V CUMULATIVE EFFECTS

Cumulative environmental effects consider the incremental impact of the Proposed Action when added to other past, present, and reasonably foreseeable future actions. In the area surrounding the LBNL site, planned, pending, and/or reasonably foreseeable actions proposed in the same timeframe as the Proposed Action include DOE projects at LBNL as well as UC projects at LBNL and on the adjacent UC Berkeley campus. These projects are listed and described below in Section V.A. Projects located at LBNL are shown in Figure V-1.

The University of California's Seismic Phase 2 Draft Environmental Impact Report (EIR), circulated for public review between January 29 and March 15, 2010, considers cumulative impacts out to 2025, which is the planning horizon for the 2006 LBNL LRDP. The LRDP provides guidance for any future development without the assurance that such development would occur. LRDP growth projections include projects that would only be executed if and when funding becomes available. Such funding has historically been very much open to question. Absent financing, the projections are not reasonably foreseeable. By contrast, this EA considers the cumulative effects of projects which have reached a "Critical Decision – 0" approval (or where funding is otherwise anticipated) and are therefore reasonably foreseeable. Accordingly, the timeline for cumulative effects has been set at 2018, which is the anticipated completion date of Seismic Phase 3, the latest project for which funding is anticipated. Any National Environmental Policy Act (NEPA) document prepared on Seismic Phase 3 would, of course, account for any projects which are reasonably foreseeable at that time.

The Next Generation Light Source (NGLS), as envisioned, would be a linear accelerator "light source" capable of producing extraordinarily bright, short, soft x-ray pulses at rates of hundreds of thousands of times per second. Soft x-rays are ideal for studying solar cells, fuel cells, advanced electronics, biological systems, cleaner catalysts, and high-temperature superconductors. If located at the LBNL site, the NGLS could be a national user facility available not only to scientists at LBNL and UC Berkeley but to re-searchers around the nation and the world. While the idea of locating the NGLS at the LBNL site is being actively studied by Laboratory management, UC LBNL has not

formally proposed this to the DOE, nor has it entered into the required DOE "Critical Decision" process for the NGLS. Consequently, the NGLS is not considered a reasonably foreseeable project at LBNL at this time. Because the idea to locate the NGLS at LBNL is not a reasonably foreseeable project at this time, the NGLS is not considered further in this analysis.

Currently, there are no foreseeable development projects planned at the RFS[1] or in adjacent areas of the City of Richmond.[2] Therefore, the only cumulative issues facing Alternative B, the off-site GPL alternative at the RFS, are greenhouse gas emissions. Discussions of these cumulative issues are located in Chapter IV.

Cumulative effects are not identified for Alternative C, the off-site leased space alternative in Berkeley or Emeryville, because the building would be already constructed and in use. The off-site facility would be in a light-industrial area of Berkeley or Emeryville and the addition of approximately 100 UC LBNL personnel relocated to the area would have only a very minimal effect.

The No-Action Alternative serves as the baseline against which the effects of the Proposed Action and alternatives are measured. For each potentially affected resource category, the area of potential effect is defined by factors specific to the medium of propagation of effects and the relative time overlap of the projects. As such, the Area of Potential Effect (APE) for cumulative effects associated with geology and seismicity is not the same as for cumulative effects related to air quality.

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[1] A specific plan for development of the RFS is expected to be prepared in the coming months.

[2] Rese-Brown, Lori, Senior Planner, City of Richmond. Personal communication with DC&E, December 21, 2009.

V.A. Construction Projects in the Vicinity of the Proposed Action

There are a number of projects either planned or under consideration for the LBNL site, adjacent UC campus, and City of Berkeley that would take place in the same approximate timeframe of the Proposed Action (allowing for project schedule changes). Project locations are shown in Figure V-1 and time frameworks in Table V-1.

V.A.1. DOE Projects at LBNL[3]

V.A.1.a. The User Support Building

Status: In Progress.

Anticipated Project End: Mid 2010

Project Size: 30,000 gsf

CEQA Documentation: Initial Study/Mitigated Negative Declaration was prepared and circulated in fall 2006 and adopted by The UC Regents in January 2007.

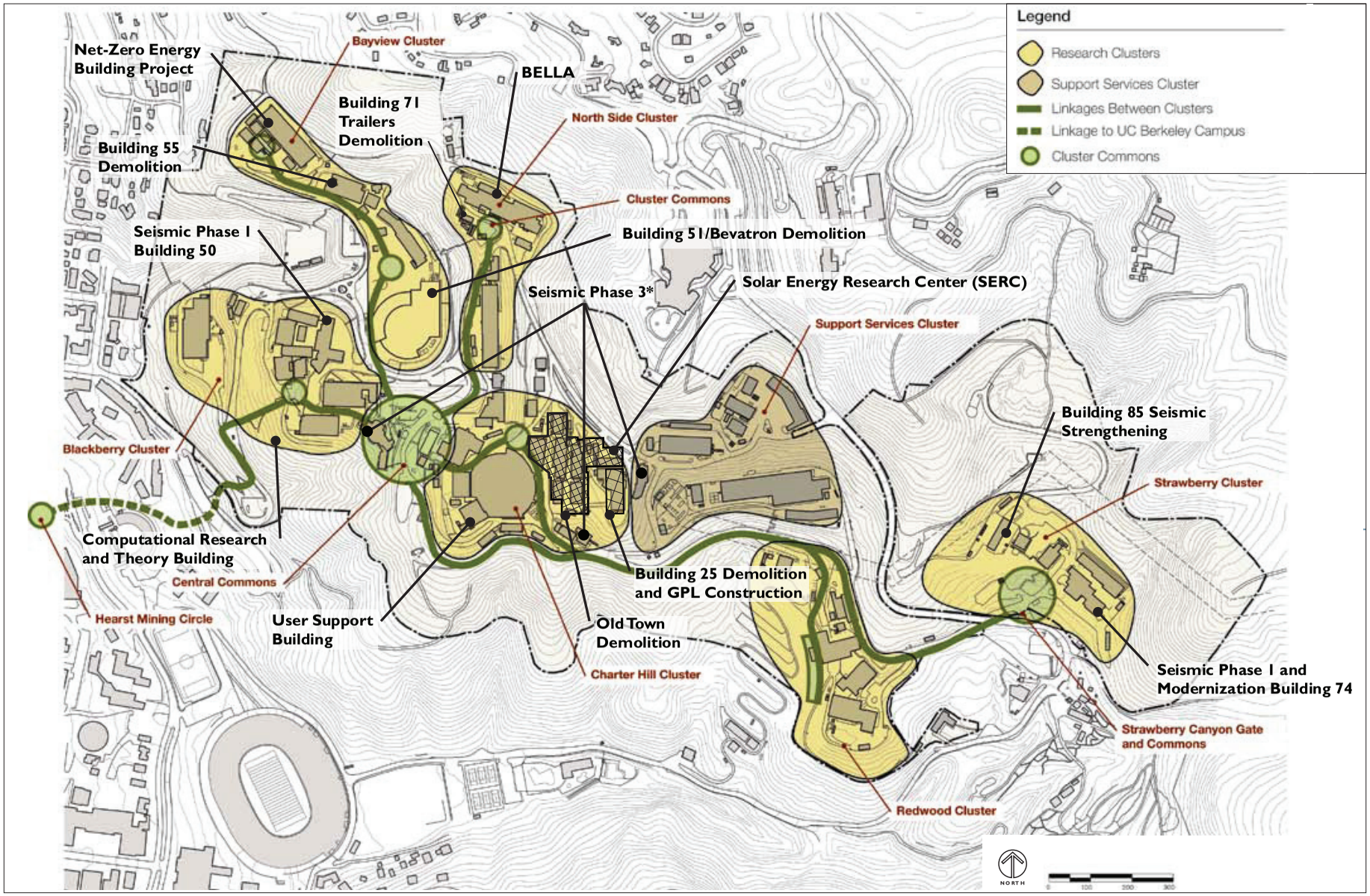
NEPA Documentation: Categorical Exclusion, December 2006.

