2.0 PROJECT REFINEMENTS

The Draft Environmental Impact Report (EIR) evaluated the environmental impacts from the construction of the proposed Helios Energy Research Facility project which included the approximately 160,000-gross-square-foot (gsf), 89-foot-high research building and a new controlled-access road that would provide access to the project site from Centennial Drive from just below UC Berkeley Botanical Gardens. Since the publication of the Draft EIR, the Lawrence Berkeley National Laboratory (LBNL) has reviewed the proposed project and determined that in order to avoid the removal of large trees at the intersection of the proposed access road with Centennial Drive, LBNL will recommend to The Regents of the University of California that instead of the project as proposed in the Draft EIR, The Regents consider EIR Alternative 5, "Proposed Project with Alternate Access Road Alignment," for approval. Alternative 5 was described and evaluated for its environmental impacts in Section 6.0, Alternatives, of the Draft EIR. Key aspects of Alternative 5 (hereinafter Preferred Alternative) are summarized below.

2.1 DESCRIPTION OF THE PREFERRED ALTERNATIVE

As described on page 6.0-26 of the Draft EIR, under this alternative, LBNL would construct the Helios research building as envisioned under the proposed project. However, the new access road to serve the research building would be constructed along a different alignment. Under this Preferred Alternative, the proposed access road would be located south of the access road included in the proposed project, avoiding Buildings 73 and 73A, and would intersect with Centennial Drive approximately 400 feet southwest of the project's proposed intersection. Similar to the proposed project, advanced flashing lights would be installed on Centennial Drive to alert motorists that there is an intersection ahead.

Figure 2.0-1, Revised Site Plan, shows the Preferred Alternative as currently proposed. The Preferred Alternative differs from Alternative 5 as presented in the Draft EIR and the previously proposed project only in a few respects that are summarized below.

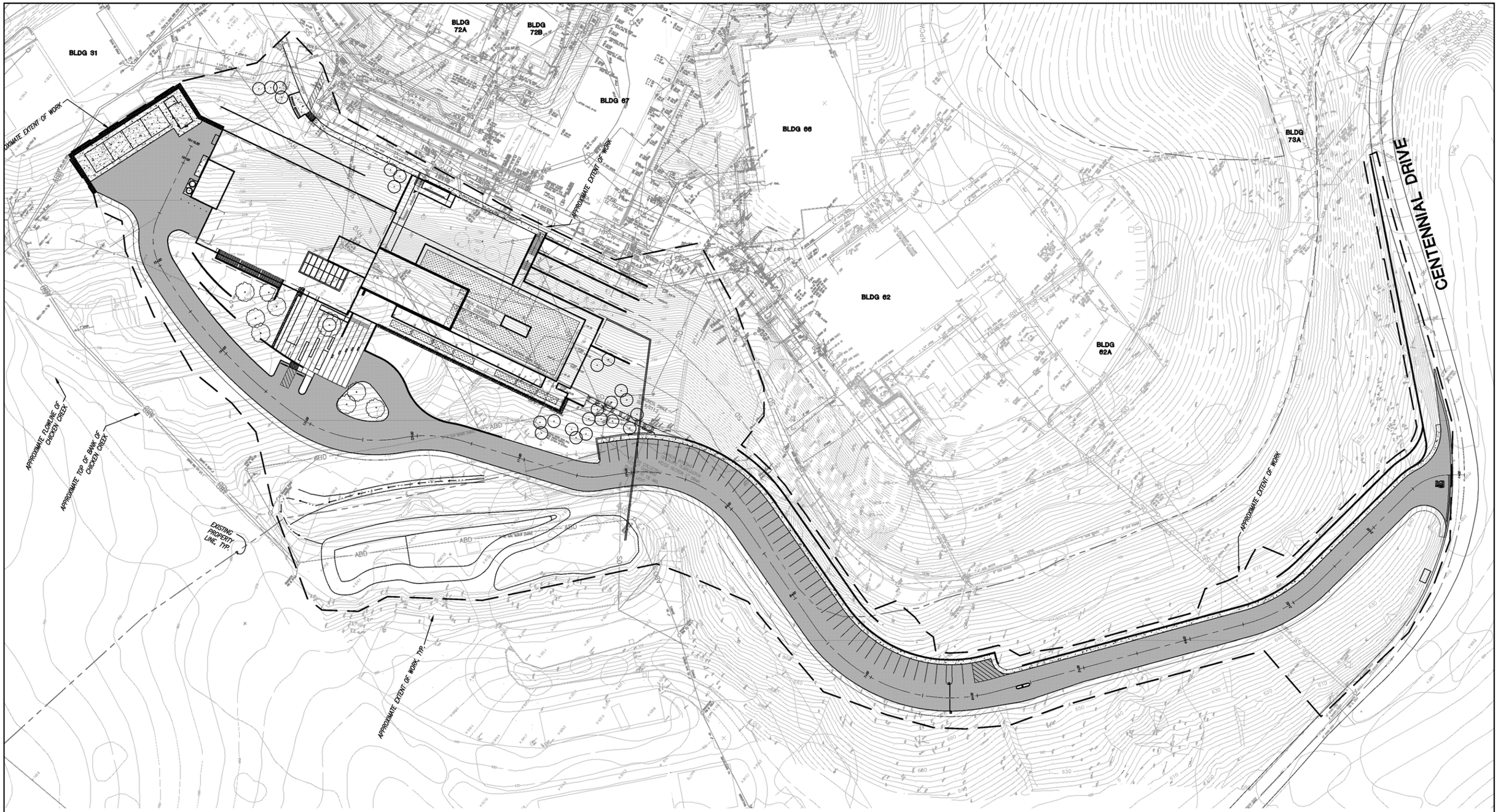
The proposed access road under the Preferred Alternative does not include a turnaround area near the Centennial Drive intersection. This change in the description of the alternative would not increase the severity of previously disclosed environmental impacts of Alternative 5 nor would it result in new environmental impacts.

