and unavoidable impact, although for the most part, the sites where construction would occur would not be close to off-site sensitive receptors. The 2006 LRDP Final EIR stated that depending on the locations of development projects, construction/demolition noise levels could exceed the City of Berkeley's maximum allowable receiving noise standard of 60 to 65 dBA (depending on the residential zone where noise is heard) for stationary equipment (i.e., construction/demolition equipment that is operated over a period of 10 days or more). However, implementation of **LRDP Mitigation Measures NOISE-1a** and **NOISE-1b** (construction noise measures), which are standard project features, would normally reduce such noise to a less-than-significant level.

Noise generated by the demolition of the existing Building 54 and the construction of the Welcome Center Building, including the reconfigured parking lot, shuttle transit shelter, and utility improvements, would locally increase ambient noise levels. However, due to the presence of a number of intervening buildings, including Shyh Wang Hall, which houses NERSC), and Buildings

70 and 70A, that would shield construction noise, the distance between the Building 54 project site and the nearest receptors (Nyingma Buddhist Institute and residences to the west), and the implementation of **LRDP Mitigation Measures NOISE-1a** and **NOISE-1b** (construction noise measures), which are standard project features, construction noise would not exceed the City of Berkeley's maximum allowable receiving noise standard. With regard to the receptors to the east, due to the intervening distance and implementation of the construction noise measures, construction noise from the Building 54 project site as well as the Building 48 project site would not exceed the maximum allowable noise standard. The proposed project's impact is adequately addressed under LRDP Impact NOISE-1. Consistent with the 2006 LRDP EIR, the proposed project's impact would be less than significant.

Operational Traffic Noise

The 2006 LRDP Final EIR evaluated increases in permanent noise levels from vehicle traffic (LRDP Impact NOISE-3 (page IV.I-19)) as a result of increased development and population on the LBNL hill site. As described in the 2006 LRDP Final EIR, the increase in traffic volumes anticipated with growth on the LBNL hill site would not be sufficient to generate perceivable increases in traffic noise.¹¹ The resulting impact would be less than significant, as stated in the LRDP Final EIR. The proposed SSM Program would not increase the population on the hill site and therefore would not increase traffic to and from the hill site or the noise associated with traffic.

Operational Stationary Noise

The 2006 LRDP Final EIR evaluated increases in permanent ambient noise levels from stationary sources such as Heating, Ventilation, and Air Conditioning (HVAC) equipment (LRDP Impact NOISE-4 (page IV.I-20)) as a result of increased development and population on the Lab site. As described in the 2006 LRDP Final EIR, HVAC equipment and specialized research equipment could generate noise that may affect off-site receptors. Observance of local noise ordinance standards and **LRDP Mitigation Measure NOISE-4** (operational noise measure), which would require mechanical equipment and building designs to incorporate noise controls to attenuate noise, would reduce any potential impact. The resulting impact would be less than significant, as stated in the 2006 LRDP Final EIR.

The proposed Welcome Center would result in increases or changes in noise levels from operation of the proposed building and associated parking lot and shuttle transit shelter. **LRDP Mitigation Measure NOISE-4** would be implemented as a standard project feature of the proposed project which would require the design of the Welcome Center to shield stationary sources such as HVAC equipment so that nearby receptors on the LBNL hill site are not affected. As a result of the standard project feature as well as distance to off-site receptors, the operational noise would not affect off-site receptors. While the parking lot would be reconfigured as part of the Welcome Center Building project, it would not result in more traffic to the site compared to existing conditions (there would be fewer parking spaces than at the present time). Similarly, while with the reconfiguration of the parking lot, the movement of shuttle buses would be changed to improve

¹¹ According to the Caltrans Technical Noise Supplement (2013), a doubling of vehicle traffic is required to produce an audible 3 dBA increase in ambient noise. According to the traffic study prepared for the proposed project (Fehr & Peers 2019), the traffic volumes for the proposed project are not anticipated to audibly increase ambient noise levels.

flow, the number of shuttle buses accessing the relocated and improved shuttle transit shelter would be the same as under existing conditions. Therefore, a substantial increase in traffic noise levels at the parking lot that could affect on- or off-site receptors is not expected. With regard to Building 48 seismic retrofit, the improvements would not include any new noise sources that could affect on- or off-site receptors. The proposed SSM Program's impact is adequately addressed under LRDP Impact NOISE-4. Consistent with the 2006 LRDP EIR, the proposed project's impact would be less than significant with standard project features.

b. Generation of excessive ground borne vibration or ground borne noise levels? No Further Environmental Document Required.

LRDP Impact NOISE-2 (page IV.I-18) concluded that construction-related vibration impacts which could stem from pile driving and the use of vibratory compaction equipment would be less than significant. The proposed Welcome Center would require the demolition of the existing Building 54 and the construction of a two-story building on the project site. However, project construction activities would not involve pile driving. In the event that piers are installed, they would be drilled. Similarly, the seismic retrofit of Building 48 would not involve activities that would generate substantial vibrations. Additionally, the off-site receptors are greater than 500 feet away, which is the distance where vibrations -- even from impact pile driving -- are perceptible. Once construction is completed, the projects included in the SSM Program would not involve any equipment that would generate perceptible vibrations. Therefore, the potential vibration impacts from the SSM Program implementation are adequately addressed under LRDP Impact NOISE-2. Consistent with the 2006 LRDP EIR, the proposed project's impact would be less than significant.

c. For a project located within the vicinity of a private airstrip or an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels? No Further Environmental Document Required.

The project sites are not located within the boundaries of any private airstrip or airport land use plan and are more than 2 miles from the nearest public airport. Therefore, the proposed project would not expose people working on the project sites to excessive aircraft noise levels associated with a public airport.

5.13.4 Analysis of Cumulative Impacts in 2006 LRDP EIR

As discussed under LRDP Impact NOISE-5, the 2006 LRDP Final EIR found that growth and development under the 2006 LRDP would result in temporary contributions to cumulative noise impacts related to construction activities, resulting in a significant and unavoidable impact (page IV.I-22). The 2006 LRDP Final EIR noted that it was possible during the lifetime of the 2006 LRDP that instances of LBNL construction noise could contribute to cumulative construction noise impacts. On the basis that there might be exceedances of local noise ordinance standards, the 2006 LRDP Final EIR found the cumulative impact of construction noise to be significant and unavoidable. LRDP Impact NOISE-5 noted that in most instances, it can reasonably be anticipated that construction noise impacts on off-site receptors would be reduced to a less than significant level through implementation of **LRDP Mitigation Measures NOISE-1a** and **NOISE-1b**. In addition, both distance to sensitive receptors as well as intervening terrain, foliage, and structures could further attenuate potential noise impacts. The 2006 LRDP Final EIR concluded that

individual projects would result in less-than-significant cumulative construction noise impacts because of distance to the nearest receptors and implementation of mitigation measures.

With the exception of the BioEPIC project and the Bayview Parcel Cleanup, no other construction project would be underway at the same time as the proposed Welcome Center Building project, which includes the Welcome Center, and parking lot and transit improvements at the Building 54 project site. The BioEPIC project and the Bayview Parcel Cleanup projects are both located in the Bayview planning area which is located in the center of the Berkeley Lab. Off-site receptors that are close to the Bayview Planning Area would be too distant (over 1,700 feet) from the Building 54 project site to experience a cumulative construction noise impact. Further, the BioEPIC project would also implement **LRDP Mitigation Measures NOISE-1a** and **NOISE-1b** to minimize noise during construction. Due to the proposed Welcome Center Building project's distance from the nearest off-site receptors and other attenuation factors, and the implementation of standard project features **LRDP Mitigation Measures NOISE-1a** and **NOISE-1b**, the proposed Welcome Center Building project's contribution to the cumulative construction noise impact would not be cumulatively considerable, and the proposed project's cumulative impact would be less than significant.

With regard to noise from construction-related trucks, as part of its TDM Plan and pursuant to LRDP Best Practice TRANS-6c, LBNL implements a Construction Truck Management System that assures that LBNL-related daily truck trips stay well below CEQA impact thresholds. Under the System, all LBNL construction truck trips for the LBNL hill site are managed by a construction truck coordinator. The coordinator assures that aggregate construction truck trips do not exceed an impact threshold that is periodically updated by an outside traffic engineering consultant. When truck trips begin to approach such a level, the coordinator works with project managers to reduce or reschedule trucks to avoid impacts. Both proposed projects included in the SSM Program would be subject to this program as a result of which, even with the addition of SSM project truck trips, daily construction truck trips to LBNL would not exceed the impact threshold level. Therefore, there would not be an increase in noise levels above existing levels along the truck route to the LBNL hill site. Further, UC LBNL has already provided for the retrofit of windows at the Nyingma Buddhist Institute to reduce the noise impact from existing truck movement on Cyclotron Road. The impact would be less than significant.

LRDP Impact NOISE-6 concluded that cumulative impacts related to noise levels from increased traffic and human activities would be less than significant. Taking into consideration the present-day setting and the current cumulative context, this analysis finds that no conditions have changed, and no new information has become available since certification of the 2006 LRDP Final EIR that would alter this previous analysis. The building space, population, and stationary sources proposed as part of the SSM project are all within the scope of the 2006 LRDP and therefore were adequately analyzed in the 2006 LRDP Final EIR and would have a less than significant cumulative operational noise impact.

5.13.5 Changes to Circumstances or New Information that could affect the Earlier Environmental Analysis

There are no changes in circumstances and no new information related to noise has become available since the certification of the 2006 LRDP Final EIR that would alter the previous analysis and change its conclusions.

5.14 Population/Housing

5.14.1 Background

LBNL Population, Housing, and Residence Patterns

Section IV.J of the 2006 LRDP Final EIR addresses the population and housing effects of LBNL growth and development under the 2006 LRDP and is incorporated by reference herein pursuant to *State CEQA Guidelines* Section 15150. The following discussion summarizes the information presented in the 'Setting' subsection of Section IV.J of the 2006 LRDP Final EIR.

In 2003, there were 3,800 people employed at LBNL. Most of these employees (56 percent) were full-time employees in scientific and technical positions. Administrative support positions accounted for 16 percent of LBNL employment. Faculty (7 percent of the total), and postdoctoral researchers (6 percent of the total), as well as undergraduate and graduate students (combined representing 15 percent of the total) were also counted among the LBNL employees.

In 2003, over the course of the year, a total of about 2,500 people used LBNL facilities as guests. Guests include industry and government researchers working at LBNL for short-term assignments, scientists visiting from other academic institutions, or people from other institutions such as UC Davis who use LBNL facilities regularly over a period of weeks or months. On an average day, a conservatively estimated 40 percent of total annual guests use LBNL facilities. In 2003, this represented about 1,000 people on any given day. LBNL estimated an Adjusted Daily Population (ADP) of 4,375 people for 2003, counting both employees and guests; of which 3,650 average daily population is on the main site.¹²

LBNL employees and their dependents represented 2.0 percent of the cities of Berkeley and Albany population in 2003. In all other residential locations, LBNL employees and their dependents accounted for less than 1 percent of the total population. LBNL employees and their dependents represented 0.3 percent of the total population of Emeryville, Oakland, and Piedmont; 0.6 percent of the total population of El Cerrito, Richmond, and San Pablo; and 0.7 percent of the total population of Lafayette, Moraga, and Orinda. For the Bay Area region as a whole, LBNL employees and the other members of their households represented 0.1 percent of total regional population in 2003.

Implementation of the 2006 LRDP could increase the LBNL hill site's total ADP from 3,650 in 2003 to 4,650 by 2025, an increase of about 1,000 people or 27 percent. Under the Project Variant, 2006 LRDP implementation could increase the LBNL hill site's total ADP to 5,000 by 2025, an increase of about 1,350 people, or 37 percent. Compared to the ADP of approximately 4,550 people in 2014, the capacity for increase by 2025 would be approximately 825 people, or 1,169 people under the Project Variant.

12 The LBNL estimate of adjusted daily population (ADP) is defined to include FTE employment plus 40 percent of total annual guests.

Regional Population and Housing

As of 2010, the total population of the Bay Area was just over 7,150,000, with roughly 2.6 million households. By 2019 the population had increased by some 633,000 to approximately 7,783,000, an annual growth rate of 1.0 percent (California Department of Finance [DOF] 2019). By 2040, the population of the Bay Area is projected to reach approximately 9.65 million residents, growing 35 percent over 2010 levels, and 26 percent over 2015 levels (ABAG 2018).

Population projections for Alameda County show a 2040 population of just above 2,092,000, a growth of approximately 423,000 over 2019 levels (DOF 2019). The cities of Berkeley and Albany, located within Alameda County, are expected to continue their population growth. Berkeley, with a 2019 population of around 123,000 is projected to grow to just below 141,000. Albany is expected to grow from a 2019 population of around 19,000 to slightly below 20,500 (DOF 2019; ABAG 2018).

Projections show the number of households growing at a slightly lower rate of 31 percent, reaching 3.42 million by 2040. The difference in population and household growth rates translates into a marginal increase in the average household size from 2.67 to 2.76 persons per household (ABAG 2018). Within Alameda County, the number of households is projected to increase by 35 percent to 734,000 in 2040. Following trends in population growth, the cities of Berkeley and Albany are expected to increase the number of households. Berkeley is expected to increase from 2019 levels of 47,604 households to 55,370 households in 2040. Albany has a 2019 estimate of 6,552 households and is projected to grow to 7,855 households in 2040 (DOF 2019; ABAG 2018).

Proposed Project

The proposed Welcome Center would provide Cafeteria, office, and conferences space for approximately 55 employees. All of the employees are already working in existing buildings on the LBNL hill site. The proposed Cafeteria would replace the existing cafeteria in Building 54 and continue to serve existing employees and visitors of LBNL. The seismic strengthening of Building 48 would not affect the building's occupancy.

5.14.2 2006 LRDP EIR Analysis

Impacts related to population and housing from LBNL growth and development under the 2006 LRDP are evaluated in Section IV.J of the 2006 LRDP Final EIR. The 2006 LRDP Final EIR concluded that all population and housing impacts of LBNL growth under the 2006 LRDP would be less than significant. As the population associated with the proposed project is already in existing facilities on the Lab hill site and the project would not increase the Lab population, the proposed project is within the scope of analysis of the 2006 LRDP Final EIR.

5.14.3 Environmental Checklist and Discussion

POPULATION & HOUSING	Additional Project-Level Impact Analysis Required	No Further Environmental Document Required
Would the project...		
a) Induce substantial unplanned population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
b) Displace substantial numbers of existing people or housing, necessitating the construction of replacement housing elsewhere?	<input type="checkbox"/>	<input checked="" type="checkbox"/>

DISCUSSION:

SSM Project Analysis

- a. **Induce substantial unplanned population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)? No Further Environmental Document Required.**

LRDP Impact POP-1 (page IV.J-13) provides examination of the impact associated with the increase in permanent employees and Lab visitor population under the 2006 LRDP and a conclusion that the impact would be less than significant. Operation of the Welcome Center would relocate existing employees from buildings already on the LBNL hill site. Building 48 seismic retrofit would also not increase lab population. Therefore, the population of the hill site would not increase due to the SSM project. All of the employees associated with the proposed project are within the anticipated hill site population. The Welcome Center would accommodate up to 1,185 visitors per day; at peak there could be up to 830 visitors present in the new building at one time. All of the visitors would be at the Lab site for other reasons and not because of the proposed project. Further, these visitors are within the LRDP's anticipated daily hill site population. Therefore, the proposed project's impact is adequately addressed under LRDP Impact POP-1. Consistent with the 2006 LRDP EIR, the proposed project's impact would be less than significant.

The proposed project would generate incidental, short-term construction employment. However, due to the short-term nature of construction jobs and the fact that the Bay Area contains a large pool of construction workers, these jobs would not result in an influx of new population into the Bay Area. The proposed project would also not require extension of roads or other infrastructure that could indirectly induce substantial population growth. The proposed project's impact would be less than significant.

- b. **Displace substantial numbers of existing people or housing, necessitating the construction of replacement housing elsewhere? No Further Environmental Document Required.**

The LBNL hill site does not include housing or long-term residential uses, and no housing would be displaced with implementation of the proposed project. No individuals would be displaced as

a result of the proposed project and no replacement housing would be required. Therefore, there would be no impact.

5.14.4 Analysis of Cumulative Impacts in 2006 LRDP EIR

LRDP Impact POP-2 evaluated the cumulative impact of 2006 LRDP growth in conjunction with other regional growth on population and housing. The 2006 LRDP Final EIR analysis indicated that the 2006 LRDP employment growth and associated demand for housing would not comprise a substantial portion of the planned growth in Berkeley and the region, and LBNL growth under the 2006 LRDP would not contribute to cumulative adverse effects with regard to population or housing. Taking into consideration the present-day setting and the current cumulative context, this analysis finds that no conditions have changed, and no new information has become available since certification of the 2006 LRDP Final EIR that would alter this previous analysis.

Because the proposed project is within the 2006 LRDP scope of development, the proposed project would also not contribute to cumulative adverse effects related to population and housing.

5.14.5 Changes to Circumstances or New Information that could affect the Earlier Environmental Analysis

There are no changes in circumstances and no new information related to population and housing has become available since the certification of the 2006 LRDP Final EIR that would alter the previous analysis and change its conclusions.

5.15 Public Services

5.15.1 Background

Section IV.K of the 2006 LRDP Final EIR addresses the effects on public services from LBNL growth under the 2006 LRDP and is incorporated by reference herein pursuant to *State CEQA Guidelines* Section 15150. The following discussion summarizes the information presented in the ‘Setting’ subsection of Section IV.K of the 2006 LRDP Final EIR.

Fire Protection

The Alameda County Fire Department is under contract with UC LBNL to provide firefighting services and to staff and operate the on-site LBNL fire station. The Alameda County Fire Department provides the LBNL hill site an “around-the-clock” engine company staffed by four Hazardous Materials Emergency Response (HAZMAT) certified firefighters. UC LBNL and the City of Berkeley have developed an Automatic Aid Agreement, under which the LBNL on-site fire station is the first responder for a portion of north Berkeley, including portions of the UC Berkeley campus. The Berkeley Fire Department provides paramedic transport for LBNL; therefore, if a patient in a medical emergency requires transport to a hospital, a City of Berkeley ambulance responds at the Lab. The City of Oakland Fire Department served the far eastern and southeastern portion of the LBNL hill site. The 2006 LRDP EIR also discusses hazardous materials emergency response and the emergency program. HAZMAT automatic aid is available through the Berkeley Fire Department or the Alameda County Fire Department. LBNL’s Master Emergency Program Plan establishes policies, procedures, and an organizational structure for responding to and recovering from a major disaster at the LBNL hill site. In addition, the 2006 LRDP EIR describes LBNL’s Vegetation Management Plan as a prevention program for wildland fires.

Law Enforcement

Police services at the LBNL hill site are provided through a contract with the UC Berkeley Police Department (UCPD), as well as with a private security provider responsible for outside security needs, including LBNL access, property protection, and traffic control. UCPD handles all patrol, investigation, and related law enforcement duties for UC Berkeley, LBNL, and other University-owned properties. UCPD operates 24 hours a day, seven days a week, coordinating closely with the City of Berkeley Police Department. UCPD and the Oakland Police Department are members of the California Law Enforcement Master Mutual Aid Plan; all law enforcement agencies in the state belong to this plan to provide each other information and resources when needed. Additionally, UC LBNL has an annual renewable contract with UCPD that provides, when requested, law enforcement emergency response, limited patrols, criminal investigations, and VIP protection. UCPD and the Berkeley Police Department have an agreement regarding jurisdiction over off-site locations occupied by UC staff and LBNL staff; this agreement is reviewed and updated annually. UC LBNL does not have such an agreement with Oakland Police Department.

The LBNL hill site is secured by a perimeter fence that provides access through vehicle entrance points, hardware lock-and-key sets at critical doors, and by an electronic system pre-coded to permit entry only to authorized card holders. Vehicular access onto the LBNL hill site is controlled by security personnel at the three vehicle entrance gates who visually inspect entering vehicles.

Schools

The Berkeley Unified School District (BUSD) and Oakland Unified School District (OUSD) provide public elementary and secondary school services to dependents of LBNL employees who live in these two communities.

Parks and Recreation

The East Bay Regional Park District (EBRPD) manages over 114,000 acres within Alameda and Contra Costa Counties, including 65 regional parks, recreational areas, wilderness, shorelines, preserves, and land bank areas as well as 1,200 miles of trails. EBRPD properties within the vicinity of the LBNL hill site include Tilden Park and the Claremont Canyon Preserve (EBRPD 2014).

UC Berkeley manages parks and athletic and recreational facilities that serve the University and the wider community. Athletic and recreational facilities are located within the central campus and also within the Strawberry Canyon Recreation Area. Additional resources include the Ecological Study Areas. The University also owns the 2.3-acre People's Park located south of the UC Berkeley campus.

The City of Berkeley's Parks, Recreation, and Waterfront Department manages the City's parks and open space. The City has 243 acres of City-owned and/or maintained parks and open space throughout Berkeley, excluding the 99-acre Aquatic Park. There are 52 parks providing traditional recreational facilities such as athletic fields, swimming pools, and tennis and basketball courts, as well as numerous tot and school-age play areas, community gardens, rock climbing, and a variety of water sports at the Berkeley Marina. The City of Berkeley maintains the parks-to-population ratio of 2.0 acres of parkland per 1,000 residents that was established in the 1977 City of Berkeley Master Plan (City of Berkeley 2001).

The City of Oakland's Office of Parks, Recreation, and Cultural Affairs manages the City's parks and recreation centers. There are 127 parks totaling 6,063 acres of parkland in the City of Oakland (City of Oakland 2014). These parks provide amenities, including play structures, sports fields, picnic areas, and dog play areas.