Description: The three-story User Support Building (USB) will include assembly space, support laboratories, and offices. An existing 16,038 gsf structure, Building 10, which housed approximately 24 full-time LBNL staff, was demolished to create space for the USB.

Project Sponsor: DOE

Relevance: Geographic proximity to Building 25 demolition and GPL construction, although it is predicted to be finished before the start of the Proposed Action. Operational traffic from USB is included in cumulative traffic, air quality, and noise analyses.

[3] The projects are the same as those analyzed in the Seismic Phase 2 Draft EIR, January 29, 2010, although they were listed in that document according to the titles of the CEQA documents in which they were analyzed. Projects are listed in this EA using the titles assigned to them by UC LBNL personnel for calculations of truck trips associated with each project.



Source: Lawrence Berkeley National Laboratory

* Indicates structures proposed to be removed as part of the Seismic Phase 3 Project. The GPL 2 building location has not been determined.

FIGURE V-1

CUMULATIVE PROJECTS

TABLE V-1 **PROJECTS AT LBNL AND UC CAMPUS DURING THE PROPOSED ACTION TIMEFRAME**

	2010	2011	2012	2013	2014	2015	2016	2017	2018
PROJECTS AT LBNL									
User Support Building									
Building 25 Demolition									
GPL at Building 25 Site									
Old Town Demolition									
SERC									
Seismic Phase 3									
Seismic Phase 1 Building 50									
CRT									
Building 55 Demolition									
Building 51 and Bevatron									
Building 71 BELLA									
Building 71 Trailer Demolition									
User Test Bed Facilities									
GPL at Building 74 SE (Alt A)									
Building 74 Modernization									
Building 85 Seismic Strengthening									
PROJECTS ON UCB CAMPUS AND IN ADJACENT CITY OF BERKELEY									
Student Athlete High Performance Center									
Stadium Seismic Upgrade									
UCB Law School Infill									

TABLE V-1 **PROJECTS AT LBNL AND UC CAMPUS DURING THE PROPOSED ACTION TIMEFRAME** (CONTINUED)

	2010	2011	2012	2013	2014	2015	2016	2017	2018
Utilities/ROW in Piedmont Ave.									
Storm and Sewer in Gayley Rd.									
Chang-Lin Tien Center Phase 2									
Community Health Campus Phases 1 and 2									
Northeast Quadrant Science and Safety Project									
Campbell Hall Replacement									
Anna Head Housing									
Berkeley Art Museum/PFA									
DHS Demo/Helios, 2151 Berkeley Way									
Blum Center/Naval Architecture									
Warren Hall Replacement/Li Ka Shing Center Steps 1&3									
Various Construction Projects									
Tolman Hall Seismic Renovation									
Lewis Hall Seismic Renovation									
Mulford Hall Seismic Renovation									
Dwinelle Annex Renovation									
Hearst Gym Seismic and Program Renovation and Expansion									

Note: **Bold** = Proposed Action and Alternatives.
Construction Durations shown in calendar years.

V.A.1.b. Old Town Demolition

Status: Environmental review completed. Project approved December 2009.
Anticipated Project Start: Late 2010
Anticipated Project End: Mid 2013
Project Size: 55,000 gsf
CEQA Documentation: Covered by LBNL 2006 LRDP EIR
NEPA Documentation: Categorical Exclusion, December 2009
Description: This project covers the decontamination and demolition of certain buildings in the LBNL "Old Town" area in the center of the LBNL site, and associated environmental restoration. Depending on funding, up to 14 buildings would be decontaminated and demolished, including Buildings 4, 5, 7, 7C, 14, 16, 25A, 40, 41, 44, 44A, 44B, 52, and 52A. In addition, any contaminated soil under these structures would be remediated and groundwater treatment systems (if necessary) would be installed within the approximately three-acre project area.
Project Sponsor: DOE
Relevance: Geographic proximity to Building 25 demolition and GPL and concurrent nature of work. Construction vehicle traffic and equipment from Old Town Demolition is included in traffic, air quality, and noise analyses. Demolition activities are considered in discussions of hazardous substances and human health, water resources, biological resources, aesthetics, and air quality.

V.A.1.c. Seismic Phase 1 – Building 50

Status: In Progress. It is anticipated that the Building 50 work would be finished prior to start of Proposed Action.
Anticipated Project End: Early 2010
Project Size: 48,719 gsf
CEQA Documentation: Categorical Exemption
NEPA Documentation: Categorical Exclusion
Description: Seismic Phase 1 is intended to correct structural deficiencies in LBNL Buildings 50 and 74 in order to improve their performance in a seismic event and upgrade the seismic rating of the buildings from "Poor" to "Good." Seismic Phase 1 work for Building 74 was finished in late 2009.

Project Sponsor: DOE
Relevance: Project location at LBNL site. Although included for completeness, this project is not relevant to any of the issues discussed below due to lack of time overlap.