Because of the topography of the area where the access road would be built under the Preferred Alternative, retaining walls would be needed along some portions of the access road and approximately 16-foot retaining walls would be constructed at the intersection of the access road with Centennial Drive (see **Figure 2.0-1)**. The impact of the new roadway, including the visual impact, is described in more detail below.

Under the Preferred Alternative, no solar panels are proposed over the parking spaces, although solar panels would still be used on the roof top area of the EBI portion of the proposed building. The elimination of the solar panels from the parking area would not alter the previously evaluated environmental impacts of the previously proposed project or Alternative 5.

The potential for landslide materials to affect the Helios building and access road was discussed under Helios Impact GEO-3 and Impact GEO-5, and Helios Mitigation Measure GEO-3 was included to ensure that unstable areas are appropriately addressed during project design (Draft EIR, pages 4.5-14 through 4.5-17). It was noted in Section 5 that Alternative 5 would result in impacts related to geology and soils that are similar to those of the proposed project. Since the publication of the Draft EIR, based on a geotechnical investigation of the building site and the access road (under the Preferred Alternative), LBNL has determined that soft earth materials are present under a portion of the Helios building site and landslide deposits are present along portions of the access road. All of these areas will require stabilization. LBNL has examined various geotechnical solutions to address the soft earth materials at the building site, and has opted for lime treatment of this material. The area with soft earth materials would be excavated and the excavated materials would be stockpiled on site, treated with lime, and placed in lifts within the excavated area until the necessary base grades are reached. None of the excavated material would be off-hauled. Landslide deposits along the access road would either be removed and replaced with engineered fill or stabilized in place using retaining walls.