Project Sites

The proposed Welcome Center would accommodate a population of approximately 55 existing employees and up to 1,185 visitors per day, with a maximum of about 830 visitors concurrently at the center at any one time, and involve construction of about 32,652 gsf of new building space. The seismic retrofit of Building 48 would not add population or building space to the Berkeley Lab. The new building space developed under the SSM Program would be served by public service agencies in the Cities of Berkeley and Oakland, Alameda County, UC Berkeley, and LBNL in the manner discussed above.

5.15.2 2006 LRDP EIR Analysis

Impacts of LBNL growth and development under the 2006 LRDP on public services are evaluated in Section IV.K of the 2006 LRDP Final EIR. Because implementation of the 2006 LRDP would not result in any significant impacts to public services and recreation, the 2006 LRDP Final EIR did not identify any mitigation measures for impacts to public services and recreation. As discussed in

Section 5.11, both the population and building space associated with the proposed SSM project are within the 2006 LRDP population and building space projections, the proposed project is within the scope of analysis of the 2006 LRDP Final EIR.

5.15.3 Environmental Checklist and Discussion

PUBLIC SERVICES	Additional Project-Level Impact Analysis Required	No Further Environmental Document Required
Would the project...		
a) Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for any of the public services:		
i) Fire protection?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
ii) Police protection?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
iii) Schools?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
iv) Parks?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
v) Other public facilities?	<input type="checkbox"/>	<input checked="" type="checkbox"/>

DISCUSSION:

SSM Project Analysis

- a.i. **Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered fire protection facilities, need for new or physically altered fire protection facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives? No Further Environmental Document Required.**

The 2006 LRDP Final EIR concluded that, based on current and expected demand for fire protection services and discussion with Alameda County Fire Department, implementation of the 2006 LRDP and individual projects under it would not result in the need for new facilities, staff, or equipment to provide adequate fire protection (LRDP Impact PUB-1 (page IV-K-17)), and the impact would be less than significant. Although the proposed Welcome Center would not increase the population on the LBNL hill site, due to the increase in building space with the construction of the proposed Welcome Center, the potential need for emergency fire services could increase. As shown in **Table 5**, this increase in building space is within the building space increase that was projected and analyzed in the 2006 LRDP EIR. Building 48 seismic retrofit would not increase building space on the hill site. Therefore, the impact of the proposed SSM project in relation to fire protection services is adequately addressed under LRDP Impact PUB-1. The proposed project would not require new fire service facilities, and consistent with the 2006 LRDP EIR, the proposed project's impact would be less than significant.

- a.ii. **Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered police protection facilities, need for new or physically altered police protection facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives? No Further Environmental Document Required.**

LRDP Impact PUB-2 (page IV.K-18) discusses the impacts associated with the increase in calls for police services associated with the increase in employees under the 2006 LRDP and concluded that the impact would be less than significant. As discussed in the 2006 LRDP Final EIR, a private security firm is responsible for on-site security needs, including access to the LBNL hill site, property protection, and traffic control, and can respond to any road-accessible area of the LBNL hill site in less than 5 minutes. Under the existing contract, UCPD responds to incidents on the LBNL hill site as needed, and response times for UCPD are also less than 5 minutes. While project construction would increase the building space, it would not increase the hill site population. Further, the project-related increase in building space and the existing employees are within the 2006 LRDP population growth projections. Therefore, the impact of the proposed project in relation to police services is adequately addressed under LRDP Impact PUB-2. Consistent with the 2006 LRDP EIR, the proposed project's impact would be less than significant.

- a.iii. **Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered schools, need for new or physically altered schools, the construction of which could cause significant environmental impacts, in order to maintain performance objectives? No Further Environmental Document Required.**

As discussed under LRDP Impact PUB-3 (page IV.K-20), implementation of the 2006 LRDP would not result in the need for new or physically altered public school facilities. The proposed project would not develop residential uses and therefore would not directly generate new student enrollment in the BUSD or OUSD (or other school districts). Further, the proposed project would not increase the number of employees at the hill site. Therefore, the proposed project would not have an impact on schools.

- a.iv. **Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered parks, need for new or physically altered parks, the construction of which could cause significant environmental impacts, in order to maintain performance objectives? No Further Environmental Document Required.**

As discussed under LRDP Impact PUB-4 (page IV.K-21), implementation of the 2006 LRDP would not adversely affect the provision of parks and recreational facilities. As noted above, the proposed project would not increase the number of employees at the hill site. Therefore, the proposed project would not have an impact on parks.

- a.v. **Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered public facilities, need for new or physically altered public facilities, the construction of which could cause significant environmental impacts, in order to maintain performance objectives? No Further Environmental Document Required.**

No other governmental services are expected to be affected by the proposed project.

5.15.4 Analysis of Cumulative Impacts in 2006 LRDP EIR

Police and Fire Services

Cumulative impacts on fire and police protection services are discussed under LRDP Impact PUB-5. Implementation of the 2006 LRDP would contribute to an increase in demand for fire protection services and police services. While foreseeable development on the LBNL hill site may cause call volume for fire services to increase slightly, such incremental increases in demand for fire protection services would be accommodated without additional staffing or facilities. Therefore, the 2006 LRDP Final EIR concluded that the increased demand would not result in the need for new or physically altered facilities, the construction of which could cause significant environmental impacts. Reasonably foreseeable development in the East Bay could result in the increased need for new or altered fire protection or police facilities in the region. The City of Berkeley General Plan indicates the need for additional fire protection facilities and the City of Oakland General Plan indicates the need for expanded facilities or the seismic retrofit of existing facilities. However, the 2006 LRDP Final EIR concluded that implementation of the 2006 LRDP would not result in the need for new facilities, staff, or equipment to provide adequate fire protection or police services. Accordingly, it concluded that the 2006 LRDP's contribution to cumulative demand would not be cumulatively considerable. Furthermore, planned residential development in local jurisdictions where UC LBNL employees might live, such as the cities of Berkeley or Oakland, would be subject to the local agency's zoning ordinance and general plan policies, which would require that environmental impacts associated with new residential development be mitigated to the maximum extent feasible.

As discussed above, the building space and population associated with the proposed SSM Program is well within the levels of growth analyzed in the 2006 LRDP EIR and the demand for police and fire services attributable to the proposed project is within the scope of the 2006 LRDP analysis. Therefore, the proposed project's cumulative impacts on police and fire services are adequately addressed by the analysis in the 2006 LRDP Final EIR and are found to be less than significant. Taking into consideration the present-day setting and the current cumulative context, this analysis finds that no conditions have changed, and no new information has become available since certification of the 2006 LRDP Final EIR that would alter this previous analysis.

Schools

According to the 2006 LRDP Final EIR, implementation of the 2006 LRDP under cumulative conditions would not result in the need for new or physically altered public school facilities (LRDP Impact PUB-6). As discussed under LRDP Impact PUB-3, the 2006 LRDP would include no housing, and therefore the effect of implementing the 2006 LRDP would be indirect; that is, any increased demand for school facilities would derive from residential development to accommodate increased daily population at the LBNL hill site. Because the 2006 LRDP would result in no direct impact on school facilities, and because the indirect effect would be minimal, implementation of the 2006 LRDP would not result in a considerable contribution to any cumulative increase in the demand for school facilities in any one school district. There would be no increase in LBNL hill site population due to the proposed SSM Program. Therefore, the proposed project would not contribute to a cumulative impact on schools. Further, taking into consideration the present-day setting and the current cumulative context, this analysis finds that no conditions have changed,

and no new information has become available since certification of the 2006 LRDP Final EIR that would alter this previous analysis.

Parks and Recreation Facilities

Implementation of the 2006 LRDP would not substantially affect the provision of parks and recreation facilities under cumulative conditions (LRDP Impact PUB-7). Implementation of the 2006 LRDP along with cumulative development could result in an increased demand for parks and recreation facilities in Berkeley and Oakland. The 2006 LRDP does not include any housing component, and therefore the effect of implementing the 2006 LRDP would be indirect; that is, any increased demand for park and recreation facilities would derive from new residential development to accommodate increased daily population at the LBNL hill site. Because the 2006 LRDP would result in no direct impact on park and recreation facilities, and because any indirect effect would be minimal, implementation of the 2006 LRDP would not result in a considerable contribution to any cumulative increase in the demand for park and recreation facilities. There would be no increase in LBNL hill site population due to the proposed SSM Program. Therefore, the proposed project would not contribute to a cumulative impact on parks. Further, taking into consideration the present-day setting and the current cumulative context, this analysis finds that no conditions have changed, and no new information has become available since certification of the 2006 LRDP Final EIR that would alter this previous analysis.

5.15.5 Changes to Circumstances or New Information that could affect the Earlier Environmental Analysis

There are no changes in circumstances and no new information related to public services has become available since the certification of the 2006 LRDP Final EIR that would alter the previous analysis and change its conclusions.

5.16 Recreation

5.16.1 Background

Section IV.K (Public Services and Recreation) of the 2006 LRDP Final EIR addresses the demand for recreational facilities and the potential for substantial deterioration of recreational facilities as a result of development under the 2006 LRDP and is incorporated by reference herein pursuant to *State CEQA Guidelines* Section 15150. Background conditions for recreation are discussed under Section 5.15.1 above.

5.16.2 2006 LRDP EIR Analysis

Impacts of LBNL growth and development under the 2006 LRDP on recreation are evaluated in Section IV.K of the 2006 LRDP Final EIR. Because implementation of the 2006 LRDP would not result in any significant impacts to recreation, the 2006 LRDP EIR did not identify any mitigation measures for impacts to recreation. For reasons set forth in **Section 5.11**, the proposed project is within the scope of analysis of the 2006 LRDP Final EIR.

5.16.3 Environmental Checklist and Discussion

RECREATION	Additional Project-Level Impact Analysis Required	No Further Environmental Document Required
Would the project...		
a) Would the project increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
b) Does the project include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment?	<input type="checkbox"/>	<input checked="" type="checkbox"/>

DISCUSSION:

SSM Project Analysis

- a. **Would the project increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated? No Further Environmental Document Required.**

As discussed under LRDP Impact PUB-4 (page IV.K-21), implementation of the 2006 LRDP would not adversely affect parks and recreational facilities. Impacts associated with the increase in demand for parks and recreational facilities in the region as a result of project-related growth in employees are discussed in the response to item **5.15 a. iv**, above. Because the proposed SSM Program would not increase LBNL hill site population, physical deterioration of recreational facilities is not expected to occur as a result of the proposed project. The proposed project's impact

is adequately addressed under LRDP Impact PUB-4. Consistent with the 2006 LRDP EIR, the proposed project's impact would be less than significant.

- b. Does the project include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment? No Further Environmental Document Required.**

The proposed project would not include recreational facilities. Since the proposed project's impacts on existing recreational facilities would be less than significant (see response to item 5.15 a. iv, above), and new or expanded recreational facilities would not be required, the proposed project's impact is adequately addressed under LRDP Impact PUB-4. Consistent with the 2006 LRDP EIR, the proposed project's impact would be less than significant.

5.16.4 Analysis of Cumulative Impacts in 2006 LRDP EIR

Implementation of the 2006 LRDP would not substantially affect the provision of parks and recreation facilities under cumulative conditions (LRDP Impact PUB-7). Implementation of the 2006 LRDP along with cumulative development could result in an increased demand for parks and recreation facilities in Berkeley and Oakland. The 2006 LRDP does not include any housing component, and therefore the effect of implementing the 2006 LRDP would be indirect; that is, any increased demand for park and recreation facilities would derive from new residential development to accommodate increased daily population at the LBNL hill site. Because the 2006 LRDP would result in no direct impacts on park and recreation facilities, and because any indirect effect would be minimal, implementation of the 2006 LRDP would not result in a considerable contribution to any cumulative increase in the demand for park and recreation facilities. As noted above, the proposed SSM Program would not increase the population on the LBNL hill site and would therefore not contribute to any cumulative impacts on parks and recreational facilities. Further, taking into consideration the present-day setting and the current cumulative context, this analysis finds that no conditions have changed, and no new information has become available since certification of the 2006 LRDP Final EIR that would alter this previous analysis.

5.16.5 Changes to Circumstances or New Information that could affect the Earlier Environmental Analysis

There are no changes in circumstances and no new information related to recreation has become available since the certification of the 2006 LRDP Final EIR that would alter the previous analysis and change its conclusions.

5.17 Transportation

5.17.1 Background

Section IV.L of the 2006 LRDP Final EIR addresses the transportation, circulation, and parking effects of LBNL growth under the 2006 LRDP and is incorporated by reference herein pursuant to *State CEQA Guidelines* Section 15150. The following discussion summarizes the information presented in the ‘Setting’ subsection of Section IV.L of the 2006 LRDP Final EIR, which provides a basis for the analysis of the environmental effects of the proposed project.

Regional and LBNL Roadway Network

The LBNL hill site is located close to three regional highways: Interstate 80/580 about 3 miles to the west and State Routes (SR) 24 and 13 about 2 miles to the south. Access to I-80/580 is via arterial roads in the City of Berkeley and Oakland, including University Avenue, Ashby Avenue, Hearst Avenue, Gayley Road, and College Avenue. Access to SR-24 and SR-13 is via Tunnel Road.

The LBNL hill site is served by three roadway entrances: (1) the Blackberry Canyon Gate in the southwestern portion of the LBNL hill site; it is the main entrance to the LBNL hill site and is on Cyclotron Road, north of the intersection of Hearst Avenue and Gayley Road; (2) Strawberry Canyon Gate in the southeastern area of the LBNL hill site, which is accessed via Centennial Drive; and (3) Grizzly Peak Gate in the northeastern area of the LBNL hill site, which is also accessed via Centennial Drive. Internal circulation on the LBNL hill site is provided by an east-west roadway system that generally follows the site contours.

Roadway Levels of Service

Level of service (LOS) is a general measure of traffic operating conditions, whereby a letter grade from A (the best) to F (the worst) is assigned to roadway intersections. These grades represent the comfort and convenience associated with driving from the driver’s perspective. To assess the worst-case traffic conditions, LOS is measured during morning (generally 7:00 AM to 9:00 AM) and afternoon (generally 4:00 PM to 6:00 PM) peak commute times. The LOS standard for City of Berkeley intersections is LOS D.

Of the 20 city intersections evaluated in the 2006 LRDP Final EIR, only one intersection (Bancroft Way at Gayley Road/Piedmont Avenue) operated at an unacceptable LOS in 2006. The 2006 LRDP Final EIR and subsequent traffic analyses found that by 2025, even without traffic added by LBNL growth, three additional intersections (Hearst Avenue/Gayley Road/La Loma Avenue, Stadium Rim Way/Gayley Road, and Durant Avenue/Piedmont Avenue) would operate at unacceptable LOS.

Parking

There are approximately 2,175 off-street and on-street parking spaces at the LBNL hill site. Because access to the LBNL hill site is controlled, parking facilities are not accessible to the general public. UC LBNL implements a permit parking program. Under its Transportation Demand Management (TDM) program, UC LBNL discourages the use of single occupant vehicle commuting.

Bicycle and Pedestrian Network

About 10 percent of LBNL main hill site employees commute by bicycle. Roads are narrow and steep with no dedicated bike lanes. Pedestrian walkways within the LBNL hill site are discontinuous. Walkways are generally used to move between nearby building clusters; for longer trips, the employees use shuttles, government vehicles, or personal vehicles.

Transit

The LBNL hill site is served by LBNL shuttles that run between the LBNL hill site and the Center Street/Shattuck BART station. Service schedules vary between 10 and 15 minutes on weekdays. An express shuttle operates on an hourly schedule during commute hours between the LBNL hill site and the Rockridge BART station. The LBNL shuttle stops have been coordinated with AC Transit bus lines serving downtown Berkeley. The shuttles are equipped with bicycle racks.

Project Sites

Building 54 project site is located on Lawrence Road, which in turn is accessed via Smoot and Chu Roads via the Blackberry Canyon entrance to the hill site. The project site is a 2.3-acre portion of an approximately 6-acre Central Commons planning area, and the site includes a 65-space Building 54 Parking Lot. Building 48 project site is also located on Lawrence Road, further east of the Building 54 project site.

5.17.2 2006 LRDP EIR Analysis

Impacts on traffic, circulation, and parking from LBNL growth and development under the 2006 LRDP are evaluated in Section IV.L of the 2006 LRDP Final EIR. The 2006 LRDP Final EIR analysis concluded under LRDP Impact TRANS-1 that the addition of LRDP-related traffic would affect the level of service at three study intersections. However, after the certification of the 2006 LRDP Final EIR, the City of Berkeley adopted new thresholds of significance for the evaluation of a project's traffic impacts. To address the change in the thresholds, in 2010 UC LBNL conducted a supplemental analysis of the traffic impacts from LRDP development under 2025 conditions in conjunction with the Seismic Phase 2 environmental review. The 2010 Supplement updated pages IV.L-28 through IV.L-44 of the 2006 LRDP Final EIR. The supplemental analysis concluded that traffic associated with growth and development under the 2006 LRDP could affect the level of service at a fourth intersection: Bancroft Way and Piedmont Avenue. Both the 2006 LRDP Final EIR and the supplemental analysis concluded that fair share funding of traffic improvements pursuant to **LRDP Mitigation Measures TRANS-1a** through **TRANS-1e** would reduce the significant LRDP Impact TRANS-1 at the four affected intersections to a less than significant level. The mitigation also required UC LBNL to prepare and implement a new Transportation Demand Management (TDM) Program which included several implementation phases tied to the addition of parking on the LBNL hill site. However, because no plan was in place for the installation of the traffic improvements at the affected intersections (due, in part, to the fact that implementation was outside the authority of UC LBNL to conduct on its own), this impact was determined to be significant and unavoidable. The Regents found the remaining significant and unavoidable impact to be acceptable when the LRDP's benefits were weighed against its environmental consequences.

The 2006 LRDP Final EIR and the 2010 Supplement also concluded that a significant and unavoidable cumulative traffic impact (LRDP Impact TRANS-8) would occur at certain study intersections. **LRDP Mitigation Measure TRANS-8** (cumulative traffic impacts measure) would be implemented for this impact, but for the same reasons identified above under LRDP Impact TRANS-1, there would be a significant unavoidable impact. All other traffic impacts were determined to be less than significant.

The proposed project is within the scope of analysis of the 2006 LRDP Final EIR, as supplemented in 2010. Relevant mitigation measures in the 2006 LRDP Final EIR (now standard project features for projects under the LRDP) have been incorporated as part of the planning and design of the proposed project and will be implemented during project construction and operations consistent with LRDP mitigation monitoring requirements.

5.17.3 Environmental Checklist and Discussion

TRANSPORTATION	Additional Project-Level Impact Analysis Required	No Further Environmental Document Required
Would the project...		
a) Conflict with a program plan, ordinance, or policy addressing the circulation system, including transit, roadway, bicycle and pedestrian facilities?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
b) Conflict or be inconsistent with CEQA Guidelines section 15064.3, subdivision (b)?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
c) Substantially increase hazards due to a geometric design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
d) Result in inadequate emergency access?	<input type="checkbox"/>	<input checked="" type="checkbox"/>

DISCUSSION:

SSM Project Analysis

- a) **Conflict with a program plan, ordinance, or policy addressing the circulation system, including transit, roadway, bicycle and pedestrian facilities? No Further Environmental Document Required.**

Impacts on Transit

LRDP Impact TRANS-2 (page IV.L-34) and Impact TRANS-3 (page IV.L-35) discuss the effects of the 2006 LRDP growth on transit ridership and shuttle buses and find that the impact on transit service would be less than significant, and the impact on shuttle buses would be less than significant with implementation of LRDP Mitigation Measure TRANS-3 (transportation mode balance measure). The proposed project is within the scope of the LRDP analysis as it would increase the building space on the LBNL hill site. However, it would not increase the Lab's daily population and thereby would not increase transit ridership and would not change the impact analyzed in the 2006 LRDP Final EIR. The proposed project's impacts on transit are adequately

addressed under LRDP Impacts TRANS-2 and TRANS-3. Consistent with the 2006 LRDP EIR, the proposed project's impacts would be less than significant.

The proposed project would reconfigure the Building 54 Parking Lot to improve vehicular access and circulation and provide a transit hub in the central portion of the parking lot with improved pedestrian access to the new Welcome Center and the other nearby buildings, including the Guest House. Consequently, the proposed project would not conflict with the 2006 LRDP Vehicle Access, Circulation, and Parking Strategies or the UC Policy on Sustainable Transportation Practices.¹³ The impact would be less than significant.

Construction Traffic Impacts

Impacts from increases in construction truck traffic from construction projects under the 2006 LRDP, including the proposed project, are addressed under LRDP Impact TRANS-6 (page IV.L-38). The analysis concluded that construction-related traffic would have temporary and intermittent effects on area traffic because of the slower movements and larger turning radii of construction trucks compared to passenger vehicles. However, with implementation of LRDP Best Practice TRANS-6, the short-term construction-related transportation impacts would be less than significant. The proposed project would also implement LRDP Best Practice TRANS-6 and the project's impact would be less than significant. In addition, as part of its TDM Plan and pursuant to LRDP Best Practice TRANS-6c, LBNL implements a Construction Truck Management System that assures that daily truck trips stay well below the CEQA impact threshold. Under the System, all LBNL construction truck trips for the LBNL hill site are managed by a construction truck coordinator. The coordinator assures that aggregate construction truck trips do not exceed an impact threshold that is periodically updated by an outside traffic engineering consultant. When truck trips begin to approach such levels, the coordinator works with project managers to reduce or reschedule trucks to avoid impacts.