V.A.1.d. Seismic Upgrades, Modernization & Replacement of General Purpose Buildings, Phase 3 (Seismic Phase 3)
Status: Conceptual design studies expected in 2011
Anticipated Project End: 2018
Project Size: 40,000-46,000 gsf
CEQA Documentation: None as yet
NEPA Documentation: None as yet
Description: LBNL's Seismic Phase 3 project would involve modernization of Building 26, a critical medical emergency facility, and Building 54, which houses conference rooms and a Lab-wide cafeteria and dining facility, in order to upgrade the buildings' seismic ratings from "Poor" to "Good." Buildings 45 and 48, which are connected and comprise the Laboratory Fire Station, would also be upgraded to a seismic rating of "Good." Finally, a General Purpose Laboratory would be constructed at a location as yet undetermined under Seismic Phase 3, to replace 40,000-46,000 gross square feet of seismically unsafe and deficient space demolished as part of the project.
Project Sponsor: DOE
Relevance: Geographic proximity to Building 25 demolition and Seismic Phase 2B GPL construction. Operational traffic from Seismic Phase 3 is included in cumulative traffic and air quality analyses.

V.A.1.e. Building 51 and the Bevatron Demolition
Status: In Progress. Expected to be finished before Proposed Action starts.
Anticipated Project End: Late 2011
Project Size: 96,562 gsf
CEQA Documentation: EIR certified July 2007, tiered from LBNL 1987 LRDP EIR.
NEPA Documentation: EA/FONSI, April 2008

Description: The work involves demolition and removal of the Building 51 complex, including the Bevatron (a retired particle accelerator), and the concrete blocks and building shell surrounding it.
Project Sponsor: DOE
Relevance: Project located near Building 55 demolition, although no predicted time overlap.

V.A.1.f. Berkeley Lab Laser Accelerator (BELLA) Laser Acquisition, Installation and Use for Research and Development

Status: In design phase
Anticipated Project Start: Laser system purchased; construction start date Fall 2010
Anticipated Project End: 18-month long period. Expected ending in 2012
Project Size: N/A
CEQA Documentation: Categorical Exemption, October 2009
NEPA Documentation: NEPA EA/FONSI, September 2009
Description: BELLA will take place almost entirely within Building 71, involving modifications to the internal structure to support a shielded experimental cave and support functions. The cave will house a new laser accelerator system. An additional utility room and stairwell will be added to the roof.
Project Sponsor: DOE
Relevance: Project location near Building 71 trailer demolition. Construction vehicle traffic and equipment from BELLA construction is included in discussions of traffic, air quality, and noise analyses.

V.A.1.g. User Test Bed Facilities

Status: Awarded funding December 2009
Anticipated Project Start: Summer 2011
Anticipated Project End: Winter 2012
Project Size: Approximately 10,000 gsf, but could be less
CEQA Documentation: None as yet
NEPA Documentation: None as yet

Description: The User Test Bed Facilities project would consist of a series of energy-efficient building "testbeds" in new and/or existing buildings to allow researchers to conduct measurements of energy use with various prototype building systems such as windows, lights, heating, ventilation, and air conditioning (HVAC), roofs, and skylights. The project is in a very early stage of development at this time. Consideration is being given to renovating existing interior floor space in Building 90, with the possibility of adding a small support building next to Building 90 on a parking lot.
Project Sponsor: DOE
Relevance: Project location near Building 71 trailer demolition. Included for the sake of completeness, but due to the lack of information and the early stage in project planning, it is not included in the analysis below. However, due to its relatively small size, it would make a minimal difference in the quantitative cumulative impact analyses, and would not change the impact conclusions in this document.

V.A.1.h. Building 74 Modernization
Status: In Progress
Anticipated Project End: Mid 2012
Project Size: 45,383 gsf
CEQA Documentation: Covered by LBNL 2006 LRDP EIR
NEPA Documentation: Categorical Exclusion
Description: An additional phase of Building 74 modernization work involves interior renovation of the entire building, including new mechanical, electrical and plumbing systems, new interior partitions, finishes, and laboratory casework.
Project Sponsor: DOE
Relevance: Project location near Building 85 seismic strengthening, and Alternative A location for GPL. Construction vehicle traffic and equipment from Building 74 modernization is included in traffic, air quality, and noise analyses.

V.A.2. UC Projects at LBNL

V.A.2.a. Solar Energy Research Center (SERC)

Status: Anticipated, foreseeable.

Anticipated Project Start: Mid 2011

Anticipated Project End: Late 2013

Project Size: 38,000 gsf

CEQA Documentation: Underway

NEPA Documentation: None as yet

Description: The goal of the Solar Energy Research Center (SERC) project is to accelerate the development of sustainable solar energy sources through various initiatives, such as the development of new materials for use in collectors, efficient processing steps, and energy handling. SERC at LBNL would be an approximately 38,000 gsf building devoted to new photovoltaic and electrochemical solar-energy systems. Various sites on the LBNL site, including the Building 25A demolition site, are currently being evaluated for this project. All are served by existing roadways and utilities.

Project Sponsor: UC

Relevance: Although not yet approved, this project is included due to its proximity to Building 25 demolition and GPL construction and its overlapping schedule. Only this location for SERC is examined. Construction vehicle traffic and equipment from SERC construction is included in traffic, air quality, and noise analyses. Construction activities are considered in discussions of hazardous substances and human health, water resources, biological resources, aesthetics, and air quality. Operational traffic from SERC is included in cumulative traffic, air quality, and noise analyses.

V.A.2.b. The Computational Research and Theory Building (CRT)

Status: Anticipated; foreseeable

Anticipated Project Start: Late 2010

Anticipated Project End: Late 2013

Project Size: 126,000 gsf

CEQA Documentation: EIR certified by The UC Regents in May 2008

NEPA Documentation: Underway

Description: As currently proposed by UC, the Computational Research and Theory (CRT) Building would be constructed near the Blackberry Gate entrance to the LBNL site. The project would provide high-end computing floor space and accompanying office space.
Project Sponsor: UC
Relevance: Project location at LBNL site and timeframe would overlap with Proposed Action. Construction vehicle traffic and equipment from CRT construction is included in cumulative traffic, air quality, and noise analyses. Operational traffic from CRT included in cumulative traffic, air quality, and noise analyses.

V.A.3. UC Projects on UC Campus and in Adjacent City of Berkeley

These are included due to their relevance in the traffic, air quality, and noise analyses from construction activity. Timeframes are included in Table V-1.