With respect to storm water improvements included in the previously proposed project and Alternative 5, the Draft EIR noted that a hydromodification vault would be constructed under the turnaround area adjacent to and west of the Helios building to handle all flows from the building and other paved areas including the northern portion of the access road and the parking area. For the lower, southerly portion of the access road, no storm water improvement to control storm water was proposed as part of the previously proposed project (or Alternative 5). Instead of the hydromodification vault, the Preferred Alternative has been designed with a bioretention pond on one of the existing terraces within the project footprint area. Similar to the proposed project and Alternative 5, under the Preferred Alternative, all storm water would flow through grassy swales before discharge into the bioretention pond. This pond has been sized and designed to provide hydromodification control. Furthermore, storm water from the lower portion of the access road under the Preferred Alternative would drain into an existing storm drain that discharges into the mid canyon basin in Strawberry Creek. An in-line stormwater pollution prevention device (Stormwater Management Storm Filter with nine filter cartridges) would be installed in the existing storm drain to remove hydrocarbons, sediment, particulate-bound metals, and nitrate in storm water. All proposed facilities have been evaluated and found to be feasible for construction at the project site (Greco and Remington 2008).



SOURCE: Creegan & D' Angelo - 2007

FIGURE **2.0-1**

Revised Site Plan

924-001•04/08

The Preferred Alternative differs from the previously proposed project in that the construction of the Preferred Alternative would begin in mid 2008 and take place over a period of about 40 months to be completed in late 2011, compared to the previous schedule which was estimated to extend over a period of 24 to 36 months to end in mid 2010. The longer construction schedule is due to a longer (6 months) grading period associated with the construction of the proposed access road and the lime treatment of the soft earth materials.

LBNL is proposing not to seek approval of the auditorium from The Regents at this time because under the Preferred Alternative, the auditorium would not be constructed in the first phase of the project. However, the design of the Preferred Alternative allows for adequate land to be maintained in front of the proposed research building to construct the auditorium in a later phase. Therefore, the auditorium is included in this Final EIR and evaluated for its impacts.

2.2 SUMMARY OF IMPACTS AND MITIGATION MEASURES

The environmental impacts of the Preferred Alternative are discussed on pages 6.0-26 through 6.0-32 of the Draft EIR and are summarized below with additional information provided where necessary based on the minor changes to Alternative 5 that are described above.

2.2.1 Aesthetic Impacts

The Preferred Alternative would avoid the potentially significant impact from the removal of mature, very tall trees near Mather Grove at the intersection of the previously proposed Helios access road and Centennial Drive (Draft EIR, page 6.0-27).

As disclosed in the Draft EIR (page 6.0-27), the Preferred Alternative would result in a greater visual impact from the construction of the roadway. This is associated mainly with the higher retaining walls that would be built adjacent to the new intersection on Centennial Drive. Due to grade changes, much of the length of the roadway itself would not be visible from Centennial Drive or the trail adjacent to Centennial Drive. Two visual simulations of the proposed access road and a bird's eye view of the project site have been prepared to show how the roadway would change the view of the hillside adjacent to Centennial Drive. The proposed Helios Access Road intersection with Centennial Drive is shown in **Figures 2.0-2, Visual Simulation – Helios Access Road Intersection at Centennial (Uphill)** and **2.0-3, Visual Simulation – Helios Access Road Intersection at Centennial (Downhill)**. A drawing showing an overhead view of the entire Helios project site has been prepared and is shown in **Figure 2.0-4, Visual Simulation - Helios Project Site**.

A viewpoint looking northeast at the intersection is shown on **Figure 2.0-2**. Motorists and pedestrians along Centennial Drive would see the cuts within the hillside for the proposed access road stabilized by a series of retaining walls as the visual change from existing conditions. In the foreground, the proposed mechanically stabilized earth (MSE) wall structure would be visible. Upon completion of construction of the MSE wall for this portion of the project, the area would be planted with hydroseed and it is anticipated that full growth, as shown in the visual simulation, would be complete within one year. In the middle to background of this view, the roadway and retaining walls would be visible. Given the elevation changes, the roadway itself would not be visible, but any vehicles traversing the access road would be. The proposed retaining walls would range in height from approximately 3 to 17 feet, given their location. The color of the wall would be a muted brown tone that would blend the evergreen and seasonal grass colors that dominate the landscape. As shown in the visual simulation, the walls would be texturized with a vertical pattern and California native vines such as California native grape (*Vitus californica*) or California honeysuckle (*Lonicera hispidula*), are proposed to break up the visual mass of the retaining walls. The proposed retaining walls in this portion of the site would be staggered along the hillside to break up their bulk. Plantings at the base of the retaining walls would also include low-growing native plants.