Impacts to roadway pavement surfaces from wear associated with construction-related truck trips are evaluated under LRDP Impact TRANS-7 (page IV.L-41). The 2006 LRDP construction would not generate enough truck traffic to result in substantial wear of roadways. The 2006 LRDP Final EIR concluded that the impact of individual construction projects under the LRDP on roadway wear would be less than significant. The proposed project's impact is adequately addressed under LRDP Impact TRANS-7. Consistent with the 2006 LRDP EIR, the proposed project's impact would be less than significant.

Operational Traffic Impacts

Neither the new Welcome Center nor Building 48 seismic retrofit would result in an increase in the average daily population of the LBNL hill site over existing conditions. As a result, there would be no increase in the number of daily vehicle trips to the hill site and no potential for any operational traffic impacts. The proposed SSM Program would not alter the results of the transportation impact analysis reported in the 2006 LRDP Final EIR, as supplemented by the updated analysis in 2010.

¹³ <https://ucop.edu/sustainability/policy-areas/sustainable-transportation/index.html>

b. Conflict or be inconsistent with CEQA Guidelines Section 15064.3, subdivision (b)? No Further Environmental Document Required.

State CEQA Guidelines Section 15064.3, subdivision (b) sets forth the new CEQA requirements that transportation impacts of a proposed project be evaluated in terms of the project's potential to increase vehicle miles traveled (VMT) on the network serving the project. These changes to the guidelines identify VMT as the most appropriate metric to evaluate a project's transportation impacts. With the California Natural Resources Agency's certification and adoption of the changes to the *State CEQA Guidelines*, automobile delay, as measured by "level of service" and other similar metrics, generally no longer constitutes a significant environmental effect under CEQA. (Pub. Resources Code, § 21099, subd. (b)(3).) Although agencies may begin the use of new metrics whenever they so choose, July 1, 2020 is the statewide implementation date.

As of the preparation of this environmental assessment, neither the University nor the local jurisdiction (City of Berkeley) has developed standards or thresholds to use to evaluate transportation impacts based on new metric. Regardless, the proposed SSM Program would not result in new vehicle trips and no transportation impact analysis is required. There would be no impact.

c. Substantially increase hazards due to a geometric design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)? No Further Environmental Document Required.

LRDP Impact TRANS-5 (page IV.L-37) discusses potential conflicts between LRDP-related growth in traffic and pedestrians and bicyclists. The impact conclusion indicates that individual projects under the LRDP program could marginally increase potential traffic conflicts with pedestrians and bicyclists by intermittently increasing traffic volumes. This impact would be less than significant. The proposed SSM Program would not increase the number of daily vehicle trips to the LBNL hill site. Furthermore, the Welcome Center Building project would improve bicycle and pedestrian circulation in the Central Commons area and would be constructed in accordance with the 2006 LRDP design guidelines, which would ensure that hazards due to geometric design features or incompatible uses would not substantially increase. The SSM Program, consistent with the 2006 LRDP, would not substantially increase transportation hazards as the proposed project involves no changes to any roads outside of project site driveways. The proposed project would be constructed in accordance with the 2006 LRDP, which would minimize vehicle access and circulation conflicts. The impact is adequately addressed under LRDP Impact TRANS-5. Consistent with the 2006 LRDP EIR, the project project's impact would be less than significant.

d. Result in inadequate emergency access? No Further Environmental Document Required.

LRDP Impact TRANS-1 (IV.L-28) examined the effect of LRDP-related traffic increases on emergency vehicle access to the LBNL hill site. No potential impacts were identified. The proposed SSM Program would not result in any increase in traffic that could affect the study intersections and increase emergency vehicle response time. Therefore, the proposed project's impact is adequately addressed under LRDP Impact TRANS-1. Consistent with the 2006 LRDP EIR, the proposed project would not have a significant impact on emergency access to the LBNL hill site.

5.17.4 Analysis of Cumulative Impacts in 2006 LRDP EIR

Construction Traffic Impacts

The 2006 LRDP EIR, under LRDP Impact TRANS-6 (focused on construction traffic), concluded that estimated construction truck traffic from the Lab, including 65 one-way daily truck trips (33 trucks per day) in a peak year, would not result in a significant impact on City intersections. A subsequent study conducted by Fehr & Peers in 2012 demonstrated that if the average truck traffic from all construction projects at the Lab does not exceed 96 daily peak truck trips and the hourly maximum is maintained at no more than 8 truck trips per hour, the impact from the Lab's construction truck traffic would be less than significant (Fehr & Peers 2012). Pursuant to LRDP Best Practice TRANS-6c, UC LBNL has an established program to manage daily construction truck trips from ongoing construction projects so as not to exceed the numbers established by the Fehr & Peers study. This program, which is implemented and actively monitored by UC LBNL, is a part of every construction project at the Lab, and it is a part of the proposed project. By limiting the total number of daily truck trips from the proposed project and other concurrent LBNL construction projects, UC LBNL will continue to avoid an exceedance of the truck trips number established to avoid a significant traffic impact on area streets, including the Hearst Avenue/Gayley Road/La Loma Avenue intersection and Gayley Road/Stadium Rim Way intersection. Therefore, the proposed project's cumulative construction traffic impact would be less than significant.

Operational Traffic Impacts

An analysis of the cumulative effect of LBNL growth under the 2006 LRDP was included in the 2006 LRDP Final EIR (LRDP Impact TRANS-8). As noted earlier in this section, a supplemental traffic analysis was conducted in July 2010 to update the cumulative traffic impacts of the 2006 LRDP in light of the revised LOS thresholds adopted by the City of Berkeley. That additional analysis, which was presented in the Seismic Phase 2 EIR, found significant and unavoidable long-term cumulative impacts at four intersections as a result of LRDP development, in combination with traffic generated by other reasonably foreseeable development in the area. The four affected intersections are:

- Durant Avenue/Piedmont Avenue,
- Hearst Avenue/Gayley Road–La Loma Avenue,
- Gayley Road/Stadium Rim Way, and
- Bancroft Way/Piedmont Avenue.¹⁴

Baseline and cumulative conditions have not experienced a meaningful change since preparation of the July 2010 supplemental traffic analysis. Therefore, the conclusions of the 2006 LRDP Final EIR analysis as updated by the July 2010 study remain unchanged.

¹⁴ The key difference between the findings of the LBNL 2006 LRDP EIR and those of the 2010 Supplement was the finding of a significant and unavoidable cumulative impact at a fourth intersection (Bancroft Way/Piedmont Avenue); the other three intersections were identified as subject to a significant and unavoidable long-term cumulative impact in the 2006 LRDP EIR.

Through the 2006 LRDP Final EIR and the 2010 Supplement approvals process, UC LBNL is committed to working with the City of Berkeley and UC Berkeley to implement measures at the four intersections identified in LRDP Mitigation Measures TRANS-1a through TRANS-1e. This includes conducting a detailed study at the Hearst Avenue/Gayley Road–La Loma Avenue intersection and contributing on a fair-share basis to the cost of implementing any specific mitigation measures identified through the study. The study was completed in November 2009 and identified a number of improvements that, taken together, would be sufficient to improve year 2025 LOS from F to E. UC LBNL has committed to its share of the necessary funding, but as of the preparation of this document, no improvement plan has been advanced or adopted by the City of Berkeley. Cumulative impacts on LOS at the Hearst Avenue/Gayley Road–La Loma Avenue intersection were therefore identified as significant and unavoidable in both the 2006 LRDP Final EIR and in the 2010 Supplement. A similar situation exists with the other three intersections identified in the 2006 LRDP Final EIR and 2010 Supplement as significantly affected: improvements have been identified and UC LBNL has committed to fair-share funding, but since improvement plans have yet to be adopted by the City, cumulative impacts at the Durant Avenue/Piedmont Avenue, Gayley Road/Stadium Rim Way, and Bancroft Way/Piedmont Avenue intersections are considered significant and unavoidable.

As discussed above, the proposed SSM Program would not generate any additional operational traffic and would not contribute traffic to the four affected intersections. The proposed project would, therefore, not contribute to the cumulative traffic impact analyzed and disclosed in the 2006 LRDP EIR. There would be no impact due to the project.

5.17.5 Changes to Circumstances or New Information that could affect the Earlier Environmental Analysis

Since the certification of the 2006 LRDP Final EIR, in anticipation of concurrent construction of a number of large projects on the Lab site, UC LBNL conducted a reevaluation of the traffic impacts associated with construction truck trips. This study, conducted by Fehr & Peers in 2012, examined the existing traffic conditions along the designated truck route from the Lab 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 average truck traffic from all construction projects at the Lab does not exceed 96 daily peak truck trips and the hourly maximum is maintained at no more than 8 truck trips per hour, the impact from the Lab's construction truck traffic would be less than significant (Fehr & Peers 2012). As noted above, pursuant to LRDP Best Practice TRANS-6c, the LBNL has instituted a Construction Truck Management System to manage construction schedules to minimize the overlap of heavy truck activity periods. As a part of this program, the LBNL makes necessary adjustments to truck movements to keep the total number of truck trips below 96 trips-per-day impact threshold (daily truck trips are typically held to a small fraction of the impact threshold). Truck trips associated with the proposed project would also be subject to this Lab site program, which is a part of the project and would ensure that the impact on city intersections from construction traffic would remain less than significant.

In addition, since the certification of the 2006 LRDP Final EIR, the City of Berkeley adopted new thresholds of significance for the evaluation of a project's traffic impacts. To address the change in the thresholds, as discussed above, UC LBNL conducted in 2010 a supplemental analysis of the traffic impacts from LRDP development under 2025 conditions. The results of that analysis are

reported in **Section 5.17.4**, above. As the proposed project would not generate new vehicle trips, it would not alter the significance of the previously analyzed impacts under the LRDP EIR.

5.18 Tribal Cultural Resources

5.18.1 Background

Section IV.D in the 2006 LRDP Final EIR addresses the effects on cultural resources, including tribal cultural resources, from LRDP-related growth and development and is incorporated herein by reference pursuant to *State CEQA Guidelines* Section 15150. The following discussion summarizes the information presented in the ‘Setting’ subsection of 2006 LRDP Final EIR Section IV.D.

LBNL hill site history presented in the 2006 LRDP Final EIR was based on information from technical studies prepared for the project area, including archival research at the California Historical Resources Information System’s Northwest Information Center; a cultural resources evaluation and survey; an archaeological survey report; and the first of a series of reports being prepared as part of an inventory and evaluation of potential historically significant buildings and structures at the LBNL hill site.

Field surveys and archival research at the California Historical Resources Information System’s Northwest Information Center have been undertaken a number of times since 2006 to determine whether any archaeological resources have been discovered at the LBNL hill site. The Northwest Information Center has indicated there is a “low potential for Native American sites in the project area” and thus “a low possibility of identifying Native American or historic-period archaeological deposits in the project area.” Additionally, field studies conducted at various times at the LBNL hill site have not encountered any archaeological resources. Native American archaeological sites in this portion of Alameda County tend to be situated on terraces along ridgetops, mid-slope terraces, alluvial flats, near ecotones, and near sources of water, including springs. LBNL is situated on a steep slope adjacent to Strawberry Creek. Therefore, there is a low-to-moderate potential for Native American sites to be present on the LBNL hill site.

5.18.2 2006 LRDP EIR Analysis

The 2006 LRDP Final EIR was prepared prior to the passage of Assembly Bill 52 (AB 52); at that time, CEQA did not require a dedicated analysis of impacts on tribal cultural resources from project implementation.

5.18.3 Environmental Checklist and Discussion

Tribal Cultural Resources	Additional Project-Level Impact Analysis Required	No Further Environmental Document Required
Would the project...		
<p>a) Would the project cause a substantial adverse change in the significance of a tribal cultural resource, defined in Public Resources Code section 21074 as either a site, feature, place, cultural landscape that is geographically defined in terms of the size and scope of the landscape, sacred place, or object with cultural value to a California Native American tribe, and that is:</p>		
i) Listed or eligible for listing in the California Register of Historical Resources, or in a local register of historical resources as defined in Public Resources Code section 5020.1(k)?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
ii) A resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in subdivision (c) of Public Resources Code Section 5024.1? In applying the criteria set forth in subdivision (c) of Public Resource Code Section 5024.1, the lead agency shall consider the significance of the resource to a California Native American tribe?	<input type="checkbox"/>	<input checked="" type="checkbox"/>

DISCUSSION:

SSM Project Analysis

- a. i. **Would the project cause a substantial adverse change in the significance of a tribal cultural resource, defined in Public Resources Code section 21074 as either a site, feature, place, cultural landscape that is geographically defined in terms of the size and scope of the landscape, sacred place, or object with cultural value to a California Native American tribe, and that is listed or eligible for listing in the California Register of Historical Resources, or in a local register of historical resources as defined in Public Resources Code section 5020.1(k)?**

UC LBNL sent out notification letters on June 4, 2020 to five local Native American tribes: The Costanoan Rumsen Carmel Tribe, the Muwekma Ohlone Indian Tribe of the SF Bay Area, the Ohlone Indian Tribe, the Amah Mutsun Tribal Band of Mission San Juan Bautista, and the Indian Canyon Mutsun Band of Costanoan. These five tribes have indicated an interest in receiving such notification for projects proposed in the Berkeley Lab area. According to AB 52, tribal notification recipients should respond within 30 days if they want to request consultation. However, the Berkeley Lab provided the tribes a period of 54 days (by July 31, 2020) to request consultation. No tribal request for consultation has been received by UC LBNL within the 54-day period or after (as of the completion of this document).

The geographic area of the project sites is not known or expected to contain any tribal cultural resources (TCRs). Furthermore, the majority of the Building 54 project site has been disturbed in conjunction with past construction projects. LRDP Impact CUL-3 (page IV.D-16) discusses impacts related to cultural resources regarding Native American sites. The 2006 LRDP Final EIR notes that the potential for Native American sites to exist on the LBNL hill site is considered low to moderate, based on field surveys and archival research at the Northwest Information Center. In the unlikely event that archaeological artifacts are discovered during construction of the Welcome Center Building project (including grading, excavation, and other earthmoving activities), **LRDP Mitigation Measure CUL-3**, would be implemented. No ground disturbance would be involved in the Building 48 Seismic Retrofit project.

LRDP Impact CUL-4 (page IV.D-18) analyzes the possibility of disturbing human remains, including Native American human remains. The impact found that there is no known evidence of prehistoric habitation at LBNL, nor any indication that the site has been used for burial purposes in the recent or distant past. Thus, and for reasons mentioned above, encountering human remains at the LBNL hill site would be unlikely. However, if human remains should be encountered during excavation and construction of the Welcome Center Building project, work would be halted and **LRDP Mitigation Measure CUL-4** would be implemented. After mitigation, impacts would be less than significant.

LRDP Mitigation Measures CUL-3 and CUL-4 are standard project features for the proposed SSM Program that would be implemented to ensure that, should such resources be encountered during construction, they would be protected, documented, and preserved, as appropriate. Therefore, while no TCRs are expected to be affected by the proposed SSM Program, the standard project features **LRDP Mitigation Measures CUL-3 and CUL-4** would further ensure that any resources encountered would not be adversely affected.

Accordingly, the proposed project is not expected to result in a substantial adverse change in the significance of TCRs, and this impact is considered less than significant.

- a. ii. **Would the project cause a substantial adverse change in the significance of a tribal cultural resource, defined in Public Resources Code section 21074 as either a site, feature, place, cultural landscape that is geographically defined in terms of the size and scope of the landscape, sacred place, or object with cultural value to a California Native American tribe, and that is a resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in subdivision (c) of Public Resources Code Section 5024.1?**

The project sites are not known to be a cultural resource or location of particular cultural value to any existing Native American tribe; no evidence to the contrary was produced during communications with interested area tribes pursuant to AB 52. See section “a. i” above for analysis.

5.18.4 Analysis of Cumulative Impacts in 2006 LRDP EIR

At the time the 2006 LRDP Final EIR was prepared, CEQA did not require a dedicated analysis of impacts to tribal cultural resources due to project implementation. AB 52, which was approved in September 2014 and became effective on July 1, 2015, requires that CEQA lead agencies consult with California Native American tribes that are traditionally and culturally affiliated with the

geographic area of a revised project, if requested by the tribes. AB 52 applies only to projects where the Notice of Preparation (NOP) was filed after July 1, 2015. Since the NOP for the 2017 Supplement to the 2006 LRDP Final EIR was issued after 2015, the SSM Program as an element of growth under the 2006 LRDP is subject to AB 52. Compliance with applicable laws, regulations, and statutes would aim to protect any possible tribal cultural resources that are discovered in the Building 54 project site (no exterior ground disturbance would occur at the Building 48 project site). These regulations would apply to all development of the Building 54 project site. By ensuring that cultural resources discovered within the project site are properly recorded and handled, with implementation of standard project feature **LRDP Mitigation Measure CUL-3**, the contribution of the proposed project to cumulative impacts on archaeological resources would not be cumulatively considerable. In addition, by ensuring that human remains and any associated or unassociated funerary objects are treated in compliance with applicable State laws by implementation of standard project feature **LRDP Mitigation Measure CUL-4**, the contribution of the proposed project to cumulative impacts on human remains would not be cumulatively considerable. The impact would be less than significant. Therefore, it would not contribute to any cumulative impact on tribal cultural resources.

5.18.5 Changes to Circumstances or New Information that could affect the Earlier Environmental Analysis

See **Section 5.18.4** above for details.

5.19 Utilities/Service Systems

5.19.1 Background

LRDP Final EIR Section IV.M addresses the effects of LRDP-related growth and development on utility systems that serve the LBNL hill site and is incorporated by reference herein pursuant to *State CEQA Guidelines* Section 15150. The LBNL hill site is served by the following utility and service systems.

Potable and Fire Protection Water: East Bay Municipal Utility District (EBMUD) provides water to the LBNL hill site via two points of connection – a 12-inch meter on Campus Drive in the Shasta Pressure Zone of the district and a 6-inch meter on Summit Road in the Berkeley View Pressure Zone. On the LBNL hill site, water is distributed by an extensive water distribution system, which provides water not only to the buildings but also for use in cooling towers, for irrigation, fire suppression, and for other uses. UC LBNL also maintains three 200,000-gallon water storage tanks on-site for emergency water supply. In 2006, the total annual water consumption at the LBNL hill site was approximately 41.6 million gallons. Even though the total building space at LBNL has increased, water usage has declined substantially since 1990 because of water conservation measures that UC LBNL has been implementing. There is adequate water supply to meet the Berkeley Lab’s demand (LBNL 2007b).

Wastewater: LBNL hill site wastewater is collected in a gravity-flow system that discharges into the City of Berkeley’s sanitary sewer system through a monitoring station located at Hearst Avenue and a second monitoring station located at Centennial Drive. The volume and quality of effluent at both monitoring stations are monitored and evaluated for compliance with EBMUD discharge requirements. From these monitoring stations, the effluent continues through the City’s sewer system to EBMUD’s north interceptor sewer and then to the wastewater treatment facility in Oakland.

Storm Drainage: The LBNL hill site storm drain system is a gravity-fed system of open and culverted drainages that generally run east-west. The combined flows are then conveyed through the developed portions of the site to eventually discharge via outfalls into the open channels in the Strawberry Creek watershed.

Solid Waste: Non-hazardous solid waste is collected and transported off-site by a commercial waste contractor. UC LBNL implements an extensive program focused on waste minimization and recycling.

Electricity: Electrical power at the LBNL hill site is purchased from the Western Area Power Administration and delivered by the Pacific Gas and Electric (PG&E) transmission system to the Lab’s Grizzly Substation located adjacent to Building 77. The total electrical power consumption in 2019 at the LBNL hill site was 129,115 megawatt hours. LBNL also has a number of stationary and portable emergency power generators that are powered by diesel, gasoline, or natural gas.

Natural Gas: Natural gas is used on the LBNL hill site for heating existing buildings, to operate certain equipment, and also in some experimental uses. However, new buildings constructed after June 30, 2019, including the proposed Welcome Center building, shall be heated by electricity consistent with the UC Sustainable Practices Policy. Natural gas is delivered to the hill site by the

PG&E system via a 6-inch line. The point of delivery is located above Cyclotron Road and below Building 88. Natural gas is distributed from this point of delivery to all buildings on the hill site. Two buildings (Buildings 73 and 73A) in the eastern portion of the LBNL hill site are served by another PG&E line located along Centennial Drive.

Other On-Site Utilities: UC LBNL also owns and operates other specialized utility systems that are needed for research and specific equipment used on site. These include a LBNL site-wide compressed air system, a LBNL site-wide low-conductivity water system, a closed-loop cooling water system, building-specific purified water systems, and building-specific de-ionized water systems.

Project Sites

Both the Building 54 and the Building 48 sites are developed with buildings and are served by on-site utilities, including water, wastewater, solid waste collection, electricity, and natural gas.

5.19.2 2006 LRDP EIR Analysis

Impacts of LBNL growth and development under the 2006 LRDP on utilities and service systems are evaluated in Section IV.M of the 2006 LRDP Final EIR. The EIR analysis concluded that implementation of the 2006 LRDP would result in impacts on utilities that would either be less than significant or reduced to a less than significant level with mitigation measures.

No building space increase is associated with the Building 48 Seismic Retrofit project. Based on the building space associated with the Welcome Center Building project, the proposed project is within the scope of analysis of the 2006 LRDP Final EIR. Relevant mitigation measures in the 2006 LRDP Final EIR (now standard project features for projects under the LRDP) have been incorporated as part of the planning and design of the proposed project and would be implemented during project construction and operations consistent with LRDP mitigation monitoring requirements.