Southeast Campus Integrated Projects

- Student Athlete High Performance Center (158,000 gsf)
- Stadium Seismic Upgrade (120,000 gsf)
- UC Berkeley Law School Infill (52,100 gsf)
- Utilities/ROW in Piedmont Avenue (N/A)
- Storm and Sewer in Gayley Road (N/A)
- Chang-Lin Tien Center Phase 2 (43,500 gsf)
- Community Health Campus Phases 1 and 2 (300,000gsf)
- Northeast Quadrant Science and Safety Project (demolition of 100,000 gsf of existing buildings, and construction of 430,000 gsf of laboratory and classroom space)
- Campbell Hall Replacement (81,600 gsf)
- Anna Head Housing (143,000 gsf)
- Berkeley Art Museum and Pacific Film Archive (142,000 gsf)
- DHS Demolition/Helios Construction, 2151 Berkeley Way (120,000 gsf)
- Blum Center/Naval Architecture (23,918 gsf)
- Warren Hall Replacement/Li Ka Shing Center Steps 1 &3 (200,000 gsf)
- Various Construction Projects

- Tolman Hall Seismic Renovation: (247,000-gsf) demolition/ construction, 2012 through 2013.
- Lewis Hall Seismic Renovation: (68,100-gsf) demolition/construction, 2015 through 2016.
- Mulford Hall Seismic Renovation: (93,500-gsf) demolition/ construction, 2012 through 2013.
- Dwinelle Annex Renovation: 817-square-meter (8,800-gsf) demolition/ construction, 2016 through 2017.
- Hearst Gym Seismic and Program Renovation and Expansion: 11,520-square-meter (124,000-gsf) demolition/construction, 2017 through 2018.

Vegetation Management Projects

The University has applied, through the State of California Governor's Office of Emergency Services, to the Federal Emergency Management Agency (FEMA) for funding under the Pre-Disaster Mitigation (PDM) Program to conduct vegetation management activities in Strawberry Canyon, Claremont Canyon, and Frowning Ridge. The vegetation management activities would involve removal of non-native trees, including approximately 10,000 stems of eucalyptus trees from Strawberry Canyon, approximately 12,000 stems of eucalyptus trees from the Claremont Canyon area, and approximately 24,000 stems of eucalyptus and pine trees from the Frowning Ridge location. Environmental review of the projects has not been completed. After approval, each project is expected to take place over a three-year period.

V.B. Issues Determined Not to Warrant Further Discussion

As discussed in Chapter IV, the following environmental issues are scarcely affected by the Proposed Action and are not discussed further at the cumulative level: Population and Housing, Socioeconomic and Environmental Justice, Intentional Destructive Acts, Public Services, Cultural Resources, Land Use and Planning, Utilities and Waste Management, and Hazards from Wildfires.

V.B.1. Proposed Action (GPL Construction and Operation at B25/25B Site, B25/25B, B55, B71 Trailer Demolition and B85/85A Seismic Strengthening)

The Proposed Action was determined not to affect the topical areas of Population and Housing, Socioeconomic and Environmental Justice, Intentional Destructive Acts, Public Services, Cultural Resources, Land Use and Planning, Utilities and Waste Management, and Hazards from Wildfires. Because there are no identified impacts at the project level, construction of the Proposed Action would not contribute to cumulative effects in these areas.

V.B.2. Alternative A (GPL Construction and Operation at B74 SE Parking Lot, B25/25B, B55, B71 Trailer Demolition and B85/85A Seismic Strengthening)

Alternative A was determined not to affect the topical areas of Population and Housing, Socioeconomic and Environmental Justice, Intentional Destructive Acts, Public Services, Cultural Resources, Land Use and Planning, Utilities and Waste Management, and Hazards from Wildfires. Because there are no identified impacts at the project level, construction of this alternative would not contribute to cumulative effects in these areas.

V.B.3. Alternative D (B85/85A Seismic Strengthening Only)

There would not be cumulative impacts resulting from construction of Alternative D in these topical areas.

V.B.4. No-Action Alternative

No cumulative impacts in these topical areas would occur under the No-Action Alternative.

V.C. Issues Determined to Warrant Further Discussion

V.C.1. Geological and Seismic Hazards

The APE for geological and seismic hazards is taken as the locations where LBNL personnel work and are exposed to geological and seismic hazards during their working day, on the site.

V.C.1.a. Proposed Action (GPL Construction and Operation at B25/25B Site, B25/25B, B55, B71 Trailer Demolition and B85/85A Seismic Strengthening)

UC LBNL plans to continue its program of correcting seismic deficiencies in existing buildings by upgrading or replacing them, and the Proposed Action would only result in a negligible increase in the ADP of the LBNL site. In addition, adherence to State requirements such as the California Building Code with its strict provisions for structural design in seismically active areas such as Berkeley would ensure that the associated risks would be reduced to acceptable levels.

V.C.1.b. Alternative A (GPL Construction and Operation at B74 SE Parking Lot, B25/25B, B55, B71 Trailer Demolition and B85/85A Seismic Strengthening)

Cumulative effects under this alternative would be the same as the Proposed Action for Geological and Seismic Hazards.

V.C.1.c. Alternative D (B85/85A Seismic Strengthening Only)

As with the proposed project, no cumulative effects would occur under this alternative.

V.C.1.d. No-Action Alternative

The No-Action Alternative would prolong the existing situation, leaving Building 85 without additional protection from the underlying landslides that could move during a severe seismic event, but would not introduce new effects.

V.C.2. Hazardous Substances and Human Health

The APE for consideration of the cumulative effects of hazardous substances and the risks to human health is taken as the area immediately surrounding the locations of the Proposed Action components, or the GPL location under Alternative A. These are the locations where LBNL personnel work and are exposed to hazards during their working day, as well as the land around the buildings that could be affected by the release of contamination into soil and groundwater.

V.C.2.a. Proposed Action (GPL Construction and Operation at B25/25B Site, B25/25B, B55, B71 Trailer Demolition and B85/85A Seismic Strengthening)

The demolition component of the Proposed Action could potentially release chemicals used in Building 25/25B and Building 55 (both of which have been used as chemical laboratories) to the air, soil, or groundwater in the vicinity of those structures. The Old Town area of LBNL is contiguous to Building 25/25B, and the period of demolition of the Old Town buildings overlaps the Building 25/25B demolition. In addition, excavation and construction of the GPL under the Proposed Action could overlap construction of the SERC if this location is selected. Reinstallation of groundwater monitoring wells that are part of the ongoing Building 25/25A remediation system will take place with consideration for the effects of the combined project work.