Figure 2.0-3, presents a viewpoint along Centennial Drive looking southwest at the Helios Access Road intersection. Motorists and pedestrians traveling along Centennial Drive would visually encounter prominent views of the proposed retaining wall in a viewscape that formerly featured a graded and vegetated hillside. The retaining walls at this portion of the intersection would be a similar design as the uphill retaining walls shown in **Figure 2.0-2**. The area directly in front of the retaining wall would be planted with hydroseed, similar to the planting proposed for the MSE wall.

The change in visual character that is shown on **Figure 2.0-2** and **2.0-3** confirms the preliminary analysis that the Preferred Alternative would result in greater visual impacts than the proposed project due to the construction of the access road at a location further downhill. However, the design measures incorporated into the Preferred Alternative would reduce the bulk and mass of the proposed intersection. In addition, the Preferred Alternative would avoid the removal of very tall, mature redwood trees associated with Mather Grove. Therefore, no new significant impacts would occur.

2.2.2 Air Quality Impacts

The air quality impacts of the Preferred Alternative would be similar to those of the previously proposed project and Alternative 5 because the same sized building would be constructed. Although the access road under the Preferred Alternative would actually be shorter in length, the area disturbed would be close to that affected by the road under the previously proposed project and therefore air quality impacts

Existing view from Centennial Drive near access road

Visual simulation of proposed project

SOURCE: Environmental Vision - April 2008

FIGURE **2.0-2**

Visual Simulation - Helios Access Road Intersection at Centennial (Uphill)

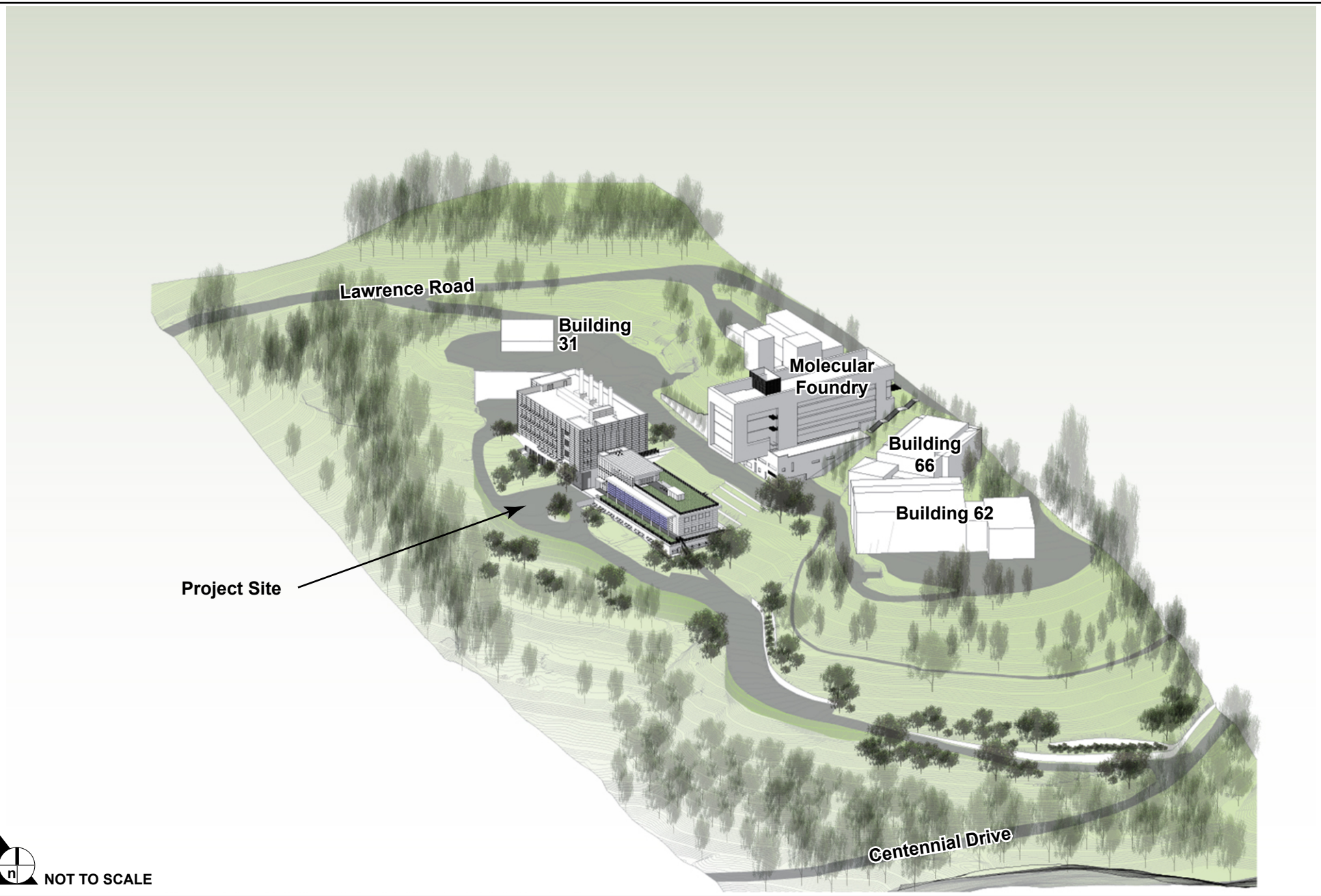
Existing view from Centennial Drive near access road