5.19.3 Environmental Checklist and Discussion

UTILITIES & SERVICE SYSTEMS	Additional Project-Level Impact Analysis Required	No Further Environmental Document Required
Would the project...		
a) Require or result in the relocation or construction of new or expanded water, wastewater treatment or storm water drainage, electric power, natural gas, or telecommunications facilities, the construction or relocation of which could cause significant environmental effects?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
b) Have sufficient water supplies available to serve the project and reasonably foreseeable future development during normal, dry and multiple dry years?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
c) Result in a determination by the wastewater treatment provider which serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the providers existing commitments?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
d) Generate solid waste in excess of State or local standards, or in excess of the capacity of local infrastructure, or otherwise impair the attainment of solid waste reduction goals?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
e) Comply with federal, state, and local management and reduction statutes and regulations related to solid waste?	<input type="checkbox"/>	<input checked="" type="checkbox"/>

DISCUSSION:

SSM Project Analysis

- a. **Require or result in the relocation or construction of new or expanded water, wastewater treatment or storm drainage, electric power, natural gas, or telecommunications facilities, the construction or relocation of which could cause significant environmental effects? No Further Environmental Document Required.**

With respect to water, LRDP Impact UTILS-1 (page IV.M-16) concluded that the implementation of the 2006 LRDP would generate demand for additional water but would not require the construction of new water facilities or expansion of existing facilities. The proposed Welcome Center would connect to and use the existing water infrastructure adjacent to the project site and would not require off-site improvements to pipelines. The transit hub and utility components of the Welcome Center Building project would be implemented within the 2.3-acre Building 54 project site to serve the new building. As the improvements would be constructed expressly to serve the new Welcome Center, the environmental impacts from the utility improvements are analyzed in this document. In order to provide redundancy of supply to the building, a secondary water supply connection would be provided to replace an inadequate 2-inch copper line. A new water supply pipeline would be installed from the existing 6-inch pipeline located south of Building 23. Two hydrants and a dedicated firewater pipeline would also be installed. All of the new pipelines

and hydrants would be within the area of disturbance analyzed in this Environmental Checklist for environmental impacts. Building 48 seismic retrofit would not require any changes to the water infrastructure. The proposed SSM Program's impacts on water infrastructure are adequately addressed under LRDP Impact UTILS-1. Consistent with the 2006 LRDP EIR, the proposed project's impacts would be less than significant.

LRDP Impact UTILS-2 (page IV.M-19) concluded that the implementation of the 2006 LRDP would generate additional wastewater which would require system upgrades to accommodate flows. At the Building 48 project site, there would be no change in the amount of wastewater generated and no modifications to the sewer system would be needed. At the Building 54 project site, as existing laterals from Building 54 would be demolished to construct the loading dock and the new building, a new wastewater lateral would be installed to connect the proposed Welcome Center to the existing sanitary sewer located to the southwest of the project near Building 70. The project also includes an underground concrete grease interceptor for kitchen grease waste. It would be located outside near the loading dock where it would be accessible for cleaning. All of these improvements would be located in the immediate vicinity of the new building. The project would not require any off-site improvements to the wastewater mains. Wastewater flows from the western portion of the LBNL hill site exit through sewer lines within Hearst Avenue that flow to the City of Berkeley's sanitary sewer sub-basin 17-013. As there would be no increase in LBNL daily population due to the project and because the new building would be more water efficient, a substantial increase in wastewater flows would not occur. The EBMUD treatment facility is expected to have adequate capacity to treat wastewater from the project site. The proposed project's impacts on wastewater infrastructure and wastewater capacity are adequately addressed under LRDP Impact UTILS-2. Consistent with the 2006 LRDP EIR, the proposed project's impact would be less than significant.

As discussed under **Section 5.9, Hydrology and Water Quality**, although there would be no increase at the Building 48 project site, the impervious surfaces on the Building 54 project site would increase by a small amount. However, BMPs are included in the Welcome Center Building project, including stormwater detention tanks, such that post-project flows from the site would not exceed current flows. The Welcome Center Building project would not require expansion of existing storm drain facilities although it would require a new storm drain that would be located in the canyon and would discharge detained water from the proposed stormwater detention tank into Cafeteria Creek. The impacts from the construction of the new storm drain are analyzed in this Environmental Checklist and would be less than significant with the implementation of standard project features.

LRDP Impact UTILS-5 (page IV.M-25) concluded that the 2006 LRDP would create additional demand for electricity and natural gas but would not require expansion or construction of infrastructure. The annual electricity consumption of the Welcome Center is estimated at 718,121 kilowatt hours (kWh). If the existing usage of about 408,070 kWh/year is deducted, the increase in electricity use would be approximately 310,051 kWh/year. The Welcome Center, in compliance with the UC LBNL's sustainability policy, would attain a minimum of a Gold rating within the LEED v4 program. Furthermore, the project's sustainability goals include producing at least 7.5 percent of estimated annual energy from on-site renewable sources and meeting or exceeding whole building energy use targets. Therefore, any increase in demand for energy due to the proposed project would be within the previously analyzed 2006 LRDP projections, and the delivery of additional electricity to the LBNL hill site would be accommodated by existing infrastructure. The existing site utility connections would be used for the proposed Welcome Center. Building 48

seismic retrofit would not result in any changes to the amount of electricity used in the existing building. Therefore, the proposed SSM Program would not require the construction or expansion of electrical facilities. The proposed project's impact on transmission and generation facilities is adequately addressed under LRDP Impact UTILS-5. Consistent with the 2006 LRDP EIR, the proposed project's impact would be less than significant.

b. Have sufficient water supplies available to serve the project and reasonably foreseeable future development during normal, dry, and multiple dry years? No Further Environmental Document Required.

LRDP Impact UTILS-1 (page IV.M-16) concluded that the implementation of the 2006 LRDP would increase demand for water, but not would not require off-site infrastructure upgrades. The 2006 LRDP also includes various system upgrades intended to improve reliability and reduce water loss due to outdated, deteriorating pipelines. Improvements include the replacement of selected existing water distribution lines.

The SSM Program would result in a minimal increase in water usage at the LBNL hill site. The proposed Welcome Center includes high-efficiency fixtures and low-flow urinals that would reduce water demand. Additionally, landscaping introduced to the project site would include drought-tolerant plant materials that would not be irrigated beyond a short establishment period and no lawns areas are proposed; in keeping with Lab policy, landscaping would not be watered after a short establishment period. There would be no change in water usage in Building 48 following the seismic retrofit. Therefore, the proposed SSM Program would not result in the need for new or expanded water entitlements under normal, dry, and multiple dry years. The proposed project's impact is adequately addressed under LRDP Impact UTILS-2. Consistent with the 2006 LRDP EIR, the proposed project's impact would be less than significant.

c. Result in a determination by the wastewater treatment provider which serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the providers existing commitments? No Further Environmental Document Required.

See item "a" above for analysis.

d. Generate solid waste in excess of State or local standards, or in excess of the capacity of local infrastructure, or otherwise impair the attainment of solid waste reduction goals? No Further Environmental Document Required.

LRDP Impact UTILS-4 (page IV.M-24) concluded that without recycling, construction debris generated at the LBNL hill site would affect Altamont Landfill capacity. The existing Building 54 on the project site would be removed, which would generate construction waste. The Welcome Center Building project would implement **LRDP Mitigation Measure UTILS-4** (solid waste diversion measure) as a standard project feature to maximize diversion of construction wastes from the regional landfill. The contractor would be required to develop a Waste Management Plan to issue Waste Management Reports to meet goals for recycle of construction waste materials per the LBNL standards.

The proposed Welcome Center Building project would have the potential to result in an increased waste stream due to an increase in operations (additional building space although no additional

personnel). However, in accordance with UC Policy,¹⁵ the Welcome Center would be designed and operated to meet waste diversion goals: by 2020, send 90 percent of municipal solid waste to recycling and compost facilities, and by 2030, reduce the per capita generation of municipal solid waste by 50 percent from 2016 levels. The Center would also include sufficient space for diversion of organic waste (see Cal Green Building Code Section 4.410.2 & Section 5.410.1). Adequate facilities would be included in the building for the collection and disposal of recyclables and landfill-bound solid waste. The proposed project would minimize waste in accordance with LBNL Sustainability Standards and would comply with federal, state, and local statutes regarding solid waste generation. Therefore, the solid waste impacts of the proposed SSM Program are adequately analyzed under LRDP Impact UTILS-4. Consistent with the 2006 LRDP EIR, the project's impact would be less than significant with standard project features.

e. Comply with federal, state, and local management and reduction statutes and regulations related to solid waste? No Further Environmental Document Required.

See item "d" above for analysis.

5.19.4 Analysis of Cumulative Impacts in 2006 LRDP EIR

The 2006 LRDP Final EIR analyzed the cumulative impact on utilities under LRDP Impact UTILS-6. According to that analysis, other foreseeable development in the City of Berkeley and in the area surrounding the LBNL hill site would contribute to cumulative increases in utility and energy demand; however, new development would occur within a largely built-out urban area where utilities and service systems generally are provided. Additionally, these increases in demand attributed to other development would be addressed on a site-by-site basis by the service providers prior to approval of new development, and through CEQA review of each development project. The incremental increase in demand for utilities for stormwater delivery systems, water supply, and solid waste associated with the 2006 LRDP would not be expected to represent a substantial increase in demand for utility and service systems, and existing utility delivery systems would be expected to handle growth anticipated under the 2006 LRDP. Taking into consideration the present-day setting and the current cumulative context, this analysis finds that the cumulative effect of 2006 LRDP development in combination with other foreseeable development would not be significant, nor would the LRDP development's contribution to any cumulative effects be cumulatively considerable. Because the proposed project is within the scope of growth and development under the 2006 LRDP, the proposed project's cumulative effects are adequately addressed under LRDP Impact UTILS-6 and its contribution to any cumulative impacts would also not be considerable.

5.19.5 Changes to Circumstances or New Information that could affect the Earlier Environmental Analysis

There are no changes in circumstances and no new information related to utilities and service systems has become available related to utilities since the certification of the 2006 LRDP Final EIR that would alter the previous analysis and change its conclusions.

¹⁵ <https://ucop.edu/sustainability/policy-areas/waste-reduction-and-recycling/index.html>

5.20 Wildfire

5.20.1 Background

Section IV.F of the 2006 LRDP EIR addresses impacts related to hazards, including wildland fire, from the growth of LBNL under the 2006 LRDP and is incorporated by reference herein pursuant to *State CEQA Guidelines* Section 15150. The following discussion summarizes the information presented in the 'Setting' subsection of Section IV.F of the 2006 LRDP Final EIR.

Fire Hazards: The eastern boundary of the LBNL hill site is in an interface between wildlands and developed lands in the East Bay hills. The hill site is similar in character to other developed hillside areas in the region as it features developed lands amidst groves of trees and annual grassland areas. Dry summers desiccate plant materials and make them more prone to burning, and a "fire season" is declared by the state each summer and fall. The fire risk during brief periods of the fall months is even more pronounced when strong offshore winds, often called "Diablo winds," occur in the East Bay hills. These offshore winds further desiccate fuel material and can drive fire fronts and fire brands at extreme speeds.

On average, serious Diablo-wind-driven wildland fires that destroy structures occur in the regional vicinity of LBNL approximately every 20 years. These fire conditions are now well understood. Although these fires can spread over large areas, it has been shown that each structure is at risk of damage for approximately 10 minutes, since during this interval a Diablo-wind-driven fire will typically consume the adjacent fuel. LBNL has reviewed fire histories, worked with fire researchers, and applied computer models to determine how the fuels adjacent to its buildings can be reduced to levels that will not support fire intensities that pose serious risks to the structures. Under LBNL's vegetation management program, the hill site is now managed to minimize wildland fire damage to structures. This program provides for annual treatment of vegetation on the LBNL hill site such that ground fuels cannot produce flame heights in excess of 3 feet (and ground plantings within 10 feet of buildings and roadways produce even lower flame heights); trees are "limbed up" so that flammable branches are at least 8 to 10 feet above the ground, and bushes that would allow ground-based fires to rise into tree canopies are removed.

LBNL provides firefighting services through a service contract with the Alameda County Fire Department, which staffs a fire station on the LBNL grounds (Alameda County Station 19). At least four firefighters are on duty at all times. Equipment at Station 19 includes one fire engine, one reserve fire engine, a hazardous materials vehicle, and a light-duty four-wheel drive "brush rig" that can be used for low-intensity wildland fires. LBNL has an automatic aid agreement with the City of Berkeley, which means that the fire engine at Station 19 responds to locations in Berkeley, including the UC Berkeley campus, when the first-due Berkeley Fire Department engine is on another call, and Berkeley Fire Department personnel and apparatus respond to the Lab when Engine 19 – stationed at the firehouse at LBNL – is on another call. The Alameda County Fire Department has mutual aid agreements with other agencies, including Oakland and the East Bay Regional Park District, which can be activated in the event of a major emergency. (Please see **Section 5.15**, above)

Project Sites

Both the Building 54 and the Building 48 sites are developed with buildings and surrounded to the north and west by other LBNL buildings and to the south and east by open space.

5.20.2 2006 LRDP EIR Analysis

LRDP growth-related impacts on wildfire risks are evaluated in Section IV.F of the 2006 LRDP Final EIR and incorporated herein by reference. The EIR analysis concluded that implementation of the 2006 LRDP would result in a less than significant impact related to wildfire hazards and no mitigation would be required.

For reasons set forth in **Section 5.11**, the proposed project is within the scope of analysis of the 2006 LRDP EIR. Relevant mitigation measures in the 2006 LRDP Final EIR (now standard project features for projects under the LRDP) have been incorporated as part of the planning and design of the proposed project and would be implemented during project construction and operations consistent with LRDP mitigation monitoring requirements.

5.20.3 Environmental Checklist and Discussion

Wildfire		
If located in or near state responsibility areas or lands classified as very high fire hazard severity zones, would the project...	Additional Project-Level Impact Analysis Required	No Further Environmental Document Required
a) Substantially impair an adopted emergency response plan or emergency evacuation plan?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
b) Due to slope, prevailing winds, and other factors, exacerbate wildfire risks, and thereby expose project occupants to, pollutant concentrations from a wildfire or the uncontrolled spread of a wildfire?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
c) Require the installation or maintenance of associated infrastructure (such as roads, fuel breaks, emergency water sources, power lines or other utilities) that may exacerbate fire risk or that may result in temporary or ongoing impacts to the environment?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
d) Expose people or structures to significant risks, including downslope or downstream flooding or landslides, as a result of runoff, post-fire slope instability, or drainage changes?	<input type="checkbox"/>	<input checked="" type="checkbox"/>

DISCUSSION:

SSM Project Analysis

a. Substantially impair an adopted emergency response plan or emergency evacuation plan? No Further Environmental Document Required.

LRDP HAZ-5 (page IV.F-32) concluded that LRDP implementation would have a less than significant effect regarding exposure of people to catastrophic events. The analysis included the secondary impacts (e.g., from evacuation) from such catastrophic events. Current safety measures and procedures would continue under the 2006 LRDP program. UC LBNL has taken many precautions to limit the impacts of such events should they occur. These include:

- Continued provision of an on-site Alameda County fire station, which provides fire and emergency medical response.
- Continued operation of an on-site medical clinic, which is staffed by doctors and other trained medical personnel during business hours.
- Construction site-wide compliance with requirements of the latest California Building Code, University of California seismic design safety policies, federal standards, and LBNL's lateral force design criteria. Such construction would help to minimize the potential injuries, damage, and subsequent fire that could result from a seismic event.
- Continued commitment to LBNL's Master Emergency Program Plan (MEPP), which establishes policies, procedures, and an organizational structure for responding to and recovering from a major disaster at LBNL.
- Continued operation and maintenance of LBNL's three on-site 200,000-gallon water tanks, which are spaced strategically throughout its site. These are designed to maintain pressure and supply of emergency water even in the event of loss of water supply from external sources.

Construction and laboratory operation activities at the LBNL hill site, including the proposed SSM Program, would comply with federal and state laws to ensure that there would be no conflict with emergency response plans. Proposed project-related increase in building space is within the scope of the 2006 LRDP. Therefore, the proposed project's impact is adequately addressed under LRDP Impact HAZ-5. Consistent with the 2006 LRDP EIR, the proposed project's impact would be less than significant.

b. Due to slope, prevailing winds, and other factors, exacerbate wildfire risks, and thereby expose project occupants to, pollutant concentrations from a wildfire or the uncontrolled spread of a wildfire? No Further Environmental Document Required.

LRDP Impact HAZ-6 (page IV.F-39) addresses impacts associated with exposure of people or structures to wildland fire hazards. The 2006 LRDP Final EIR concluded that continued implementation of the LBNL vegetation management program would limit damage to assets from wildland fires and would reduce potential wildland fire hazards. Development of the proposed Welcome Center would increase support facility space at the LBNL hill site. The Welcome Center would meet required safety standards and fire codes at the time of facility construction. Furthermore, the project would be located at a site that is already developed. While wildland areas

lie to the south of the Building 54 project site, the landscaping on that side of the building would include fire resistant species. The Building 48 seismic retrofit would not involve construction of a new building or installation of new landscaping. Therefore, the proposed SSM Program would not expose structures or persons to a significant risk from wildland fires. The proposed project's impact is adequately addressed under LRDP Impact HAZ-6. Consistent with the 2006 LRDP EIR, the proposed project's impact would be less than significant.

- c. **Require the installation or maintenance of associated infrastructure (such as roads, fuel breaks, emergency water sources, power lines or other utilities) that may exacerbate fire risk or that may result in temporary or ongoing impacts to the environment? No Further Environmental Document Required.**

LRDP Impact HAZ-6 (page IV.F-39) indicates that the great majority of new construction and renovation on the LBNL hill site would occur within designated developable areas. The Perimeter Open Space land use zone would continue to be managed to reduce wildland fire risk and primarily be reserved for minor maintenance and support structures.

The Welcome Center would be located within the Central Commons zone that is a subset of the developable "Research and Academic" zone designated on the LRDP Land Use Map. The project would not require the installation or maintenance of associated infrastructure that may exacerbate fire risk or that may result in temporary or ongoing impacts to the environment. The impact would be less than significant.

- d. **Expose people or structures to significant risks, including downslope or downstream flooding or landslides, as a result of runoff, post-fire slope instability, or drainage changes? No Further Environmental Document Required.**

See Sections 5.7 and 5.9, above. The Welcome Center Building project would not expose the building occupants or the Welcome Center to significant risks from landslides or other post-fire slope instability. The Building 48 seismic retrofit would also not expose people or structures to risks from landslides or other post-fire slope instability. The impact would be less than significant.

5.20.4 Analysis of Cumulative Impacts in 2006 LRDP EIR

LRDP Impact HAZ-7 (page IV.F-41) analyzes cumulative impacts related to catastrophic events, such as a wildfire. It concludes that LBNL's contribution to any region-wide impacts would be less than cumulatively considerable. Implementation of the 2006 LRDP, including the proposed SSM Program, would not substantially increase the Lab's contribution to any such risk; in some cases, it would decrease the Lab's contribution compared to existing conditions. For these reasons, the cumulative impact would be less than significant.

5.20.5 Changes to Circumstances or New Information that could affect the Earlier Environmental Analysis

Changes to the *State CEQA Guidelines* have occurred since the certification of the 2006 LRDP Final EIR. The new guidelines released in 2018, in recognition of the state's need to specifically address wildfire dangers, have separated wildfire risks into its own focused section to be analyzed separately. However, the 2006 LRDP Final EIR, under section IV.F, addressed the impacts related

to catastrophic events, including wildfires. Furthermore, none of the Guidelines changes have altered the previous analysis or changed its conclusions.

5.21 Mandatory Findings of Significance

MANDATORY FINDINGS OF SIGNIFICANCE	Additional Project-Level Impact Analysis Required	No Further Environmental Document Required
Would the project...		
a) Does the project have the potential to substantially degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, substantially reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
b) Does the project have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects)?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
c) Does the project have environmental effects that will cause substantial adverse effects on human beings, either directly or indirectly?	<input type="checkbox"/>	<input checked="" type="checkbox"/>

DISCUSSION:

- a. **Does the project have the potential to substantially degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, substantially reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory? No Further Environmental Document Required.**

As noted in the checklist responses, the SSM Program would not substantially degrade the quality of the environment, or adversely affect wildlife or fish habitat or cultural resources. Therefore, no further environmental documentation is required.

- b. **Does the project have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects)? No Further Environmental Document Required.**

All cumulative impacts are adequately addressed in the 2006 LRDP Final EIR, as supplemented by the 2010 and 2017 Supplements, which provided updated traffic, energy, tribal cultural resources, and GHG analyses, and further evaluation of those cumulative impacts is not required. Consideration of the current cumulative context both at and surrounding the LBNL site conducted

for this SSM Program Environmental Analysis and Checklist further confirms that there is no new information, pursuant to *State CEQA Guidelines* Section 15162, that would alter this conclusion.

- c. **Does the project have environmental effects that will cause substantial adverse effects on human beings, either directly or indirectly? No Further Environmental Document Required.**

For reasons presented in the checklist responses, the proposed SSM Program would not, directly or indirectly, have a substantial adverse effect on human beings.

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7.0 REPORT PREPARERS

Lawrence Berkeley National Laboratory

Jeff Philliber, Sr. Site and Environmental Planner

Barati Consulting

Shabnam Barati, Ph.D., Principal

Illingworth & Rodkin (Air Quality and GHG Analysis)

James Reyff, Principal

APPENDIX A
STANDARD PROJECT FEATURES

APPENDIX A

Standard Project Features

Introduction to Standard Project Features

Standard Project Features (SPFs) were originally identified in the UC LBNL 2006 LRDP EIR as environmentally proactive measures that would be incorporated into all LBNL projects. These measures have been adopted as part of the LBNL 2006 LRDP EIR by the Regents of the University of California. Because the proposed SSM project is an element of the LBNL site growth projected by the University, the following SPFs are included in and a part of the proposed project (described in **Section 2.0, Project Description**).