Potential project-specific effects would be reduced through implementation of the SPF HAZ-3(a) as described in Appendix A of this EA, and also through compliance with local, regional, State, and Federal regulations. Releases of dust would be minimized by the incorporation of standard dust control measures as part of SPF AQ-1 (a) from Appendix A, which calls for dust abatement control measures.

Construction of the GPL at the Building 25/25B site, under the Proposed Action, would involve excavation to a depth of over 10 feet (compared to at least 3 feet if the GPL is not located here) in an area previously contaminated with VOCs. Soil and groundwater sampling performed in compliance with

the SMP and GWMP would ensure that any new, as yet undiscovered, sources would be remediated prior to construction of the building. Adherence to health and safety plans would ensure protection of construction workers.

Building 55 demolition work would take place more than several hundred feet from the Bevatron and Building 51 and is scheduled to take place one to two years afterwards, so one project would not likely affect the other.

Seismic strengthening of Building 85/85A, although it involves borings up to approximately 50 feet deep and about 4 to 5 feet wide, takes place in an area of no known contamination. Additionally, it is unlikely to provide any pathways for spreading contamination should any be released in a future event.

V.C.2.b. Alternative A (GPL Construction and Operation at B74 SE Parking Lot, B25/25B, B55, B71 Trailer Demolition and B85/85A Seismic Strengthening)

Alternative A would involve construction at the Building 74 SE Parking Lot site, located relatively near Building 85/85A, where the seismic strengthening component of the Proposed Action would take place. However, as previously indicated, Building 85/85A strengthening would not involve contaminated soil. Besides the Alternative A location for the GPL, there is no other foreseeable development planned for the Strawberry Canyon area.

V.C.2.c. Alternative D (B85/85A Seismic Strengthening Only)

As previously indicated, Building 85/85A strengthening would not involve contaminated soil.

V.C.2.d. No-Action Alternative

The No-Action Alternative would not introduce any new environmental effects. However, with the projected growth of LBNL as outlined under the LBNL 2006 LRDP, there would be an increase in the number of personnel and activities at the LBNL site and the number of hazardous-waste generating

activities. Under an agreement with the Department of Toxic Substances Control (DTSC) entered pursuant to the Federal Facility Compliance Act of 1992, certain mixed waste streams are stored at LBNL for longer than the year limit normally allowed at permitted hazardous waste handling facilities such as the HWHF in order to allow for characterizing the waste and locating appropriate mixed waste treatment and disposal facilities. Therefore, it would not be possible to operate multiple interim storage facilities around the site for short-term stockpiling before manifesting to a final destination, and it would be necessary to have a functioning waste treatment facility on-site.

V.C.3. Water Resources

The APE for consideration of the cumulative effects of risks to Water Resources is taken as the Strawberry Creek watershed that is affected by the components of the Proposed Action, Alternative A, and Alternative D. For potential cumulative impacts on hydrology and water quality, only those projects that would include grading, excavation, new exterior construction, and/or intensified land use that are in the same watershed would be expected to be capable of contributing to cumulative hydrology and water quality impacts. This includes the USB, SERC, CRT, Seismic Phase 3, and Old Town Demolition. Potential water quality issues from groundwater contamination are described under Section V.C.2, above.

V.C.3.a. Proposed Action (GPL Construction and Operation at B25/25B Site, B25/25B, B55, B71 Trailer Demolition and B85/85A Seismic Strengthening)

At the project level, it was found that the Proposed Action would not cause any changes in drainage patterns, sediment runoff, or groundwater infiltration as a result of the demolition or seismic strengthening components. In addition, a new GPL constructed at the LBNL site would use water supplied by EBMUD and would not draw on groundwater.

Concurrent projects listed in Section V.A. located in the APE for cumulative analysis of Water Resources would occur largely on previously developed land. Consequently, they would result in a loss of approximately 3.14 acres

of pervious surface in the Strawberry Creek watershed. This represents approximately 0.26 percent of the 1,163 acre watershed. The shallow soils located on steep slopes that exist across the majority of the site permit rapid runoff and likely do not allow for substantial levels of groundwater recharge to occur. Therefore, in general, impacts to groundwater recharge area from present and future development in the APE would be minimal. This represents the background situation under the No-Action Alternative.

The Proposed Action would take place entirely on previously developed land and therefore would not contribute to loss of pervious surface on the site or affect groundwater recharge. In addition, surface water resources would not increase due to compliance with SPFs from Appendix A which maintain current flows through retention techniques, thus avoiding erosion of the creek system.

V.C.3.b. Alternative A (GPL Construction and Operation at B74 SE Parking Lot, B25/25B, B55, B71 Trailer Demolition and B85/85A Seismic Strengthening)

Under Alternative A, construction of the GPL at the Building 74 SE Parking Lot site would result in the loss of about 20,000 square feet (0.46 acres) of undeveloped land and would thus contribute to the foreseeable loss of pervious surface in the APE. However, 20,000 square feet represents only eight percent of the total foreseeable area that could be converted to impervious surface and only 0.04 percent of the total area of the Strawberry Creek watershed.

Additional stormwater runoff that would result from development of an additional 20,000 square feet under Alternative A would be managed by three new stormwater drains and a new stormwater detention basin, all designed in conformance with NPDES regulations to ensure no net increase in runoff flowing into the storm sewer system from the GPL.

V.C.3.c. Alternative D (B85/85A Seismic Strengthening Only)

Seismic strengthening activities would result in no increases in impervious surfaces or stormwater runoff at the Building 85/85A site, and therefore no change to baseline conditions.

V.C.3.d. No-Action Alternative

No increases in stormwater runoff would occur under the No-Action Alternative.

V.C.4. Biological Resources

For the Proposed Action, Alternative A, Alternative D, and the No-Action Alternative, the APE for consideration of the cumulative effects on biological resources is taken as the East Bay hills.

V.C.4.a. Proposed Action (GPL Construction and Operation at B25/25B Site, B25/25B, B55, B71 Trailer Demolition and B85/85A Seismic Strengthening)

The Proposed Action takes place entirely on land that is already developed or otherwise disturbed. Minor and temporary effects on the adjacent biota could be caused by demolition/construction noise and dust. The possible removal of three trees would be compensated by planting replacement trees elsewhere on the LBNL hill site. The schedule for construction of the GPL at the Building 25/25B demolition site, under the Proposed Action, would overlap with projects such as Old Town demolition and construction of SERC, if that were to take place at the Building 25A Site. This would exacerbate the disturbance, but overall would not contribute to a cumulatively adverse effect on biological resources because of the highly developed nature of LBNL in the Old Town area.