Visual simulation of proposed project

SOURCE: Environmental Vision - April 2008

FIGURE **2.0-3**

Visual Simulation - Helios Access Road Intersection at Centennial (Downhill)



SOURCE: SMITHGROUP - 2008

FIGURE **2.0-4**

Visual Simulation - Helios Project Site

during construction would be similar. Although the duration of site grading would be longer (6 months compared to 3 months for the previously proposed project), the construction-phase air impacts would not be any greater because the same mitigation measures that are presented in the Draft EIR would apply to the Preferred Alternative to control dust, including dust generated by the excavation of soft earth materials for stabilizing the building site and the dust generated by roadway construction. Implementation of these mitigation measures would ensure that dust emissions are minimized and a significant impact on air quality is avoided.

2.2.3 Biological Resources

Similar to the proposed project and Alternative 5, construction activities for the Preferred Alternative could affect Alameda whipsnake, should an individual snake enter the construction site. However, similar to the proposed project and Alternative 5, LRDP Mitigation Measures BIO-5a through 5c are incorporated in this alternative and would reduce the impact to a less than significant level. This alternative would result in a potentially significant impact from the removal of approximately 1.27 acres of coastal scrub habitat that is considered potentially suitable habitat for the Alameda whipsnake and about 2.71 acres of grassland that could be used by the whipsnake. However, the impact would be reduced to a less than significant level with a project-specific mitigation measure (Draft EIR, pages 6.0-26 and 6.0-27). Helios Mitigation Measure BIO-5b is incorporated into the Preferred Alternative to address this impact:

> **Helios Mitigation Measure BIO-5b:** To compensate for the loss of 3.98 acres of Alameda whipsnake habitat (combination of scrub and annual grassland), LBNL will enhance, create, and/or restore habitat for Alameda whipsnake with a minimum of a 2:1 functional equivalence to the habitat to be removed by development of the access road under the Preferred Alternative. To the degree possible, the mitigation will take place on LBNL land. A minimum of 8.0 acres of enhancement (Eucalyptus and other non-native tree removal, scrub planting, rock outcrop creation) will occur on the contiguous habitat area to the west of the project site. This area is designated as open-space perimeter in the LBNL 2006 LRDP. This mitigation shall be implemented by developing an Alameda whipsnake habitat enhancement, creation, and management plan that includes the foregoing provisions that will be submitted to the Resource Agencies for approval. It will include details on which trees will be removed, and provide information on areas suitable for scrub creation or enhancement within that area. It will detail the following (1) the approach, site preparation, plant species, and planting procedures; (2) a schedule and action plan to maintain and monitor the mitigation site; (3) a list of criteria and performance standards by which to measure success of the mitigation; and (4) contingency measures in the event that mitigation efforts are not successful.