For clarity this Appendix lists SPFs as they were characterized in the 2006 LRDP EIR in Chapter 5, entitled Mitigation Monitoring and Reporting Program, including some revisions made to the traffic SPFs following a supplemental traffic analysis that was conducted in 2010 and new mitigation measures implemented following a 2017 Supplement (Building 59 Upgrade & Installation and Operation of NERSC – 9 Focused EIR). These SPFs are pertinent to such environmental resource areas as aesthetics; air quality; biological resources; cultural resources; geology and soils; greenhouse gas emissions; hazards and hazardous materials; hydrology and water quality; noise; traffic and transportation; and utilities and service systems. The analysis presented in the Environmental Analysis and Checklist evaluates environmental impacts that would result from project implementation following the application of these SPFs.

SPF VIS-4a: All new buildings on the LBNL hill site constructed pursuant to the 2006 LRDP shall incorporate design standards that ensure lighting would be designed to confine illumination to its specific site, in order to minimize light spillage to adjacent LBNL buildings and open space areas. Consistent with safety considerations, LBNL project buildings shall shield and orient light sources so that they are not directly visible from outside their immediate surroundings.

SPF VIS-4b: New exterior lighting fixtures shall be compatible with existing lighting fixtures and installations in the vicinity of the new building, and will have an individual photocell. In general, and consistent with safety considerations, exterior lighting at building entrances, along walkways and streets, and at parking lots shall maintain an illumination level of not more than 20 Lux (approximately 2 foot-candles).

SPF VIS-4c: All new buildings on the LBNL hill site constructed pursuant to the 2006 LRDP shall incorporate design standards that preclude or limit the use of reflective exterior wall materials or reflective glass, or the use of white surfaces for roofs, roads, and parking lots, except in specific instances when required for energy conservation.

SPF AQ-1a: The BAAQMD's approach to dust abatement calls for "basic" control measures that should be implemented at all construction sites, "enhanced" control measures that should be implemented at construction sites greater than four acres in area, and "optional" control measures that should be implemented on a case-by-case basis at construction sites that are large in area or are located near sensitive receptors, or that, for any other reason, may warrant additional emissions reductions.

During construction of individual projects proposed under the LRDP, LBNL shall require construction contractors to implement the appropriate level of mitigation (as detailed below), based on the size of the construction area, to maintain project construction related impacts at acceptable levels; this would reduce the potential impact to a less-than-significant level.

Elements of the “basic” dust control program for project components that disturb less than one acre shall include the following at a minimum:

- Water all active construction areas at least twice daily. Watering should be sufficient to prevent airborne dust from leaving the site. Increased watering frequency may be necessary whenever wind speeds exceed 15 miles per hour. Reclaimed water should be used whenever possible.
- Cover all trucks hauling soil, sand, and other loose materials or require all trucks to maintain at least two feet of freeboard (i.e., the minimum required space between the top of the load and the top of the trailer).
- Pave, apply water three times daily (or as sufficient to prevent dust from leaving the site), or apply (non-toxic) soil stabilizers on all unpaved access roads, parking areas, and staging areas at construction sites.
- Sweep daily or as appropriate (with water sweepers using reclaimed water if possible) all paved access roads, parking areas and staging areas at construction sites.
- Sweep streets daily or as appropriate (with water sweepers using reclaimed water if possible) if visible soil material is carried onto adjacent public streets.

Elements of the “enhanced” dust abatement program for project components that disturb four or more acres shall include all of the “basic” measures in addition to the following measures:

- Hydroseed or apply (non-toxic) soil stabilizers to inactive construction areas (previously graded areas inactive for ten days or more).
- Enclose, cover, water twice daily (or as sufficient to prevent dust from leaving the site), or apply (non-toxic) soil stabilizers to exposed stockpiles (dirt, sand, etc.).
- Limit traffic speeds on unpaved roads to 15 miles per hour.
- Install sandbags or other erosion control measures to prevent silt runoff to public roadways.
- Replant vegetation in disturbed areas as quickly as possible.

Elements of the “optional” control measures are strongly encouraged at construction sites that are large in area or located near sensitive receptors, or that for any other reason may warrant additional emissions reductions:

- Install wheel washers for all exiting trucks, or wash off tires or tracks of all trucks and equipment leaving the site.

- Install wind breaks, or plant trees/vegetative wind breaks at windward side(s) of construction areas.
- Suspend excavation and grading activity when winds (instantaneous gusts) exceed 25 miles per hour.
- Limit the area subject to excavation, grading, and other construction activity at any one time.
- Pave all roadways, driveways, sidewalks, etc. as soon as possible. In addition, building pads should be laid as soon as possible after grading unless seeding or soil binders are used.
- Designate a person or persons to monitor the dust control program and to order increased watering, as necessary, to prevent transport of dust off-site. Their duties shall include holidays and weekend periods when work may not be in progress. The names and telephone numbers of such persons shall be provided to the BAAQMD prior to the start of construction.

SPF AQ-1b: To mitigate equipment exhaust emissions, LBNL shall require its construction contractors to comply with the following measures:

- Construction equipment shall be properly tuned and maintained in accordance with manufacturers' specifications.
- Best management construction practices shall be used to avoid unnecessary emissions (e.g., trucks and vehicles in loading and unloading queues would turn their engines off when not in use).
- Any stationary motor sources such as generators and compressors located within 100 feet of a sensitive receptor shall be equipped with a supplementary exhaust pollution control system as required by the BAAQMD and the California Air Resources Board.
- Incorporate use of low-NO_x emitting, low-particulate emitting, or alternatively fueled construction equipment into the construction equipment fleet where feasible, especially when operating near sensitive receptors.
- For all construction projects of more than 10 days' duration, LBNL shall designate and have on-site during construction a qualified air quality manager to oversee the implementation of construction air quality mitigation measures. Alternatively, LBNL may direct the construction contractor(s) to employ and have on site a construction air quality manager acceptable to LBNL.
- Idling time of diesel-powered construction equipment shall be limited to three minutes.
- All diesel engines used by LBNL construction contractor(s) at the site, or for on-road hauling of construction material, shall be post-1996 models.

- On-site power shall be used to minimize reliance on portable generators.
- Offer incentives to encourage construction workers to carpool or employ other means of transportation. The incentives shall include, but are not necessarily limited to, preferential onsite parking and substantial assistance with transportation costs (gas cards, FasTrak toll passes, public transit passes, etc.); charging for parking as a disincentive shall also be explored.
- All construction diesel engines, which have a rating of 100 hp or more, shall meet, at a minimum, the Tier 2 California Emission Standards for Off-Road Compression Ignition Engines as specified in California Code of Regulations, Title 13, section 2423(b)(1) unless certified by the on-site construction air quality manager that such engine is not available for a particular item of equipment. In the event a Tier 2 engine is not available for any off-road equipment larger than 100 hp, that equipment shall be outfitted with a Tier 1 engine. In the event a Tier 1 engine is not available for any off-road equipment larger than 100 hp, that equipment shall be outfitted with a catalyzed diesel particulate filter (soot filter), unless certified by engine manufacturers or the on-site construction air quality manager that the use of such devices is not practical for specific engine types. For purposes of this condition, the use of such devices is “not practical” if, among other reasons:
 - 1 There is no available soot filter that has been certified by either the California Air Resources Board or U.S. Environmental Protection Agency for the engine in question; or
 - 2 The construction equipment is intended to be on-site for ten (10) days or less.

The use of a soot filter may be terminated immediately if one of the following conditions exists, provided that LBNL is informed within one (1) working day of the termination:

- (1) The use of the soot filter is excessively reducing normal availability of the construction equipment due to increased downtime for maintenance, and/or reduced power output due to an excessive increase in backpressure.
- (2) The soot filter is causing or is reasonably expected to cause significant engine damage.
- (3) The soot filter is causing or is reasonably expected to cause a significant risk to workers or the public.
- (4) Any other seriously detrimental cause which has the approval of LBNL prior to the termination being implemented.

Relief may be granted from this requirement if the construction air quality manager can demonstrate to LBNL that a good faith effort has been made to comply with this requirement and that compliance is not possible.

- Include the specifications in this measure in the construction bid documents and contracts.

SPF BIO-3: Direct disturbance, including tree and shrub removal or nest destruction by any other means, or indirect disturbance (e.g., noise, increased human activity in area) of active nests of raptors and other special-status bird species (as listed in EIR Table IV.C-1) within or in the vicinity of the proposed footprint of a future development project shall be avoided in accordance with the following procedures for Pre-Construction Special-Status Avian Surveys and Subsequent Actions. No more than two weeks in advance of any tree or shrub removal or demolition or construction activity involving particularly noisy or intrusive activities (such as concrete breaking) that will commence during the breeding season (February 1 through July 31), a qualified wildlife biologist shall conduct pre-construction surveys of all potential special-status bird nesting habitat in the vicinity of the planned activity and, depending on the survey findings, the following actions shall be taken to avoid potential adverse effects on nesting special-status nesting birds:

1. Pre-construction surveys are not required for demolition or construction activities scheduled to occur during the non-breeding season (August 1 through January 31).
2. If pre-construction surveys indicate that no nests of special-status birds are present or that nests are inactive or potential habitat is unoccupied, no further mitigation is required.
3. If active nests of special-status birds are found during the surveys, a no-disturbance buffer zone will be created around active nests during the breeding season or until a qualified biologist determines that all young have fledged. The size of the buffer zones and types of construction activities restricted within them will be determined through consultation with the CDFW, taking into account factors such as the following:
 - a. Noise and human disturbance levels at the project site and the nesting site at the time of the survey and the noise and disturbance expected during the construction activity;
 - b. Distance and amount of vegetation or other screening between the project site and the nest; and
 - c. Sensitivity of individual nesting species and behaviors of the nesting birds.
4. Noisy demolition or construction activities as described above (or activities producing similar substantial increases in noise and activity levels in the vicinity) commencing during the non-breeding season and continuing into the breeding season do not require surveys (as it is assumed that any breeding birds taking up nests would be acclimated to project-related activities already under way). However, if trees and shrubs are to be removed during the breeding season, the trees and shrubs will be surveyed for nests prior to their removal, according to the survey and protective action guidelines 3a through 3c, above.

5. Nests initiated during demolition or construction activities would be presumed to be unaffected by the activity, and a buffer zone around such nests would not be necessary.
6. Destruction of active nests of special-status birds and overt interference with nesting activities of special-status birds shall be prohibited.
7. The noise control procedures for maximum noise, equipment, and operations identified in Section IV.I, Noise, of this EIR shall be implemented.

SPF BIO-4: Project implementation under the 2006 LRDP shall avoid disturbance to the maternity roosts of special-status bats during the breeding season in accordance with the following procedures for Pre-Construction Special-Status Bat Surveys and Subsequent Actions. No more than two weeks in advance of any demolition or construction activity involving concrete breaking or similarly noisy or intrusive activities, that would commence during the breeding season (March 1 through August 31), a qualified bat biologist, acceptable to the CDFW, shall conduct pre-demolition surveys of all potential special-status bat breeding habitat in the vicinity of the planned activity. Depending on the survey findings, the following actions shall be taken to avoid potential adverse effects on breeding special-status bats:

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

removal, according to the survey and protective action guidelines 1a through 1c, above.

5. Bat roosts initiated during demolition or construction activities are presumed to be unaffected by the activity, and a buffer is not necessary.
6. Destruction of roosts of special-status bats and overt interference with roosting activities of special-status bats shall be prohibited.
7. The noise control procedures for maximum noise, equipment, and operations identified in Section IV.I, Noise, of this EIR shall be implemented.

SPF BIO-5b: Conduct focused pre-construction surveys for the Alameda whipsnake at all project sites within or directly adjacent to areas mapped as having high potential for whipsnake occurrence. Project sites within high potential areas shall be fenced to exclude snakes prior to project implementation. This would not include ongoing and non-site specific activities such as fuel management.

Methods for pre-construction surveys, burrow excavation, and site fencing shall be developed prior to implementation of any project located within or adjacent to areas mapped as having high potential for whipsnake occurrence. Such methods would be developed in consultation or with approval of USFWS for any development taking place in USFWS officially designated Alameda whipsnake critical habitat. Pre-construction surveys of such project sites shall be carried out by a permitted biologist familiar with whipsnake identification and ecology (Swaim, 2002). These are not intended to be protocol-level surveys but designed to clear an area so that individual whipsnakes are not present within a given area prior to initiation of construction. At sites where the project footprint would not be contained entirely within an existing developed area footprint and natural vegetated areas would be disturbed any existing animal burrows shall be carefully hand-excavated to ensure that there are no whipsnakes within the project footprint. Any whipsnakes found during these surveys shall be relocated according to the Alameda Whipsnake Relocation Plan. Snakes of any other species found during these surveys shall also be relocated out of the project area. Once the site is cleared it shall then be fenced in such a way as to exclude snakes for the duration of the project. Fencing shall be maintained intact throughout the duration of the project.

SPF BIO-5c: (1) A full-time designated monitor shall be employed at project sites that are within or directly adjacent to areas designated as having high potential for whipsnake occurrence, or (2) Daily site surveys for Alameda whipsnake shall be carried out by a designated monitor at construction sites within or adjacent to areas designated as having moderate potential for whipsnake occurrence. Each morning, prior to initiating excavation, construction, or vehicle operation at sites identified as having moderate potential for whipsnake occurrence, the project area of applicable construction sites shall be surveyed by a designated monitor trained in Alameda whipsnake identification to ensure that no Alameda whipsnakes are present. This survey is not intended to be a protocol-level survey. All laydown and deposition areas, as well as other areas that might conceal or shelter snakes or other animals, shall be inspected each morning by the designated monitor to ensure that Alameda whipsnakes are not present. At sites in high potential areas the monitor shall remain on-site during construction hours. At sites in moderate potential areas the monitor shall remain on-

call during construction hours in the event that a snake is found on-site. The designated monitor shall have the authority to halt construction activities in the event that a whipsnake is found within the construction footprint until such time as threatening activities can be eliminated in the vicinity of the snake and it can be removed from the site by a biologist permitted to handle whipsnakes. USFWS shall be notified within 24 hours of such event.

SPF BIO-5d: Alameda whipsnake awareness and relevant environmental sensitivity training for each worker shall be conducted by the designated monitor prior to commencement of on-site activities.

All on-site workers at applicable construction sites shall attend an Alameda whipsnake information session conducted by the designated monitor prior to beginning work. This session shall cover identification of the species and procedures to be followed if an individual is found on-site, as well as basic site rules meant to protect biological resources, such as speed limits and daily trash pickup.

SPF BIO-5e: Hours of operation and speed limits shall be instituted and posted.

All construction activities that take place on the ground (as opposed to within buildings) at applicable construction sites shall be performed during daylight hours, or with suitable lighting so that snakes can be seen. Vehicle speed on the construction site shall not exceed 5 miles per hour.

SPF BIO-5f: Site vegetation management shall take place prior to tree removal, grading, excavation, or other construction activities. Construction materials, soil, construction debris, or other material shall be deposited only on areas where vegetation has been mowed.

Areas where development is proposed under the 2006 LRDP are subject to annual vegetation management involving the close-cropping of all grasses and ground covers; this management activity would be performed prior to initiating project-specific construction. Areas would be re-mowed if grass or other vegetation on the project site becomes high enough to conceal whipsnakes during the construction period. In areas not subject to annual vegetation management, dense vegetation would be removed prior to the onset of grading or the use of any heavy machinery, using goats, manual brush cutters, or a combination thereof.

SPF CUL-3: If an archaeological artifact is discovered on-site during construction under the proposed LRDP, all activities within a 50-foot radius shall be halted and a qualified archaeologist shall be summoned within 24 hours to inspect the site. If the find is determined to be significant and to merit formal recording or data collection, adequate time and funding shall be devoted to salvage the material. Any archaeologically important data recovered during monitoring shall be cleaned, catalogued, and analyzed, with the results presented in a report of finding that meets professional standards.

SPF CUL-4: In the event that human skeletal remains are uncovered during construction or groundbreaking activities resulting from implementation of the 2006 LRDP at the LBNL site, CEQA Guidelines Section 15064.5(e)(1) shall be followed:

- In the event of the accidental discovery or recognition of any human remains in any location other than a dedicated cemetery, the following steps should be taken:

1. There shall be no further excavation or disturbance of the site or any nearby area reasonably suspected to overlie adjacent human remains until:
 - (A) The coroner of the county in which the remains are discovered must be contacted to determine that no investigation of the cause of death is required, and
 - (B) If the coroner determines the remains to be Native American: (1) The coroner shall contact the Native American Heritage Commission within 24 hours. (2) The Native American Heritage Commission shall identify the person or persons it believes to be the most likely descended from the deceased Native American. (3) The most likely descendent may make recommendations to the landowner or the person responsible for the excavation work, for means of treating or disposing of, with appropriate dignity, the human remains and any associated grave goods as provided in Public Resources Code Section 5097.98, or
2. Where the following conditions occur, the landowner or his authorized representative shall rebury the Native American human remains and associated grave goods with appropriate dignity on the property in a location not subject to further subsurface disturbance.
 - (A) The Native American Heritage Commission is unable to identify a most likely descendent or the most likely descendent failed to make a recommendation within 24 hours after being notified by the commission;
 - (B) The descendant identified fails to make a recommendation; or
 - (C) The landowner or his authorized representative rejects the recommendation of the descendant, and the mediation by the Native American Heritage Commission fails to provide measures acceptable to the landowner.

SPF GEO-2: A site-specific, design-level geotechnical investigation shall occur during the design phase of each LBNL building project, and prior to approval of new building construction within the LBNL hill site. This investigation shall be conducted by a licensed geotechnical engineer and include a seismic evaluation of potential maximum ground motion at the site. Geotechnical investigations for sites within either a Seismic Hazard Zone for landslides or an area of historic landslide activity at LBNL, as depicted on Figures IV.E-2 and IV.E-3, or newly recognized areas of slope instability at the inception of project planning, shall incorporate a landslide analysis in accordance with CGS Publication 117. Geotechnical recommendations shall subsequently be incorporated into building design.

Earthquakes and groundshaking in the Bay Area are unavoidable and may occur at some time during the period covered by the LRDP. Although some structural damage is typically not avoidable, building codes and local construction requirements have been established to protect against building collapse and to minimize injury during a seismic event. Considering that the future individual buildings would be constructed in conformance with the California Building Code, LBNL requirements, federal regulations and guidelines, and Mitigation Measure GEO-2, the risks of injury and structural damage from groundshaking and

earthquake-induced landsliding would be reduced and the impacts, therefore, would be considered less than significant.

Furthermore, as described in the Project Description, some of the buildings constructed pursuant to the LRDP would be occupied by staff relocated from other, older LBNL facilities, some of which were constructed in accordance with less stringent building code requirements than those that would apply to future construction. As of 2003, 14 percent of LBNL buildings were over 60 years old. Many of these buildings were constructed as temporary structures that were never replaced. The LRDP specifically proposes the demolition of some 30 outdated buildings that together include approximately 250,000 square feet. In this regard, implementation of the LRDP would result in a beneficial seismic safety impact.

SPF GEO-3a: Construction under the LRDP shall be required to use construction best management practices and standards to control and reduce erosion. These measures could include, but are not limited to, restricting grading to the dry season, protecting all finished graded slopes from erosion using such techniques as erosion control matting and hydroseeding or other suitable measures.

SPF GEO-3b: Revegetation of areas disturbed by construction activities, including slope stabilization sites, using native shrubs, trees, and grasses, shall be included as part of all new projects.

SPF GHG-1: Berkeley Lab shall monitor GHG emissions each year and develop or purchase renewable energy (RE) and/or purchase renewable energy certificates (REC) or other verifiable GHG offsets in the amount of at least 35,092 MTCO_{2e}/year by the end of FY 2021 to reduce GHG emissions from Building 59.

SPF HAZ-3a: LBNL shall continue to prepare an annual self-assessment summary report and a Site Environmental Report that summarize environment, health, and safety program performance and identify any areas where LBNL is not in compliance with environmental laws and regulations governing hazardous materials, and worker safety, emergency response, and environmental protection.

An EH&S assessment of LBNL activities is performed annually, and these results are reported annually in the LBNL Self-Assessment Report. In addition, LBNL prepares an annual Site Environmental Report that describes the environmental activities noted above. Implementation of this measure would ensure that the information in the LBNL Self Assessment and Site Environmental Reports continues to be collected, reviewed, and provided.

SPF HAZ-3b: Prior to shipping hazardous materials to a hazardous waste treatment, storage, or disposal facility, LBNL shall confirm that the facility is licensed to receive the type of waste LBNL is proposing to ship.

LBNL is required by DOE Order 435.1 to verify that the receiving facility has all appropriate licenses and that the waste meets all waste acceptance criteria of the receiving facility.

SPF HAZ-3c: LBNL shall require hazardous waste haulers to provide evidence that they are appropriately licensed to transport the type of wastes being shipped from LBNL.

Shipping procedures at LBNL require all transporters of hazardous, radioactive, and mixed waste to provide evidence that they are appropriately licensed.

SPF HAZ-3d: LBNL shall continue its waste minimization programs and strive to identify new and innovative methods to minimize hazardous waste generated by LBNL activities.

Each LBNL Division is required to identify and implement new waste minimization activities each year. The waste minimization program at LBNL reduced hazardous waste by 72% during the period 1993-2004.