V.C.4.b. Alternative A (GPL Construction and Operation at B74 SE Parking Lot, B25/25B, B55, B71 Trailer Demolition and B85/85A Seismic Strengthening)

Although a large percentage of the GPL site under Alternative A is a parking lot, construction would involve excavation and development of an undevel-

oped hillside in an area that is critical habitat for a threatened species, the Alameda whipsnake, as well as habitat for other wildlife and plants. It could also involve removal of approximately 46 trees, including native species such as Coast live oaks. The SPFs listed in Appendix A are part of the Proposed Action and would reduce the effects on the whipsnake and other wildlife. (See SPFs BIO-3, BIO-4, BIO-5 (a) through (f), which include pre-construction surveys and vegetation management).

Nonetheless, Alternative A would see the development of about 20,000 square feet (approximately 0.46-acre) of as yet undeveloped land in the East Bay hills. This would be in addition to the removal of about 9.5 acres of habitat and open space from the LBNL site and the removal of approximately 5 acres removed by other potential development from the UC campus.[4] The Oakland and Berkeley general plans do not foresee development of undeveloped land in the East Bay hills under their respective jurisdictions, nor does the East Bay Regional Park District that controls Tilden and other ridgeline parks. There are more than 10,000 acres of undeveloped land in the East Bay hills,[5] and therefore, the potential loss from Alternative A would be less than 1.5 percent of the total undeveloped area in the East Bay hills.

Development of about 20,000 square feet under Alternative A would represent an increase of approximately three percent over other planned development. UC LBNL and UC Berkeley both have numerous policies and procedures in place to protect threatened species from development in general. With these in place, it is not anticipated that there would be adverse effects to biological resources from planned and foreseeable development, to which Alternative A would contribute only 0.46 acres of a total of 14.5 acres.

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[4] LBNL, 2007, *Long-Range Development Plan Environmental Impact Report*, page IV.C-57.

[5] East Bay Regional Park District, http://www.ebparks.org/parks, accessed on February 24, 2010.

V.C.4.c. Alternative D (B85/85A Seismic Strengthening Only)
No effects to biological resources would occur under this alternative.

V.C.4.d. No-Action Alternative
No effects to biological resources would occur under this alternative.

V.C.5. Aesthetics

The APE for consideration of the cumulative effects to aesthetics is taken as the LBNL site, including lower elevation viewsheds of the site. The APE applies to the Proposed Action, Alternative A, Alternative D, and the No-Action Alternative.

V.C.5.a. Proposed Action (GPL Construction and Operation at B25/25B Site, B25/25B, B55, B71 Trailer Demolition and B85/85A Seismic Strengthening)

The Proposed Action would decrease the density of development at the LBNL hill site by removing Building 55 and Building 71 trailers from the viewshed, and removing Building 25/25B, but replacing it with a new building. The new building would be taller and slightly more prominent than the existing building, but would be located in the center of the LBNL site, the portion of the site that is historically the most developed. As it is behind the cusp of a hill, the location could only be viewed from selected viewpoints. It is anticipated that this part of the LBNL hill site would undergo several changes that could affect its aesthetic qualities, including the demolition of the Old Town and possible construction of SERC at the Building 25A site. SERC is likely to be similar in height to the proposed GPL and not highly visible from off-site. Overall, changes in the Old Town area would reduce the amount of developed space and the density of development in the center of LBNL and would add two new aesthetically pleasing buildings (GPL and SERC) in their place. To most eyes, the cumulative effect would be an improvement in the visual character of the area.

V.C.5.b. Alternative A (GPL Construction and Operation at B74 SE Parking Lot, B25/25B, B55, B71 Trailer Demolition and B85/85A Seismic Strengthening)

Construction of the GPL at the Building 74 SE Parking Lot under Alternative A would increase the amount of developed land in the Strawberry Canyon area. The addition of the GPL to the Strawberry Cluster (Figure V-1) would increase the amount of development in Strawberry Canyon that is visible from natural areas, including hiking trails to the southeast. However, there are currently no plans for further development of the Strawberry Canyon area either by LBNL or other parties, and a large portion of Strawberry Canyon is designated as Perimeter Open Space under the LBNL 2006 LRDP land use classification system. Overall, Alternative A would not contribute to a cumulative aesthetic effect in the APE.

V.C.5.c. Alternative D (B85/85A Seismic Strengthening Only)

No effects to aesthetic resources would occur under this alternative.

V.C.5.d. No-Action Alternative

No effects to aesthetic resources would occur under this alternative.

V.C.6. Transportation and Traffic

The APE for consideration of the cumulative effects to transportation and traffic for the Proposed Action is taken as the designated truck routes from the LBNL construction sites to the freeway (for construction truck traffic) and the streets in Berkeley around the UC Berkeley Campus (for operational traffic).

V.C.6.a. Proposed Action (GPL Construction and Operation at B25/25B Site, B25/25B, B55, B71 Trailer Demolition and B85/85A Seismic Strengthening)

The cumulative effects of the Proposed Action on traffic and transportation are identified and analyzed in Chapter IV, Section IV.C.6. As discussed, construction traffic at LBNL would be controlled so as not to cause an intersection level of service threshold to be exceeded. Also as discussed, because there

would be no increase in the number of vehicle commute trips associated with the Proposed Action, with any of Alternatives A, D, or the No-Action Alternative, conditions on stressed intersections in the vicinity of the site would not be exacerbated.

V.C.6.b. Alternative A (GPL Construction and Operation at B74 SE Parking Lot, B25/25B, B55, B71 Trailer Demolition and B85/85A Seismic Strengthening)

Cumulative effects would be the same as the Proposed Action.

V.C.6.c. Alternative D (B85/85A Seismic Strengthening Only)

Construction traffic under Alternative D would be limited to trucks from the Building 85/85A seismic strengthening component. As with the Proposed Action, the Site Construction Coordinator would manage construction traffic to stay within accepted daily limits.

V.C.6.d. No-Action Alternative

The No-Action Alternative would not involve any demolition, new construction or seismic strengthening and there would be no change to the current situation with respect to transportation and traffic.

V.C.7. Noise

The APE for consideration of the cumulative effects of noise is taken as the areas immediately surrounding the components of the Proposed Action, Alternative A, or Alternative D sites that would be affected by noise from project activities.

V.C.7.a. Proposed Action (GPL Construction and Operation at B25/25B Site, B25/25B, B55, B71 Trailer Demolition and B85/85A Seismic Strengthening)

V.C.7.a.i. Cumulative Construction Noise

If the Proposed Action were to go ahead as planned, it would be one of several construction projects underway at approximately the same time in the Old Town area in the center of the LBNL site. The USB is a construction

project underway and anticipated to last at least until late 2010. Old Town demolition would follow on a similar schedule, starting in mid 2010. Construction of SERC at the Building 25A demolition site (if the project goes ahead at that location) is anticipated to start in early 2011. However, these projects would all take place near the center of the LBNL site, well away from the LBNL perimeter fence and (as measured from the GPL site at Building 25/25B) approximately 1,800 feet from the nearest residences. With the incorporation of SPFs NOISE-1 (a) to (b), and NOISE-4, from Appendix A, which call for comprehensive noise control specifications, cumulative construction noise would not exceed City of Berkeley noise standards at the nearest off-site receptors.

Building 55 demolition would take place in the Bayview Cluster area in the northwest of the site in 2013. Demolition of the Bevatron and Building 51, located in relatively close proximity, is expected to be finished by early 2011 so there would not be cumulative effects on neighboring residences resulting from this component of the Proposed Action. Similarly Building 71 trailer demolition, although in close proximity to the Berkeley Lab Laser Accelerator (BELLA) site, is not expected to have much, if any, overlap in time and would be completed within a relatively short period.

The seismic strengthening at Building 85/85A would take place at the same time as the Building 74 modernization work. However, both activities would take place mostly inside the buildings, or underground and out of view. Therefore no cumulative noise effects would result.

V.C.7.a.ii. Cumulative Construction Traffic Noise

Cumulative construction truck traffic from all LBNL and UC projects concurrent with the Proposed Action was analyzed to determine whether or not it would cause a substantial temporary increase in noise along the major arterials (Hearst Avenue, Oxford Street, and University Avenue) used by the construction trucks. To demonstrate a worst-case scenario, assuming all projects were under construction concurrently and all construction truck traffic traveled along the same arterials, on an average day calculations indicate the

noise level would increase by less than 1 dBA L_{dn}. On a peak day the noise level is calculated to increase from about 1 to 2 dBA L_{dn}. The second scenario represents the upper estimate of possible noise effects because peak construction truck traffic for all projects would be controlled so as not to overlap. As a rule of thumb, an increase of less than 3 dBA L_{dn} is not substantial and there would be no cumulative noise impacts from construction truck traffic to, from, or within the LBNL site under the Proposed Action.[6]

V.C.7.a.iii. Cumulative Operational Noise

Operational noise from the proposed GPL at the Building 25/25B site would not make a considerable contribution to community noise levels. Even if SERC were constructed on an adjacent site, both buildings would be sufficiently far from off-site sensitive receptors that no effects at the cumulative level would result.

V.C.7.b. Alternative A (GPL Construction and Operation at B74 SE Parking Lot, B25/25B, B55, B71 Trailer Demolition and B85/85A Seismic Strengthening)

V.C.7.b.i. Cumulative Construction Noise

As discussed in Section IV.C.7, it is unlikely that the noise level from construction at this location would meet the standard at the UC Botanical Garden. The seismic strengthening at Building 85/85A would take place at the same time as the Building 74 modernization work. However, both activities would take place mostly inside the buildings, or underground and out of view. Therefore no cumulative noise effects would result.

V.C.7.b.ii. Cumulative Construction Traffic Noise

Under Alternative A, a similar volume of construction traffic would travel along the same designated truck routes as under the Proposed Action, and consequently no cumulative effect on noise would result from this alternative either.

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[6] Rich Rodkin, Principal, Illingworth & Rodkin, Inc. Personal communication with DC&E, January 25, 2010.

V.C.7.b.iii. Cumulative Operational Noise

As discussed above in IV.C.7.c.ii, operational noise from the GPL at the Building 74 SE site could result in noise levels above City of Oakland regulatory thresholds. This is due to the proximity of sensitive receptors in the UC Botanical Garden, located less than 50 feet away from the GPL at its nearest point. Combined with background noise from existing development at Buildings 85, 83, and 84, the situation would be compounded. Consequently, Alternative A would result in both project-specific and cumulative effects on surrounding sensitive receptors due to operational noise.

V.C.7.c. Alternative D (B85/85A Seismic Strengthening Only)

V.C.7.c.i. Cumulative Construction Noise

The seismic strengthening at Building 85/85A would take place at the same time as the Building 74 modernization work. However, both activities would take place mostly inside the buildings, or underground and out of view. Therefore no cumulative noise effects would result.

V.C.7.c.ii. Cumulative Construction Traffic Noise

Construction traffic under Alternative D would be limited to trucks from the Building 85/85A seismic strengthening component, resulting in no cumulative noise effects.

V.C.7.c.iii. Cumulative Operational Noise

There would be no change in operational noise from existing conditions.

V.C.7.d. No-Action Alternative

The No-Action Alternative would not involve any demolition, new construction or seismic strengthening and there would be no change to the current situation with respect to noise.

V.C.8. Air Quality

The APE for consideration of the cumulative effects on air quality is, in general terms, the San Francisco Bay Area Air Basin. However, the various pollutants of concern have different areas of spatial effect depending on their

nature and sources. BAAQMD guidelines have taken these factors into account in the criteria used as cumulative thresholds. Air quality emissions from the Proposed Action in combination with other concurrent projects were calculated by Golder Associates, 2010.

The BAAQMD recently approved new guidance for use in evaluating cumulative impacts from toxic air contaminant emissions under CEQA. By its own terms, that guidance does not apply to the evaluation of this proposed Federal action under NEPA. However, because there is no well-defined set of Federal standards for TACs or HAPs, cumulative air quality impacts from HAPs/TACs associated with the Proposed Action in conjunction with projects occurring over the same time period are evaluated below using the BAAQMD thresholds.