SPF HAZ-3e: In addition to implementing the numerous employee communication and training requirements included in regulatory programs, LBNL shall undertake the following additional measures as ongoing reminders to workers of health and safety requirements:

- Continue to post phone numbers of LBNL EH&S subject matter experts on the EH&S website.¹
- Continue to post Emergency Response and Evacuation Plans in all LBNL buildings.
- Continue to post sinks, in areas where hazardous materials are handled, with signs reminding users that hazardous materials and wastes cannot be poured down the drain.
- Continue to post dumpsters and central trash collection areas where hazardous materials are handled with signs reminding users that hazardous wastes cannot be disposed of as trash.

SPF HAZ-3f: LBNL shall update its emergency preparedness and response program on an annual basis and shall provide copies of this program to local emergency response agencies and to members of the public upon request.

SPF NOISE-1a: To reduce daytime noise impacts due to construction/demolition, LBNL shall require construction/demolition contractors to implement noise reduction measures appropriate for the project being undertaken. Measures that might be implemented could include, but not be limited to, the following:

- Construction/demolition activities would be limited to a schedule that minimizes disruption to uses surrounding the project site as much as possible. Such activities would be limited to the hours designated in the Berkeley and/or Oakland noise ordinance(s), as applicable to the location of the project. This would eliminate or substantially reduce noise impacts during the more noise-sensitive nighttime hours and on days when construction noise might be more disturbing.
- To the maximum extent feasible, equipment and trucks used for project construction shall utilize the best available noise control techniques (e.g., improved mufflers,

¹ This mitigation measure has been slightly altered from the previous wording of "Post, in areas where hazardous materials are handled, phone numbers of LBNL offices that can assist in proper handling and emergency response information."

equipment redesign, use of intake silencers, ducts, engine enclosures and acoustically-attenuating shields or shrouds, wherever feasible).

- Stationary noise sources shall be located as far from adjacent receptors as possible.
- At locations where noise may affect neighboring residential uses, LBNL will develop a comprehensive construction noise control specification to implement construction/demolition noise controls, such as noise attenuation barriers, siting of construction laydown and vehicle staging areas, and community outreach, as appropriate to specific projects. The specification will 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. This document will be modified as appropriate for a particular construction project and included within the construction specification.

SPF NOISE-1b: For each subsequent project pursuant to the LRDP that would involve construction and/or demolition activities, LBNL shall engage a qualified noise consultant to determine whether, based on the location of the site and the activities proposed, construction/demolition noise levels could approach the property-line receiving noise standards of the cities of Berkeley or Oakland (as applicable). If the consultant determines that the standards would not be exceeded, no further mitigation is required. If the standards would be reached or exceeded absent further mitigation, one or more of the following additional measures would be required, as determined necessary by the noise consultant.

- Stationary noise sources shall be muffled and enclosed within temporary sheds, incorporate insulation barriers, or other measures to the extent feasible.
- Impact tools (e.g., jack hammers, pavement breakers, and rock drills) used for project construction shall be hydraulically or electrically powered wherever possible to avoid noise associated with compressed air exhaust from pneumatically powered tools. However, where use of pneumatic tools is unavoidable, an exhaust muffler on the compressed air exhaust shall be used; this muffler can lower noise levels from the exhaust by up to about 10 dBA. External jackets on the tools themselves shall be used where feasible, and this could achieve a reduction of 5 dBA. Quieter procedures shall be used, such as drills rather than impact equipment, whenever feasible.
- Noise from idling trucks shall be kept to a minimum. No trucks shall be permitted to idle for more than 10 minutes if waiting within 100 feet of a residential area.
- If determined necessary by the noise consultant, a set of site-specific noise attenuation measures shall be developed before construction begins; possible measures might include erection of temporary noise barriers around the construction site, use of noise control blankets on structures being erected to reduce noise emission from the site, evaluation of the feasibility of noise control at the receivers by temporarily improving the noise reduction capability of adjacent buildings, and monitoring the effectiveness of noise attenuation measures by taking noise measurements.
- If determined necessary by the noise consultant, at least two weeks prior to the start of excavation, LBNL or its contractor shall provide written notification to all neighbors within 500 feet of the construction site. The notification shall indicate the estimated

duration and completion date of the construction, construction hours, and necessary contact information for potential complaints about construction noise (i.e., name, telephone number, and address of party responsible for construction). The notice shall indicate that noise complaints resulting from construction can be directed to the contact person identified in the notice. The name and phone number of the contact person also shall be posted outside the LBNL boundaries.

SPF NOISE-4: Mechanical equipment shall be selected and building designs prepared for all future development projects pursuant to the 2006 LRDP so that noise levels from future building and other facility operations would not exceed the Noise Ordinance limits of the cities of Berkeley or Oakland for commercial areas or residential zones as measured on any commercial or residential property in the area surrounding the future LRDP project. Controls that would typically be incorporated to attain adequate noise reduction would include selection of quiet equipment, sound attenuators on fans, sound attenuator packages for cooling towers and emergency generators, acoustical screen walls, and equipment enclosures.

SPF TRANS-1a: LBNL shall work with UC Berkeley and the City of Berkeley to design and install a signal at the Gayley Road/Stadium Rim Way intersection, when a signal warrant analysis shows that the signal is needed. LBNL shall contribute funding on a fairshare basis, to be determined in consultation with UC Berkeley and the City of Berkeley, for a periodic (annual or biennial) signal warrant check to allow the City to determine when a signal is warranted, and for installation of the signal. Should the City determine that alternative mitigation strategies may reduce or avoid the significant impact, the Lab shall work with the City and UC Berkeley to identify and implement such alternative feasible measure(s). See also Mitigation Measure TRANS-1d, development and implementation of a new Transportation Demand Management Program.

SPF TRANS-1b: LBNL shall work with the City of Berkeley to design and install a signal at the Durant Avenue/Piedmont Avenue intersection, when a signal warrant analysis shows that the signal is needed. LBNL shall contribute funding, on a fairshare basis, to be determined in consultation with UC Berkeley and the City of Berkeley, for a periodic (annual or biennial) signal warrant check to allow the City to determine when a signal is warranted, and for installation of the signal. Should the City determine that alternative mitigation strategies may reduce or avoid the significant impact, the Lab shall work with the City and UC Berkeley to identify and implement such alternative feasible measure(s). See also Mitigation Measure TRANS-1d, development and implementation of a new Transportation Demand Management Program.

SPF TRANS-1c: LBNL shall fund and conduct a study to evaluate whether there may be feasible mitigation (with design standards acceptable to the City) at the intersection of Hearst Avenue at Gayley Road/La Loma Avenue. This intersection is currently signalized, and physical geometric limitations constrain improvements within its current right-of-way. All four corners of this intersection are occupied by existing UC Berkeley facilities, including Foothill Student Housing, Cory Hall, and outdoor tennis courts, as well as the Founders' Rock. The LOS analyses herein used conservative assumptions so as to not underestimate potential project impacts. For example, even though the approach widths at this intersection allow drivers to maneuver past other vehicles as they near the intersection, the absence of pavement striping to delineate separate lanes dictated that the analysis conservatively assume all vehicle movements on each approach are made on a single lane. Similarly, without the certainty

that standard lane widths (and adequate storage lengths) could be provided, possible improvement measures were not relied on to judge that significant impacts would be mitigated to less than significant levels. Judging the success of possible mitigation measures with a conservative standard is reasonable, but in consultation with City of Berkeley staff, the Lab will conduct a further study to re-evaluate whether there may be feasible mitigation (with design standards acceptable to the City) at this intersection. That additional study will be conducted by the Lab as part of the TDM program set forth below as Mitigation Measure TRANS-1d. If such mitigation is determined by Berkeley Lab to be feasible, then Berkeley Lab shall contribute funding on a fair-share basis, to be determined in consultation with UC Berkeley and the City of Berkeley, for the installation of the improvements.

SPF TRANS-1d: LBNL shall develop and implement a new TDM Program to replace its existing TDM program. This enhanced TDM Program has been drafted in consultation with the City of Berkeley, and is proposed to be adopted by the Lab following The Regents' consideration of the 2006 LRDP. The proposed TDM Program includes several implementation phases tied to the addition of parking to LBNL. The final provisions of the TDM Program may be revised as it is finally adopted but will include a TDM coordinator and transportation committee, an annual inventory of parking spaces and a gate count, a study of more aggressive TDM measures, investigation of a possible parking fee, investigation of sharing services with UC Berkeley and an alternative fuels program. The TDM program shall also include funding of a study to reevaluate the feasibility of mitigation at the Hearst and Gayley/LaLoma intersection. The new draft proposed TDM Program also includes a requirement that LBNL conduct an additional traffic study to reevaluate traffic impacts on the earliest to occur of 10 years following the certification of this EIR or the time at which the Lab formally proposes a project that will bring total development of parking spaces pursuant to the 2006 LRDP to or above 375 additional parking spaces.

SPF TRANS-1e: LBNL will work with the City of Berkeley to design and install a signal at the Bancroft Way/Piedmont Avenue intersection and provide an exclusive left-turn lane and an exclusive through lane on the northbound approach when a signal warrant analysis shows that the signal is needed. LBNL shall contribute funding, on a fair-share basis, to be determined in consultation with UC Berkeley and the City of Berkeley, for a periodic (annual or biennial) signal warrant check to allow the City to determine when a signal is warranted, and for installation of the signal. Should the City determine that alternative mitigation strategies may reduce or avoid the significant impact, the Lab shall work with the City and UC Berkeley to identify and implement such alternative feasible measure(s). See also Mitigation Measure TRANS-1d, development and implementation of a new Transportation Demand Management Program.

SPF TRANS-3: LBNL shall develop and maintain a transportation plan designed to ensure that the current balance of transportation modes is maintained. This plan shall include 1) maintaining the same (or lesser) ratio of parking permits and parking spaces to average daily population (ADP), and 2) ensuring that levels of shuttle bus service and provision of bike racks on shuttle buses are sufficient to accommodate projected demand.

SPF TRANS-8: LBNL shall implement LRDP MM TRANS-1a (work with UC Berkeley and the City of Berkeley to design and install a signal at the Gayley Road/Stadium Rim Way intersection; LBNL would contribute funding on a fair share basis, to be determined in consultation with UC Berkeley and the City of Berkeley, to install the signal); LRDP MM TRANS-1b (work with

the City of Berkeley to design and install a signal at the Durant Avenue/Piedmont Avenue intersection, when a signal warrant analysis shows that the signal is needed); and LRDP MM TRANS-1e (work with the City of Berkeley to design and install a signal at the Bancroft Way/Piedmont Avenue intersection when a signal warrant analysis shows that the signal is needed). LBNL would contribute funding on a fair-share basis, to be determined in consultation with UC Berkeley and the City of Berkeley, to install the signal and for monitoring to determine when a signal is warranted.

SPF UTILS-4: LBNL shall develop a plan for maximizing diversion of construction and demolition materials associated with the construction of the proposed project from landfill disposal.

APPENDIX B
Air Quality and Greenhouse Gas Emissions Calculations

ILLINGWORTH & RODKIN, INC.
Acoustics • Air Quality

429 E. Cotati Avenue
Cotati, CA 94931

Tel: 707-794-0400
www.illingworthrodkin.com

Fax: 707-794-0405
illro@illingworthrodkin.com

April 23, 2020
Revised July 7, 2020

Shabnam Barati
Barati Consulting, LLC
35688 Barnard Dr.
Fremont, CA 94536

VIA E-Mail: shabnam@baraticonsulting.com

SUBJECT: **LBNL SSM Project Welcome Center in Berkeley, CA –
Air Pollutant and Greenhouse Gas Emissions Analysis – I&R #20-053**

Dear Shabnam:

This letter presents the prediction of air pollutant and greenhouse gas (GHG) emissions associated with the New Welcome Center that would be constructed under the Seismic Safety Modernization (SSM) Project at the Lawrence Berkeley National Laboratory (LBNL). We understand that the SSM project consists of the demolition of the existing Building 54 Cafeteria, the construction of a new approximately 46,500 square foot (sf) Welcome Center in its place. The Welcome Center Building will house the LBNL Campus Central Cafeteria, Health Services Department, Human Resources Department, and also contain a Conference Center. The project replaces the existing 14,848 sf Building 54. The new Welcome Center will be a two-story building with a partial basement. All the employees in the new building are already located at the LBNL; therefore, there would be no increase in Lab population or vehicle trips. The new building will be all electric, including the kitchen in the Cafeteria with natural gas to be used only in the kitchen cooktop. The heating and cooling system is designed to be based on air- or water-cooled chillers that would operate on electricity.

The primary source of criteria air pollutant emissions would be the construction activities associated with the project. There would be minimal to no increase in criteria air pollutant emissions from project operations because there would be no increase in vehicle trips due to the project, natural gas use would be small, and there are no stationary or area sources of criteria air pollutants such as generators, boilers and heating systems associated with the project. Emissions from landscape and building maintenance would not be substantially higher from what they are at the present time. Therefore, criteria air pollutant emissions were not estimated but would be considered near zero or a net decrease when compared to the existing facility.

The primary source of GHG emissions would be from long-term operation of the project. Operational GHG emissions would result mainly from electricity used in the new facility, and electricity usage associated with water usage and solid waste generation. This analysis of criteria

air pollutant and GHG emissions was conducted following guidance provided by the Bay Area Air Quality Management District (BAAQMD).¹

Construction Emissions (Criteria Air Pollutants and GHG)

The California Emissions Estimator Model, Version 2016.3.2 (CalEEMod) was used to estimate construction emissions. CalEEMod is a computer model developed by the South Coast Air Quality Management District with cooperation of other California Air Districts to estimate criteria air pollutant and GHG emissions from land use development projects. The model is recommended by the BAAQMD for use in estimating emissions from land use development projects. The following information was used in CalEEMod to estimate construction emissions.

The preliminary construction schedule for the project includes: (1) Start site retaining walls in September 2021 and Building 54 demolition in October 2021, (2) Building construction starts June 2022 and completes June 2024, (3) site utilities are installed from July 2022 to March 2024. Overall, construction would occur over a duration of about 2 years and 10 months. The project equipment usage was based on CalEEMod default for a project of this size and type. The project proposed land uses were entered as:

1. “High Turnover (Sit Down Restaurant)” of 20,000 sf to represent the cafeteria
2. “Medical Office Building” of 8,200 sf to represent the Health Services portion of the project
3. “General Office Building” of 17,800 sf to represent the Human Resources, Conference Center and Shared spaces of the building.

CalEEMod default acreages were used in the modeling that totaled 2.3 acres.

A construction start date of 9/1/2021 was used in the modeling with all construction activity condensed into a 260-workday schedule. The active construction schedule is based on the CalEEMod default assignments. A longer schedule would result in lower average daily emissions. The estimated construction emissions are presented in Table 1.

Table 1. Construction Period Emissions

Scenario	ROG	NOx	PM ₁₀ Exhaust	PM _{2.5} Exhaust	GHG
Total Construction Emissions (tons)	0.49 tons	2.09 tons	0.10 tons	0.09 tons	308 MT
Average Daily Emissions (pounds/day) ¹	3.8 lbs./day	16.1 lbs./day	0.8 lbs./day	0.7 lbs./day	--
<i>BAAQMD Thresholds (pounds per day)</i>	54 lbs./day	54 lbs./day	82 lbs./day	54 lbs./day	--
Exceed Threshold?	No	No	No	No	No

Note: ROG = reactive organic gases, NOx = nitrogen oxides, PM₁₀ = course particulate matter or particulates with an aerodynamic diameter of 10 micrometers (µm) or less, PM_{2.5} = fine particulate matter or particulates with an aerodynamic diameter of 2.5µm or less. GHG = greenhouse gases.

All of the criteria air pollutant emissions would be well below the thresholds set forth by the BAAQMD.

With regard to GHG emissions, construction of the project would emit a total of 308 metric tons

¹ BAAQMD, 2017. *BAAQMD CEQA Air Quality Guidelines*. May.

of CO₂e. Neither the LBNL nor the BAAQMD have established quantitative thresholds to evaluate GHG emissions from construction activities. However, the emissions would be below the lowest numeric threshold of 1,100 CO₂e set forth by the BAAQMD and could be considered less-than-significant. The BAAQMD recommends quantifying emissions and disclosing that GHG emissions would occur during construction. The BAAQMD also encourages the incorporation of best management practices to reduce GHG emissions during construction where feasible and applicable. All new projects at LBNL are required to comply with the campus sustainability standards, which provide a practical path towards meeting both the DOE Guiding Principles requirements and the University of California Policy on Sustainable Practices. The Welcome Center will comply with the following requirements:

- Meet LBNL Sustainability Standards for New Construction, April 29, 2019
- Follow LBNL Implementation Guide to the Berkeley Lab Sustainability Standards for New Construction, March 2019
- Achieve LEED Gold Certification

Project Operational Emissions (GHG)

CalEEMod was also used to estimate full build-out operational GHG emissions, shown in Table 2. Unless otherwise noted below, the model defaults for Alameda County were used. The year 2024 was used for modeling, as this assumed to be the first full year after construction that the project could be operational. Annual emissions occurring after 2024 would be lower as electricity production emission rates are anticipated to continually decrease. CalEEMod estimates emissions for mobile, areas sources, electricity consumption, natural gas combustion, electricity usage associated with water usage and wastewater discharge, and solid waste land filling and transport. Table 2 summarizes annual operational GHG emissions due to implementation of the project. Inputs to the GHG modeling are described below.

Traffic

The project would serve the existing LBNL campus; therefore, new traffic is not anticipated. The project traffic trip generation rates for each land use were set to 0.

Energy, Natural Gas, Water Usage and Solid Waste Production

. The project is anticipated to exceed current Title 24 Building Standards since it will achieve LEED Gold Certification, exceed new Federal requirements by 30 percent and design for an Energy Use Intensity (EUI) that is 50% lower than the established benchmark. Project projections are that the project would consume 818,121 kilowatts of electricity per year. Indirect emissions from electricity were computed in CalEEMod based on the eGRID2018 intensity rate for GHG emissions of carbon dioxide (CO₂), methane CH₄ and nitrous oxide (N₂O), collectively referred to as CO₂e when considering their global weighting potentials. This 2018 rate of 496.5 pounds of CO₂ per megawatt of electricity delivered was used in the CalEEMod modeling.

New building or major renovations on the LBNL campus are required to avoid use of onsite fossil fuel combustion for space or water heating. To meet this target, an all-electric design is proposed for the Welcome Center. However, the Cafeteria kitchen cooktop is assumed to use natural gas.

The project is required to reduce indoor water use by 30-40% over the LEED baseline, to reduce appliance and process use where possible, and to implement landscaping that does not require a permanent irrigation system. Water/wastewater use were changed to 100% aerobic conditions to represent treatment by a wastewater treatment plant. Indoor water usage was assumed to be 30% lower than the default CalEEMod rate. Drought tolerant plantings and efficient irrigation systems were assumed in the modeling, as reflected in the CalEEMod mitigation tab.

Default model assumptions for emissions associated with solid waste generation use were applied to the project and then reduced by 80% to reflect the Zero Waste Plan will be developed by LBNL to help implement campus zero waste goals. This effect was also reflected in the CalEEMod mitigation tab.

Existing B54 Cafeteria Building

CalEEMod was used to model the GHG emissions from the current building use. This includes the 14,850-sf building modeled as a “High Turnover (Sit Down Restaurant)” using CalEEMod default values. The trip generation rate was set to 0 since the use currently serves only the campus and the Welcome Center would continue that function. The existing facility currently consumes 895,818 kilowatts of electricity per year.

Table 2. Annual Operational GHG Emissions in Metric Tons of CO₂e

Source	Existing Cafeteria Emissions	Welcome Center Emissions
Area	<1	<1
Energy Consumption	223	300
Mobile	0	0
Solid Waste	89	35
Water	9	15
Total	321	350
Net New Emissions		29

As shown in Table 2, the proposed project would have direct and indirect GHG emissions that are below the GHG operational threshold (1,100 metric tons of CO₂e per year) recommended by BAAQMD for new projects. GHG emissions associated with the new building are anticipated to be slightly higher than the emissions from the current Building 54 since the square footage would be much greater. Note that the emissions associated with solid waste generation for the project may be overestimated since the campus policies to reduce waste generation likely apply to this use currently. In any event, the project’s GHG emissions would *not significantly* contribute to a cumulative impact on global climate change.

Energy

Project construction and operation energy usage is shown in Table 3.

Construction

Construction equipment usage, where the horsepower hours are converted to British Thermal Units (BTU) and

Construction worker and truck travel in trips per day and average trip length. The total vehicle miles travelled for these trips are computed. Gallons of gasoline and gallons of diesel are computed, based on average fleet fuel use, and converted to BTUs

Operation

CalEEMod reports operational electricity and natural gas consumption in BTUs or kilojoules that are converted to BTUs. The model also reports annual vehicle miles travelled (VMT) where gallons of gasoline and gallons of diesel are computed, based on average fleet fuel use, and converted to BTUs.

Table 3. Project Construction and Annual Operational Energy Demand

Energy Usage	Estimated Demand	Estimated 2022 Demand in MM Btu	Source
Project Construction			
Diesel from Construction Equipment	517,943 HP hours	1,318	Computed from CalEEMod HP and hours/days
Diesel from Truck Hauling	13,048 VMT	205	Computed from CalEEMod Worker Vendor and Haul truck trip rates and EMFAC2017 average fuel economy of 25.5 mpg vehicle and 5.8 mpg diesel trucks
Gasoline from Worker Travel	45,889 VMT	307	
Construction Total		1,830	
Project Operation			
Natural Gas	2,560,400kBtu	2,560	CalEEMod
Electricity Unmitigated	1718,121 kWh	2,450	Project projected electricity usage
Vehicle Travel (gasoline, and diesel vehicles)	0 annual miles travelled	0	Project will not increase traffic
Total		5,010	
Existing Operation			
Natural Gas	2,493,280 kBtu	2,493	CalEEMod
Electricity	395,818 kWh	1,350	Historical electricity usage
Vehicle Travel (gasoline, diesel and electric vehicles)	0 annual miles travelled Facility serves users of the campus only	0	No traffic generation
Total		3,843	
Net Change (Operational)		1,167	

* * *

This concludes our assessment of the GHG impacts from this project. If you have any questions or comments, please feel free to contact me at (707) 794-0400. We appreciate the opportunity to assist you.

Sincerely,

James A. Reyff
Principal Consultant
Illingworth & Rodkin, Inc.

Attachment 1: CalEEMod Outputs
Attachment 2: Construction Energy Calculations

I&R Project: 20-053

Attachment 1: CalEEMod Outputs

LBNL Welcome Center Building - Alameda County, Annual

LBNL Welcome Center Building
Alameda County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
General Office Building	17.80	1000sqft	0.00	17,800.00	0
Medical Office Building	8.20	1000sqft	0.00	8,200.00	0
High Turnover (Sit Down Restaurant)	20.00	1000sqft	2.30	20,000.00	0

1.2 Other Project Characteristics

Urbanization	Urban	Wind Speed (m/s)	2.2	Precipitation Freq (Days)	63
Climate Zone	5			Operational Year	2024
Utility Company	Pacific Gas & Electric Company				
CO2 Intensity (lb/MWhr)	496.5	CH4 Intensity (lb/MWhr)	0.029	N2O Intensity (lb/MWhr)	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics - Egrid rate

Land Use - Use default acreage withrounded square footage from Table 3-1 of Design Report

Vehicle Trips - No New Traffic

Energy Use - No natural gas usage. LEED Gold, consuming 718,121 kw/year assigned to restaurant portion of building at 35.9061 kwhr/sf/yr

Energy Mitigation -

Water Mitigation -

Waste Mitigation -

Water And Wastewater - WTP treatment

Table Name	Column Name	Default Value	New Value
tblEnergyUse	LightingElect	3.58	0.00
tblEnergyUse	LightingElect	5.34	0.00
tblEnergyUse	LightingElect	3.58	0.00
tblEnergyUse	NT24E	4.80	0.00
tblEnergyUse	NT24E	20.97	35.91
tblEnergyUse	NT24E	4.80	0.00
tblEnergyUse	NT24NG	1.01	0.00
tblEnergyUse	NT24NG	1.01	0.00
tblEnergyUse	T24E	4.10	0.00
tblEnergyUse	T24E	2.67	0.00
tblEnergyUse	T24E	4.10	0.00
tblEnergyUse	T24NG	18.32	0.00
tblEnergyUse	T24NG	39.90	0.00
tblEnergyUse	T24NG	18.32	0.00
tblLandUse	LotAcreage	0.41	0.00
tblLandUse	LotAcreage	0.19	0.00
tblLandUse	LotAcreage	0.46	2.30
tblProjectCharacteristics	CO2IntensityFactor	641.35	496.5
tblVehicleTrips	ST_TR	2.46	0.00
tblVehicleTrips	ST_TR	158.37	0.00
tblVehicleTrips	ST_TR	8.96	0.00
tblVehicleTrips	SU_TR	1.05	0.00
tblVehicleTrips	SU_TR	131.84	0.00
tblVehicleTrips	SU_TR	1.55	0.00
tblVehicleTrips	WD_TR	11.03	0.00
tblVehicleTrips	WD_TR	127.15	0.00
tblVehicleTrips	WD_TR	36.13	0.00
tblWater	AerobicPercent	87.46	100.00

tblWater	AerobicPercent	87.46	100.00
tblWater	AerobicPercent	87.46	100.00
tblWater	AnaerobicandFacultativeLagoonsPercent	2.21	0.00
tblWater	AnaerobicandFacultativeLagoonsPercent	2.21	0.00
tblWater	AnaerobicandFacultativeLagoonsPercent	2.21	0.00
tblWater	SepticTankPercent	10.33	0.00
tblWater	SepticTankPercent	10.33	0.00
tblWater	SepticTankPercent	10.33	0.00

2.0 Emissions Summary

2.1 Overall Construction

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2021	0.0909	0.7846	0.6413	1.1900e-003	0.0289	0.0384	0.0673	0.0122	0.0364	0.0486	0.0000	101.7399	101.7399	0.0207	0.0000	102.2571
2022	0.4012	1.2977	1.2685	2.4000e-003	0.0158	0.0596	0.0753	4.2900e-003	0.0570	0.0613	0.0000	202.4550	202.4550	0.0359	0.0000	203.3523
Maximum	0.4012	1.2977	1.2685	2.4000e-003	0.0289	0.0596	0.0753	0.0122	0.0570	0.0613	0.0000	202.4550	202.4550	0.0359	0.0000	203.3523

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					

2021	0.0909	0.7846	0.6413	1.1900e-003	0.0289	0.0384	0.0673	0.0122	0.0364	0.0486	0.0000	101.7398	101.7398	0.0207	0.0000	102.2570
2022	0.4012	1.2977	1.2685	2.4000e-003	0.0158	0.0596	0.0753	4.2900e-003	0.0570	0.0613	0.0000	202.4548	202.4548	0.0359	0.0000	203.3521
Maximum	0.4012	1.2977	1.2685	2.4000e-003	0.0289	0.0596	0.0753	0.0122	0.0570	0.0613	0.0000	202.4548	202.4548	0.0359	0.0000	203.3521

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Percent Reduction	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Quarter	Start Date	End Date	Maximum Unmitigated ROG + NOX (tons/quarter)	Maximum Mitigated ROG + NOX (tons/quarter)
1	9-1-2021	11-30-2021	0.6581	0.6581
2	12-1-2021	2-28-2022	0.5773	0.5773
3	3-1-2022	5-31-2022	0.5710	0.5710
4	6-1-2022	8-31-2022	0.5587	0.5587
5	9-1-2022	9-30-2022	0.2126	0.2126
		Highest	0.6581	0.6581

2.2 Overall Operational Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	0.2037	0.0000	4.2000e-004	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	8.2000e-004	8.2000e-004	0.0000	0.0000	8.8000e-004
Energy	0.0138	0.1255	0.1054	7.5000e-004		9.5400e-003	9.5400e-003		9.5400e-003	9.5400e-003	0.0000	298.3600	298.3600	0.0121	4.4600e-003	299.9905
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Waste						0.0000	0.0000		0.0000	0.0000	69.6482	0.0000	69.6482	4.1161	0.0000	172.5505
Water						0.0000	0.0000		0.0000	0.0000	3.6312	14.4952	18.1263	0.0133	8.0700e-003	20.8653

Total	0.2175	0.1255	0.1059	7.5000e-004	0.0000	9.5400e-003	9.5400e-003	0.0000	9.5400e-003	9.5400e-003	73.2794	312.8559	386.1353	4.1415	0.0125	493.4072
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Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	0.2037	0.0000	4.2000e-004	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	8.2000e-004	8.2000e-004	0.0000	0.0000	8.8000e-004
Energy	0.0138	0.1255	0.1054	7.5000e-004		9.5400e-003	9.5400e-003		9.5400e-003	9.5400e-003	0.0000	298.3600	298.3600	0.0121	4.4600e-003	299.9905
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Waste						0.0000	0.0000		0.0000	0.0000	13.9297	0.0000	13.9297	0.8232	0.0000	34.5101
Water						0.0000	0.0000		0.0000	0.0000	2.5418	10.7431	13.2849	9.3800e-003	5.6600e-003	15.2053
Total	0.2175	0.1255	0.1059	7.5000e-004	0.0000	9.5400e-003	9.5400e-003	0.0000	9.5400e-003	9.5400e-003	16.4715	309.1039	325.5754	0.8447	0.0101	349.7067

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Percent Reduction	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	77.52	1.20	15.68	79.60	19.23	29.12

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Demolition	Demolition	9/1/2021	9/28/2021	5	20	
2	Site Preparation	Site Preparation	9/29/2021	10/1/2021	5	3	
3	Grading	Grading	10/2/2021	10/11/2021	5	6	
4	Building Construction	Building Construction	10/12/2021	8/15/2022	5	220	
5	Paving	Paving	8/16/2022	8/29/2022	5	10	

6	Architectural Coating	Architectural Coating	8/30/2022	9/12/2022	5	10
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Acres of Grading (Site Preparation Phase): 4.5

Acres of Grading (Grading Phase): 3

Acres of Paving: 0

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 69,000; Non-Residential Outdoor: 23,000; Striped Parking Area: 0

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Demolition	Concrete/Industrial Saws	1	8.00	81	0.73
Demolition	Rubber Tired Dozers	1	8.00	247	0.40
Demolition	Tractors/Loaders/Backhoes	3	8.00	97	0.37
Site Preparation	Graders	1	8.00	187	0.41
Site Preparation	Scrapers	1	8.00	367	0.48
Site Preparation	Tractors/Loaders/Backhoes	1	7.00	97	0.37
Grading	Graders	1	8.00	187	0.41
Grading	Rubber Tired Dozers	1	8.00	247	0.40
Grading	Tractors/Loaders/Backhoes	2	7.00	97	0.37
Building Construction	Cranes	1	8.00	231	0.29
Building Construction	Forklifts	2	7.00	89	0.20
Building Construction	Generator Sets	1	8.00	84	0.74
Building Construction	Tractors/Loaders/Backhoes	1	6.00	97	0.37
Building Construction	Welders	3	8.00	46	0.45
Paving	Cement and Mortar Mixers	1	8.00	9	0.56
Paving	Pavers	1	8.00	130	0.42
Paving	Paving Equipment	1	8.00	132	0.36
Paving	Rollers	2	8.00	80	0.38
Paving	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Architectural Coating	Air Compressors	1	6.00	78	0.48

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class	
Demolition		5	13.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Site Preparation		3	8.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Grading		4	10.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction		8	17.00	8.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Paving		6	15.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating		1	3.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

3.2 Demolition - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0199	0.1970	0.1449	2.4000e-004		0.0104	0.0104		9.7100e-003	9.7100e-003	0.0000	21.0713	21.0713	5.3900e-003	0.0000	21.2060
Total	0.0199	0.1970	0.1449	2.4000e-004		0.0104	0.0104		9.7100e-003	9.7100e-003	0.0000	21.0713	21.0713	5.3900e-003	0.0000	21.2060

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
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Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	4.2000e-004	3.0000e-004	3.1000e-003	1.0000e-005	1.0300e-003	1.0000e-005	1.0300e-003	2.7000e-004	1.0000e-005	2.8000e-004	0.0000	0.8820	0.8820	2.0000e-005	0.0000	0.8825
Total	4.2000e-004	3.0000e-004	3.1000e-003	1.0000e-005	1.0300e-003	1.0000e-005	1.0300e-003	2.7000e-004	1.0000e-005	2.8000e-004	0.0000	0.8820	0.8820	2.0000e-005	0.0000	0.8825

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0199	0.1970	0.1449	2.4000e-004		0.0104	0.0104		9.7100e-003	9.7100e-003	0.0000	21.0713	21.0713	5.3900e-003	0.0000	21.2060
Total	0.0199	0.1970	0.1449	2.4000e-004		0.0104	0.0104		9.7100e-003	9.7100e-003	0.0000	21.0713	21.0713	5.3900e-003	0.0000	21.2060

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	4.2000e-004	3.0000e-004	3.1000e-003	1.0000e-005	1.0300e-003	1.0000e-005	1.0300e-003	2.7000e-004	1.0000e-005	2.8000e-004	0.0000	0.8820	0.8820	2.0000e-005	0.0000	0.8825

Total	4.2000e-004	3.0000e-004	3.1000e-003	1.0000e-005	1.0300e-003	1.0000e-005	1.0300e-003	2.7000e-004	1.0000e-005	2.8000e-004	0.0000	0.8820	0.8820	2.0000e-005	0.0000	0.8825
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3.3 Site Preparation - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					2.3900e-003	0.0000	2.3900e-003	2.6000e-004	0.0000	2.6000e-004	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	2.3200e-003	0.0274	0.0161	4.0000e-005		1.0500e-003	1.0500e-003		9.7000e-004	9.7000e-004	0.0000	3.2290	3.2290	1.0400e-003	0.0000	3.2551
Total	2.3200e-003	0.0274	0.0161	4.0000e-005	2.3900e-003	1.0500e-003	3.4400e-003	2.6000e-004	9.7000e-004	1.2300e-003	0.0000	3.2290	3.2290	1.0400e-003	0.0000	3.2551

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	4.0000e-005	3.0000e-005	2.9000e-004	0.0000	9.0000e-005	0.0000	1.0000e-004	3.0000e-005	0.0000	3.0000e-005	0.0000	0.0814	0.0814	0.0000	0.0000	0.0815
Total	4.0000e-005	3.0000e-005	2.9000e-004	0.0000	9.0000e-005	0.0000	1.0000e-004	3.0000e-005	0.0000	3.0000e-005	0.0000	0.0814	0.0814	0.0000	0.0000	0.0815

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					2.3900e-003	0.0000	2.3900e-003	2.6000e-004	0.0000	2.6000e-004	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	2.3200e-003	0.0274	0.0161	4.0000e-005		1.0500e-003	1.0500e-003		9.7000e-004	9.7000e-004	0.0000	3.2290	3.2290	1.0400e-003	0.0000	3.2551
Total	2.3200e-003	0.0274	0.0161	4.0000e-005	2.3900e-003	1.0500e-003	3.4400e-003	2.6000e-004	9.7000e-004	1.2300e-003	0.0000	3.2290	3.2290	1.0400e-003	0.0000	3.2551

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	4.0000e-005	3.0000e-005	2.9000e-004	0.0000	9.0000e-005	0.0000	1.0000e-004	3.0000e-005	0.0000	3.0000e-005	0.0000	0.0814	0.0814	0.0000	0.0000	0.0815
Total	4.0000e-005	3.0000e-005	2.9000e-004	0.0000	9.0000e-005	0.0000	1.0000e-004	3.0000e-005	0.0000	3.0000e-005	0.0000	0.0814	0.0814	0.0000	0.0000	0.0815

3.4 Grading - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					

Fugitive Dust					0.0197	0.0000	0.0197	0.0101	0.0000	0.0101	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	5.4800e-003	0.0606	0.0293	6.0000e-005		2.7500e-003	2.7500e-003		2.5300e-003	2.5300e-003	0.0000	5.4312	5.4312	1.7600e-003	0.0000	5.4751
Total	5.4800e-003	0.0606	0.0293	6.0000e-005	0.0197	2.7500e-003	0.0224	0.0101	2.5300e-003	0.0126	0.0000	5.4312	5.4312	1.7600e-003	0.0000	5.4751

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.0000e-004	7.0000e-005	7.2000e-004	0.0000	2.4000e-004	0.0000	2.4000e-004	6.0000e-005	0.0000	6.0000e-005	0.0000	0.2035	0.2035	0.0000	0.0000	0.2037
Total	1.0000e-004	7.0000e-005	7.2000e-004	0.0000	2.4000e-004	0.0000	2.4000e-004	6.0000e-005	0.0000	6.0000e-005	0.0000	0.2035	0.2035	0.0000	0.0000	0.2037

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0197	0.0000	0.0197	0.0101	0.0000	0.0101	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	5.4800e-003	0.0606	0.0293	6.0000e-005		2.7500e-003	2.7500e-003		2.5300e-003	2.5300e-003	0.0000	5.4312	5.4312	1.7600e-003	0.0000	5.4751
Total	5.4800e-003	0.0606	0.0293	6.0000e-005	0.0197	2.7500e-003	0.0224	0.0101	2.5300e-003	0.0126	0.0000	5.4312	5.4312	1.7600e-003	0.0000	5.4751

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.0000e-004	7.0000e-005	7.2000e-004	0.0000	2.4000e-004	0.0000	2.4000e-004	6.0000e-005	0.0000	6.0000e-005	0.0000	0.2035	0.2035	0.0000	0.0000	0.2037
Total	1.0000e-004	7.0000e-005	7.2000e-004	0.0000	2.4000e-004	0.0000	2.4000e-004	6.0000e-005	0.0000	6.0000e-005	0.0000	0.2035	0.2035	0.0000	0.0000	0.2037

3.5 Building Construction - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0603	0.4728	0.4296	7.4000e-004		0.0241	0.0241		0.0231	0.0231	0.0000	61.2564	61.2564	0.0121	0.0000	61.5577
Total	0.0603	0.4728	0.4296	7.4000e-004		0.0241	0.0241		0.0231	0.0231	0.0000	61.2564	61.2564	0.0121	0.0000	61.5577

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
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Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	7.3000e-004	0.0252	5.3500e-003	6.0000e-005	1.5500e-003	5.0000e-005	1.6000e-003	4.5000e-004	5.0000e-005	5.0000e-004	0.0000	6.1825	6.1825	3.4000e-004	0.0000	6.1910
Worker	1.6000e-003	1.1400e-003	0.0120	4.0000e-005	3.9700e-003	3.0000e-005	3.9900e-003	1.0500e-003	2.0000e-005	1.0800e-003	0.0000	3.4025	3.4025	8.0000e-005	0.0000	3.4046
Total	2.3300e-003	0.0264	0.0173	1.0000e-004	5.5200e-003	8.0000e-005	5.5900e-003	1.5000e-003	7.0000e-005	1.5800e-003	0.0000	9.5851	9.5851	4.2000e-004	0.0000	9.5956

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0603	0.4728	0.4296	7.4000e-004		0.0241	0.0241		0.0231	0.0231	0.0000	61.2563	61.2563	0.0121	0.0000	61.5576
Total	0.0603	0.4728	0.4296	7.4000e-004		0.0241	0.0241		0.0231	0.0231	0.0000	61.2563	61.2563	0.0121	0.0000	61.5576

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	7.3000e-004	0.0252	5.3500e-003	6.0000e-005	1.5500e-003	5.0000e-005	1.6000e-003	4.5000e-004	5.0000e-005	5.0000e-004	0.0000	6.1825	6.1825	3.4000e-004	0.0000	6.1910
Worker	1.6000e-003	1.1400e-003	0.0120	4.0000e-005	3.9700e-003	3.0000e-005	3.9900e-003	1.0500e-003	2.0000e-005	1.0800e-003	0.0000	3.4025	3.4025	8.0000e-005	0.0000	3.4046

Total	2.3300e-003	0.0264	0.0173	1.0000e-004	5.5200e-003	8.0000e-005	5.5900e-003	1.5000e-003	7.0000e-005	1.5800e-003	0.0000	9.5851	9.5851	4.2000e-004	0.0000	9.5956
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3.5 Building Construction - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.1494	1.1756	1.1554	2.0100e-003		0.0565	0.0565		0.0542	0.0542	0.0000	167.1825	167.1825	0.0323	0.0000	167.9888
Total	0.1494	1.1756	1.1554	2.0100e-003		0.0565	0.0565		0.0542	0.0542	0.0000	167.1825	167.1825	0.0323	0.0000	167.9888

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	1.8600e-003	0.0654	0.0137	1.7000e-004	4.2300e-003	1.2000e-004	4.3500e-003	1.2200e-003	1.2000e-004	1.3400e-003	0.0000	16.7059	16.7059	8.9000e-004	0.0000	16.7281
Worker	4.0600e-003	2.7900e-003	0.0299	1.0000e-004	0.0108	7.0000e-005	0.0109	2.8800e-003	7.0000e-005	2.9400e-003	0.0000	8.9465	8.9465	2.0000e-004	0.0000	8.9515
Total	5.9200e-003	0.0682	0.0435	2.7000e-004	0.0151	1.9000e-004	0.0152	4.1000e-003	1.9000e-004	4.2800e-003	0.0000	25.6525	25.6525	1.0900e-003	0.0000	25.6796

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.1494	1.1756	1.1554	2.0100e-003		0.0565	0.0565		0.0542	0.0542	0.0000	167.1823	167.1823	0.0323	0.0000	167.9886
Total	0.1494	1.1756	1.1554	2.0100e-003		0.0565	0.0565		0.0542	0.0542	0.0000	167.1823	167.1823	0.0323	0.0000	167.9886

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	1.8600e-003	0.0654	0.0137	1.7000e-004	4.2300e-003	1.2000e-004	4.3500e-003	1.2200e-003	1.2000e-004	1.3400e-003	0.0000	16.7059	16.7059	8.9000e-004	0.0000	16.7281
Worker	4.0600e-003	2.7900e-003	0.0299	1.0000e-004	0.0108	7.0000e-005	0.0109	2.8800e-003	7.0000e-005	2.9400e-003	0.0000	8.9465	8.9465	2.0000e-004	0.0000	8.9515
Total	5.9200e-003	0.0682	0.0435	2.7000e-004	0.0151	1.9000e-004	0.0152	4.1000e-003	1.9000e-004	4.2800e-003	0.0000	25.6525	25.6525	1.0900e-003	0.0000	25.6796

3.6 Paving - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					

Off-Road	4.7100e-003	0.0467	0.0585	9.0000e-005		2.4400e-003	2.4400e-003		2.2500e-003	2.2500e-003	0.0000	7.7550	7.7550	2.4600e-003	0.0000	7.8165
Paving	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	4.7100e-003	0.0467	0.0585	9.0000e-005		2.4400e-003	2.4400e-003		2.2500e-003	2.2500e-003	0.0000	7.7550	7.7550	2.4600e-003	0.0000	7.8165