V.C.8.a. Proposed Action (GPL Construction and Operation at B25/25B Site, B25/25B, B55, B71 Trailer Demolition and B85/85A Seismic Strengthening)

V.C.8.a.i. Construction, Demolition and Seismic Strengthening

For this assessment, cumulative DPM and $PM_{2.5}$ emissions from trucks and off-road equipment associated with all identified construction and demolition projects (including the Proposed Action) occurring over the Proposed Action time period were estimated, using methods and models identical to those used to estimate DPM and $PM_{2.5}$ emissions from trucks and off-road equipment associated with the Proposed Action alone, as described in Chapter IV, Section IV.C.8.a. Identical dispersion modeling methods were then used to estimate maximum average DPM concentrations at potential sensitive receptor locations on- and off-site, and maximum average $PM_{2.5}$ concentrations in ambient air (defined as any off-site location).

Next, LECR and chronic hazard for the hypothetical MEI were calculated using the same methods used to estimate these impacts resulting from on-road truck and off-road equipment emissions in Chapter IV, from the Proposed Action alone. These results are provided in Tables V-2 and V-3.

TABLE V-2 **CUMULATIVE MEI LECR AND CHRONIC HAZARD ESTIMATES FOR ON-SITE, OFF-ROAD CONSTRUCTION/DEMOLITION EQUIPMENT DPM EMISSIONS**

Assessment	MEI Result	Significance Threshold
Cumulative On-Site LECR	15-in-a-million	100-in-a-million
Cumulative On-Site Chronic Hazard	0.3	1.0
Cumulative Off-Site LECR	25-in-a-million	100-in-a-million
Cumulative Off-Site Chronic Hazard	0.06	1.0

Source: Golder Associates, January 2010.

TABLE V-3 **CUMULATIVE MEI LECR AND CHRONIC HAZARD ESTIMATES FOR CONSTRUCTION/DEMOLITION TRUCK TRAFFIC**

Assessment	MEI Result	Significance Threshold
Cumulative Off-Site LECR	9-in-a-million	100-in-a-million
Cumulative Off-Site Chronic Hazard	0.02	1.0

Source: Golder Associates, January 2010.

Maximum cumulative $PM_{2.5}$ concentrations in ambient air (i.e. any off-site location) were also determined using dispersion modeling methods identical to those used to determine $PM_{2.5}$ impacts from the proposed project. These results are provided in Table V-4. Based on these estimates, the cumulative LECR, chronic hazard, and $PM_{2.5}$ impacts would not exceed the proposed BAAQMD thresholds.

V.C.8.a.ii. Operations Impact

As described in Chapter IV, Section IV.C.8.b, the maximum LECR impacts from Proposed Action operation would be relatively small: 0.5-in-a-million within the LBNL facility property boundary (5 percent of the BAAQMD

recommended threshold of significance) and 0.2-in-a-million outside of the boundary (2 percent of the BAAQMD recommended threshold of significance). The LBNL 2006 LRDP EIR estimated maximum LECR impacts from all projects occurring over the LRDP period out to 2025 to be 22-in-a-million. Although the proposed project is part of the growth projected under the 2006 LRDP and is therefore already accounted for in the LBNL site-wide LECR assessment, conservatively adding the maximum LECR for the proposed project (0.5-in-a-million) to the maximum cumulative LECR from the LRDP analysis (22-in-a-million) would provide a result of no more than 23-in-a-million. This is less than the BAAQMD proposed threshold of 100-in-a-million (for either construction or operation) for assessing cumulative LECR, and adopted for use in this EA.

V.C.8.b. Alternative A (GPL Construction and Operation at B74 SE Parking Lot, B25/25B, B55, B71 Trailer Demolition and B85/85A Seismic Strengthening)

Alternative A would be very similar to the Proposed Action at the cumulative level for emissions from construction truck travel and construction equipment use. Operational emissions, although similar, would be produced from a location approximately 0.45 miles farther east. According to the analysis in the LBNL 2006 LRDP EIR, air emissions that affect areas north of LBNL are a greater concern than those to the east, because the pollutant load from existing and reasonably foreseeable development in the vicinity is greater in that area. From the perspective of residents living north of the LBNL, site emissions would therefore be less. On the other hand, as described under Section IV.C.8.c, the Alternative A site would be less desirable because emissions would be closer to sensitive receptors in the UC Botanical Garden and the residences nearby. However, as there is no other development planned for the Strawberry Canyon area, there would not be an effect at the cumulative level.

V.C.8.c. Alternative D (B85/85A Seismic Strengthening Only)

This alternative would not generate the emissions associated with demolition and new construction, although there would still be emissions associated with

TABLE V-4 **CUMULATIVE MAXIMUM ESTIMATED ANNUAL $PM_{2.5}$ CONCENTRATION IN AMBIENT AIR FROM CONSTRUCTION/DEMOLITION EMISSIONS**

Pollutant	Assessment	Maximum Ambient Concentration	Significance Threshold
$PM_{2.5}$	On-Site, Off-Road Equipment Emissions	0.31 $\mu g/m^3$	0.8 $\mu g/m^3$
$PM_{2.5}$	Off-Site, On-Road Truck Emissions	0.07 $\mu g/m^3$	0.8 $\mu g/m^3$

Source: Golder Associates, January 2010.

the seismic strengthening. There would be no new operational emissions from the GPL, although there would still be operational emissions associated with activities and employees that would have otherwise occupied the GPL. Given the results of the cumulative analysis discussed above, and the fact that emissions from this alternative would be substantially lower, this alternative would not result in cumulative air quality effects.

V.C.8.d. No-Action Alternative

The No-Action Alternative would not involve any demolition, new construction, or seismic strengthening and there would be no change to the current situation with respect to air quality.

V.C.9. Greenhouse Gases

The effect of GHG emissions upon climate change is a global phenomenon. The discussion presented in Chapter IV is already a cumulative-level discussion because project-related emissions are considered in relation to other existing emissions. The analysis in this EA follows the *Draft NEPA Guidance on Consideration of the Effects of Climate Change and Greenhouse Gas Emissions*, recently issued by CEQ, the federal agency charged with overseeing NEPA's implementation. As discussed above, the contribution to the balance of GHG emissions would be well below the CEQ threshold under the Proposed

Action and each of the alternatives. Additionally, implementation of the Proposed Action or the alternatives would not greatly affect the overall GHG balance and climate change worldwide.

The BAAQMD recently approved new GHG guidance for use in evaluating climate change impacts under CEQA. As noted in Chapter IV, that guidance does not apply to the evaluation of this proposed federal action under NEPA. For informational purposes, however, it is also worth noting that the proposed action (and each of the alternatives thereto) falls below the BAAQMD's screening levels for climate change analysis, and therefore would not be subject to the District's significance criteria for operational GHG emissions in any event.