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.2000e-004	1.5000e-004	1.6400e-003	1.0000e-005	5.9000e-004	0.0000	6.0000e-004	1.6000e-004	0.0000	1.6000e-004	0.0000	0.4903	0.4903	1.0000e-005	0.0000	0.4906
Total	2.2000e-004	1.5000e-004	1.6400e-003	1.0000e-005	5.9000e-004	0.0000	6.0000e-004	1.6000e-004	0.0000	1.6000e-004	0.0000	0.4903	0.4903	1.0000e-005	0.0000	0.4906

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	4.7100e-003	0.0467	0.0585	9.0000e-005		2.4400e-003	2.4400e-003		2.2500e-003	2.2500e-003	0.0000	7.7550	7.7550	2.4600e-003	0.0000	7.8165
Paving	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	4.7100e-003	0.0467	0.0585	9.0000e-005		2.4400e-003	2.4400e-003		2.2500e-003	2.2500e-003	0.0000	7.7550	7.7550	2.4600e-003	0.0000	7.8165

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.2000e-004	1.5000e-004	1.6400e-003	1.0000e-005	5.9000e-004	0.0000	6.0000e-004	1.6000e-004	0.0000	1.6000e-004	0.0000	0.4903	0.4903	1.0000e-005	0.0000	0.4906
Total	2.2000e-004	1.5000e-004	1.6400e-003	1.0000e-005	5.9000e-004	0.0000	6.0000e-004	1.6000e-004	0.0000	1.6000e-004	0.0000	0.4903	0.4903	1.0000e-005	0.0000	0.4906

3.7 Architectural Coating - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating	0.2399					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	1.0200e-003	7.0400e-003	9.0700e-003	1.0000e-005		4.1000e-004	4.1000e-004		4.1000e-004	4.1000e-004	0.0000	1.2766	1.2766	8.0000e-005	0.0000	1.2787
Total	0.2409	7.0400e-003	9.0700e-003	1.0000e-005		4.1000e-004	4.1000e-004		4.1000e-004	4.1000e-004	0.0000	1.2766	1.2766	8.0000e-005	0.0000	1.2787

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
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Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	4.0000e-005	3.0000e-005	3.3000e-004	0.0000	1.2000e-004	0.0000	1.2000e-004	3.0000e-005	0.0000	3.0000e-005	0.0000	0.0981	0.0981	0.0000	0.0000	0.0981
Total	4.0000e-005	3.0000e-005	3.3000e-004	0.0000	1.2000e-004	0.0000	1.2000e-004	3.0000e-005	0.0000	3.0000e-005	0.0000	0.0981	0.0981	0.0000	0.0000	0.0981

Mitigated Construction On-Site

Category	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating	0.2399					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	1.0200e-003	7.0400e-003	9.0700e-003	1.0000e-005		4.1000e-004	4.1000e-004		4.1000e-004	4.1000e-004	0.0000	1.2766	1.2766	8.0000e-005	0.0000	1.2787
Total	0.2409	7.0400e-003	9.0700e-003	1.0000e-005		4.1000e-004	4.1000e-004		4.1000e-004	4.1000e-004	0.0000	1.2766	1.2766	8.0000e-005	0.0000	1.2787

Mitigated Construction Off-Site

Category	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	4.0000e-005	3.0000e-005	3.3000e-004	0.0000	1.2000e-004	0.0000	1.2000e-004	3.0000e-005	0.0000	3.0000e-005	0.0000	0.0981	0.0981	0.0000	0.0000	0.0981

Total	4.0000e-005	3.0000e-005	3.3000e-004	0.0000	1.2000e-004	0.0000	1.2000e-004	3.0000e-005	0.0000	3.0000e-005	0.0000	0.0981	0.0981	0.0000	0.0000	0.0981
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4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

4.2 Trip Summary Information

Land Use	Average Daily Trip Rate			Unmitigated	Mitigated
	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
General Office Building	0.00	0.00	0.00		
High Turnover (Sit Down Restaurant)	0.00	0.00	0.00		
Medical Office Building	0.00	0.00	0.00		
Total	0.00	0.00	0.00		

4.3 Trip Type Information

Land Use	Miles			Trip %			Trip Purpose %		
	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
General Office Building	9.50	7.30	7.30	33.00	48.00	19.00	77	19	4
High Turnover (Sit Down)	9.50	7.30	7.30	8.50	72.50	19.00	37	20	43
Medical Office Building	9.50	7.30	7.30	29.60	51.40	19.00	60	30	10

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
General Office Building	0.562515	0.038056	0.190319	0.106285	0.014814	0.005157	0.024895	0.046887	0.002221	0.002358	0.005460	0.000343	0.000690
High Turnover (Sit Down Restaurant)	0.562515	0.038056	0.190319	0.106285	0.014814	0.005157	0.024895	0.046887	0.002221	0.002358	0.005460	0.000343	0.000690
Medical Office Building	0.562515	0.038056	0.190319	0.106285	0.014814	0.005157	0.024895	0.046887	0.002221	0.002358	0.005460	0.000343	0.000690

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Electricity Mitigated						0.0000	0.0000		0.0000	0.0000	0.0000	161.7273	161.7273	9.4500e-003	1.9500e-003	162.5458
Electricity Unmitigated						0.0000	0.0000		0.0000	0.0000	0.0000	161.7273	161.7273	9.4500e-003	1.9500e-003	162.5458
NaturalGas Mitigated	0.0138	0.1255	0.1054	7.5000e-004	9.5400e-003	9.5400e-003	9.5400e-003	9.5400e-003	9.5400e-003	9.5400e-003	0.0000	136.6327	136.6327	2.6200e-003	2.5000e-003	137.4446
NaturalGas Unmitigated	0.0138	0.1255	0.1054	7.5000e-004	9.5400e-003	9.5400e-003	9.5400e-003	9.5400e-003	9.5400e-003	9.5400e-003	0.0000	136.6327	136.6327	2.6200e-003	2.5000e-003	137.4446

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					

General Office Building	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
High Turnover (Sit Down Restaurant)	2.5604e+06	0.0138	0.1255	0.1054	7.5000e-004	9.5400e-003	9.5400e-003	9.5400e-003	9.5400e-003	9.5400e-003	0.0000	136.6327	136.6327	2.6200e-003	2.5000e-003	137.4446
Medical Office Building	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total		0.0138	0.1255	0.1054	7.5000e-004	9.5400e-003	9.5400e-003	9.5400e-003	9.5400e-003	9.5400e-003	0.0000	136.6327	136.6327	2.6200e-003	2.5000e-003	137.4446

Mitigated

	Natural Gas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
General Office Building	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
High Turnover (Sit Down Restaurant)	2.5604e+06	0.0138	0.1255	0.1054	7.5000e-004	9.5400e-003	9.5400e-003	9.5400e-003	9.5400e-003	9.5400e-003	9.5400e-003	0.0000	136.6327	136.6327	2.6200e-003	2.5000e-003	137.4446
Medical Office Building	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total		0.0138	0.1255	0.1054	7.5000e-004	9.5400e-003	9.5400e-003	9.5400e-003	9.5400e-003	9.5400e-003	9.5400e-003	0.0000	136.6327	136.6327	2.6200e-003	2.5000e-003	137.4446

5.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
General Office Building	0	0.0000	0.0000	0.0000	0.0000
High Turnover (Sit Down Restaurant)	718122	161.7273	9.4500e-003	1.9500e-003	162.5458
Medical Office Building	0	0.0000	0.0000	0.0000	0.0000

Total		161.7273	9.4500e-003	1.9500e-003	162.5458
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Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
General Office Building	0	0.0000	0.0000	0.0000	0.0000
High Turnover (Sit Down Restaurant)	718122	161.7273	9.4500e-003	1.9500e-003	162.5458
Medical Office Building	0	0.0000	0.0000	0.0000	0.0000
Total		161.7273	9.4500e-003	1.9500e-003	162.5458

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	0.2037	0.0000	4.2000e-004	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	8.2000e-004	8.2000e-004	0.0000	0.0000	8.8000e-004
Unmitigated	0.2037	0.0000	4.2000e-004	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	8.2000e-004	8.2000e-004	0.0000	0.0000	8.8000e-004

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.0240						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.1797						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	4.0000e-005	0.0000	4.2000e-004	0.0000			0.0000	0.0000		0.0000	0.0000	8.2000e-004	8.2000e-004	0.0000	0.0000	8.8000e-004
Total	0.2037	0.0000	4.2000e-004	0.0000			0.0000	0.0000		0.0000	0.0000	8.2000e-004	8.2000e-004	0.0000	0.0000	8.8000e-004

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.0240						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.1797						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	4.0000e-005	0.0000	4.2000e-004	0.0000			0.0000	0.0000		0.0000	0.0000	8.2000e-004	8.2000e-004	0.0000	0.0000	8.8000e-004
Total	0.2037	0.0000	4.2000e-004	0.0000			0.0000	0.0000		0.0000	0.0000	8.2000e-004	8.2000e-004	0.0000	0.0000	8.8000e-004

7.0 Water Detail

7.1 Mitigation Measures Water

Apply Water Conservation Strategy

Use Water Efficient Irrigation System

	Total CO2	CH4	N2O	CO2e
Category	MT/yr			
Mitigated	13.2849	9.3800e-003	5.6600e-003	15.2053
Unmitigated	18.1263	0.0133	8.0700e-003	20.8653

7.2 Water by Land Use

Unmitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
General Office Building	3.16366 / 1.93902	6.5030	4.1700e-003	2.5000e-003	7.3519
High Turnover (Sit Down Restaurant)	6.07067 / 0.38749	9.8510	7.8400e-003	4.7600e-003	11.4667
Medical Office Building	1.02894 / 0.195989	1.7724	1.3400e-003	8.1000e-004	2.0468
Total		18.1263	0.0134	8.0700e-003	20.8653

Mitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
General Office Building	2.21456 / 1.93902	5.0106	2.9400e-003	1.7500e-003	5.6072
High Turnover (Sit Down Restaurant)	4.24947 / 0.38749	6.9873	5.5000e-003	3.3400e-003	8.1188
Medical Office Building	0.720258 / 0.195989	1.2870	9.4000e-004	5.7000e-004	1.4793
Total		13.2849	9.3800e-003	5.6600e-003	15.2053

8.0 Waste Detail

8.1 Mitigation Measures Waste

Institute Recycling and Composting Services

Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated	13.9297	0.8232	0.0000	34.5101
Unmitigated	69.6482	4.1161	0.0000	172.5505

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
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Land Use	tons	MT/yr			
General Office Building	16.55	3.3595	0.1985	0.0000	8.3230
High Turnover (Sit Down Restaurant)	238	48.3119	2.8552	0.0000	119.6906
Medical Office Building	88.56	17.9769	1.0624	0.0000	44.5370
Total		69.6482	4.1161	0.0000	172.5505

Mitigated

Land Use	Waste Disposed	Total CO2	CH4	N2O	CO2e
tons	MT/yr				
General Office Building	3.31	0.6719	0.0397	0.0000	1.6646
High Turnover (Sit Down Restaurant)	47.6	9.6624	0.5710	0.0000	23.9381
Medical Office Building	17.712	3.5954	0.2125	0.0000	8.9074
Total		13.9297	0.8232	0.0000	34.5101

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type
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10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type
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Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type
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User Defined Equipment

Equipment Type	Number
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11.0 Vegetation

LBNL existing cafeteria - Alameda County, Annual

LBNL existing cafeteria
Alameda County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
High Turnover (Sit Down Restaurant)	14.85	1000sqft	0.34	14,848.00	0

1.2 Other Project Characteristics

Urbanization	Urban	Wind Speed (m/s)	2.2	Precipitation Freq (Days)	63
Climate Zone	5	Operational Year		2024	
Utility Company	User Defined				
CO2 Intensity (lb/MW hr)	496.5	CH4 Intensity (lb/MW hr)	0.034	N2O Intensity (lb/MW hr)	0.004

1.3 User Entered Comments & Non-Default Data

- Project Characteristics - eGRID2018
- Land Use - existing cafeteria
- Construction Phase - existing use
- Off-road Equipment - existing use
- Vehicle Trips - no traffic
- Water And Wastewater - wtp treatment
- Energy Use - Used existing electricity usage of 395,818kw = 26.6544 kwhr/sf/year

Table Name	Column Name	Default Value	New Value
tblConstructionPhase	NumDays	1.00	0.00
tblEnergyUse	LightingElect	5.34	0.00
tblEnergyUse	NT24E	20.97	26.65
tblEnergyUse	T24E	2.67	0.00
tblGrading	AcresOfGrading	0.00	0.50
tblLandUse	LandUseSquareFeet	14,850.00	14,848.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblProjectCharacteristics	CH4IntensityFactor	0	0.034
tblProjectCharacteristics	CO2IntensityFactor	0	496.5
tblProjectCharacteristics	N2OIntensityFactor	0	0.004
tblTripsAndVMT	WorkerTripNumber	0.00	5.00
tblVehicleTrips	ST_TR	158.37	0.00
tblVehicleTrips	SU_TR	131.84	0.00
tblVehicleTrips	WD_TR	127.15	0.00
tblWater	AerobicPercent	87.46	100.00
tblWater	AnaerobicandFacultativeLagoonsPercent	2.21	0.00
tblWater	SepticTankPercent	10.33	0.00

2.0 Emissions Summary

4.2 Trip Summary Information

Land Use	Average Daily Trip Rate			Unmitigated	Mitigated
	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
High Turnover (Sit Down Restaurant)	0.00	0.00	0.00		
Total	0.00	0.00	0.00		

4.3 Trip Type Information

Land Use	Miles			Trip %			Trip Purpose %		
	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
High Turnover (Sit Down Restaurant)	9.50	7.30	7.30	8.50	72.50	19.00	37	20	43

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
High Turnover (Sit Down Restaurant)	0.562515	0.038056	0.190319	0.106285	0.014814	0.005157	0.024895	0.046887	0.002221	0.002358	0.005460	0.000343	0.000690

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

Category	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
	tons/yr										MT/yr					
Electricity Mitigated						0.0000	0.0000		0.0000	0.0000	0.0000	89.1296	89.1296	6.1000e-003	7.2000e-004	89.4962
Electricity Unmitigated						0.0000	0.0000		0.0000	0.0000	0.0000	89.1296	89.1296	6.1000e-003	7.2000e-004	89.4962
NaturalGas Mitigated	0.0134	0.1222	0.1027	7.3000e-004	9.2900e-003	9.2900e-003	9.2900e-003	9.2900e-003	9.2900e-003	9.2900e-003	0.0000	133.0507	133.0507	2.5500e-003	2.4400e-003	133.8414
NaturalGas Unmitigated	0.0134	0.1222	0.1027	7.3000e-004	9.2900e-003	9.2900e-003	9.2900e-003	9.2900e-003	9.2900e-003	9.2900e-003	0.0000	133.0507	133.0507	2.5500e-003	2.4400e-003	133.8414

5.2 Energy by Land Use - NaturalGas

Unmitigated

Land Use	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
	kBTU/yr	tons/yr										MT/yr					
High Turnover (Sit Down Restaurant)	2.49328e+006	0.0134	0.1222	0.1027	7.3000e-004	9.2900e-003	9.2900e-003	9.2900e-003	9.2900e-003	9.2900e-003	9.2900e-003	0.0000	133.0507	133.0507	2.5500e-003	2.4400e-003	133.8414
Total		0.0134	0.1222	0.1027	7.3000e-004	9.2900e-003	9.2900e-003	9.2900e-003	9.2900e-003	9.2900e-003	9.2900e-003	0.0000	133.0507	133.0507	2.5500e-003	2.4400e-003	133.8414

Mitigated

Land Use	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
	kBTU/yr	tons/yr										MT/yr					

Architectural Coating	7.7400e-003					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.0580					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	1.0000e-005	0.0000	1.4000e-004	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	2.7000e-004	2.7000e-004	0.0000	0.0000	2.8000e-004
Total	0.0657	0.0000	1.4000e-004	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	2.7000e-004	2.7000e-004	0.0000	0.0000	2.8000e-004

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	7.7400e-003					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.0580					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	1.0000e-005	0.0000	1.4000e-004	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	2.7000e-004	2.7000e-004	0.0000	0.0000	2.8000e-004
Total	0.0657	0.0000	1.4000e-004	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	2.7000e-004	2.7000e-004	0.0000	0.0000	2.8000e-004

7.0 Water Detail

7.1 Mitigation Measures Water

	Total CO2	CH4	N2O	CO2e
Category	MT/yr			
Mitigated	7.3144	5.8800e-003	3.5100e-003	8.5086
Unmitigated	7.3144	5.8800e-003	3.5100e-003	8.5086

7.2 Water by Land Use

Unmitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
High Turnover (Sit Down Restaurant)	4.50748 / 0.287711	7.3144	5.8800e-003	3.5100e-003	8.5086
Total		7.3144	5.8800e-003	3.5100e-003	8.5086

Mitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
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Land Use	Mgal	MT/yr			
High Turnover (Sit Down Restaurant)	4.50748 / 0.287711	7.3144	5.8800e-003	3.5100e-003	8.5086
Total		7.3144	5.8800e-003	3.5100e-003	8.5086

8.0 Waste Detail

8.1 Mitigation Measures Waste

Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated	35.8726	2.1200	0.0000	88.8728
Unmitigated	35.8726	2.1200	0.0000	88.8728

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
High Turnover (Sit Down Restaurant)	176.72	35.8726	2.1200	0.0000	88.8728
Total		35.8726	2.1200	0.0000	88.8728

Mitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
High Turnover (Sit Down Restaurant)	176.72	35.8726	2.1200	0.0000	88.8728
Total		35.8726	2.1200	0.0000	88.8728

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type
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10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type
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Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type
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User Defined Equipment

Equipment Type	Number
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11.0 Vegetation

Attachment 2: Construction Energy Calculations

LBNL SSM							
Diesel Conversion							
1 horsepower	=	2,544	BTU	=	2,684	kiloJoules	
1 gallon Diesel	=	137,381	BTU	=	144,945	kiloJoules	
1 gallon Diesel	=	54	hp hour				
	=	9	gallon Diesel				
Gasoline Conversion							
1 gallon gasoline	=	114,000	BTU	=	120,277	kiloJoules	
1 gallon gasoline	=	137,381	BTU	=			
Construction Equipment			HP hours				
HP hours (from Construction Worksheet)			517,943	hrs	9,592.70	gallons diesel	
					1,317,854,271	BTU	
					1,318	MM BTU	
Construction Traffic							
Trips &VMT from CalEEMod		<u>trips/day</u>	<u>days</u>	<u>Total</u>			
Workers: Demolition		13	20	260	Autos:	45889	VMT
Site Preperation		3	3	9		1796	gallons gas
Grading		10	6	60		204,729,142	BTU
Building Construction		17	220	3740		204.73	
Paving		15	10	150			
Architectual Coating		3	10	30			
Vendors		8	220	1760	Trucks:	13048	VMT
Haul		68	1	10		2237	gallons diesel
					307,348,191	BTU	
					307.35	MM BTU	
					1,830	Total MM BTU	

Quantity	Description	HP	Load Factor	Hours/day	Total Work Days	Avg. Hours per day	HP Hours	Annual Hours
	Demolition	Start Date:	1/1/2021	Total phase:	20			
		End Date:						
1	Concrete/Industrial Saws	81	0.73	8	20	8	9460.8	160
	Excavators	158	0.38			0	0	0
1	Rubber-Tired Dozers	247	0.4	8	20	8	15808	160
3	Tractors/Loaders/Backhoes	97	0.37	8	20	8	17227.2	480
	Site Preparation	Start Date:		Total phase:	3			
		End Date:						
1	Graders	187	0.41	8	3	8	1840.08	24
1	Rubber Tired Dozers	247	0.4	8	3	8	2371.2	24
1	Tractors/Loaders/Backhoes	97	0.37	8	3	8	861.36	24
	Grading / Excavation	Start Date:		Total phase:	6			
		End Date:						
	Excavators	158	0.38			0	0	0
1	Graders	187	0.41	8	6	8	3680.16	48
1	Rubber Tired Dozers	247	0.4	8	6	8	4742.4	48
	Concrete/Industrial Saws	81	0.73			0	0	0
2	Tractors/Loaders/Backhoes	97	0.37	8	6	8	3445.44	96
	<i>Other Equipment?</i>							
	Trenching/Foundation	Start Date:		Total phase:				
		End Date:						
	Tractor/Loader/Backhoe	97	0.37			#DIV/0!		0
	Excavators	158	0.38			#DIV/0!		0
	<i>Other Equipment?</i>							
	Building - Exterior	Start Date:		Total phase:	220			
		End Date:						
1	Cranes	231	0.29	8	220	8	117902.4	1760
2	Forklifts	89	0.2	7	220	7	54824	3080
1	Generator Sets	84	0.74	8	220	8	109401.6	1760
1	Tractors/Loaders/Backhoes	97	0.37	6	220	6	47374.8	1320
3	Welders	46	0.45	8	220	8	109296	5280
	<i>Other Equipment?</i>							
	Building - Interior/Architectural Coating	Start Date:		Total phase:	10			
		End Date:						
1	Air Compressors	78	0.48	6	10	6	2246.4	60
1	Aerial Lift	62	0.31	6	10	6	1153.2	60
	<i>Other Equipment?</i>							
	Paving	Start Date:		Total phase:	10			
		Start Date:						
1	Cement and Mortar Mixers	9	0.56	8	10	8	403.2	80
1	Pavers	130	0.42	8	10	8	4368	80
1	Paving Equipment	132	0.36	8	10	8	3801.6	80
2	Rollers	80	0.38	8	10	8	4864	160
1	Tractors/Loaders/Backhoes	97	0.37	8	10	8	2871.2	80
	<i>Other Equipment?</i>							