If adequate mitigation cannot be planned on LBNL land, potential mitigation sites shall be identified adjacent to or within the designated critical habitat for the Alameda whipsnake in the easternmost portion of the LBNL site; this area is designated as a fixed constraint under the 2006 LRDP and development within this area is prohibited. The USFWS and CDFG shall be consulted to discuss the measures to be included in the Plan.

2.2.4 Cultural Resources

Although it would avoid removal of a Berkeley Lab building and redwood trees associated with Mather Grove, this alternative would have a marginally greater potential to encounter cultural resources during construction activities. This would be reduced to a less than significant level with LRDP mitigation measures (Draft EIR, page 6.0-29).

2.2.5 Hydrology and Water Quality

To address the potential hydromodification effect of the increased runoff from about 0.5 acre of new roadway and to ensure that all required facilities were appropriately sized and developed, the Draft EIR included Helios Mitigation Measures HYDRO-1a, HYDRO-2a and 2b, and HYDRO-4a and 4b. As described above in subsection 2.1, because several design features to handle storm water are included in the Preferred Alternative and all facilities have been evaluated and found to be feasible (Greco and Remington 2008), under the Preferred Alternative, Helios Impacts HYDRO-2 and HYDRO-4 would be less than significant and Helios Mitigation Measures HYDRO-1a, HYDRO-2a and 2b, and HYDRO-4a and 4b would not be required for the Preferred Alternative.

2.2.6 Noise

The Preferred Alternative would be at the same approximate distance from the nearest off-site noise-sensitive receptor as the previously proposed project. Although the duration of construction for the Preferred Alternative would be longer, the construction noise impacts of the Preferred Alternative, like those of the previously proposed project, would be less than significant because the same types of construction activities would be involved and the same types of construction equipment would be used. The volume of construction truck traffic would be slightly less than what was analyzed in the Draft EIR. Based on current construction estimates, construction truck traffic would be six daily truck trips. Even though the trucks would travel to and from the site over a longer period of time, the incremental noise produced by the construction truck traffic would be the same or slightly less than as reported in the Draft EIR and the impact would remain less than significant.

2.2.7 Traffic and Transportation

The Draft EIR noted (page 6.0-31) that there could be a potential safety impact under this alternative due to lack of adequate sight distance at the new intersection. Consequently, a mitigation measure involving cutting of the hillside and removal of vegetation north of the intersection on the west side of Centennial Drive would be required. In January 2008, LBNL conducted an evaluation of the sight distances in all three directions at the proposed intersection and determined that all sight distances would be adequate and additional cutting of the hillside beyond the cuts included in the intersection design would not be required. The study (included in **Appendix B**) requires that landscaping at the intersection be minimal and regularly maintained to continue to provide adequate sight distance.

Helios Mitigation Measure TRANS-2 has been revised to include the following mitigation measure:

- Provide minimal landscaping at the new Centennial Drive/Helios Access Road intersection (no shrubs or trees to exceed 3 feet in height). Maintain the landscaping regularly to provide adequate sight distance at this intersection.

As discussed above under **subsection 2.2.6 Noise**, the volume of daily construction truck traffic to the project site would be the same as previously evaluated for the proposed project. Therefore, the construction traffic impact under the Preferred Alternative would be same as previously reported in the Draft EIR for the proposed project, and would be less than significant.

2.2.8 All Other Resources

All other impacts of the Preferred Alternative would be identical to the impacts of the previously proposed project and those impacts that are significant or potentially significant would require the implementation of the same mitigation measures that were presented for the previously proposed project in the Draft EIR.

Table 2.0-1, Preferred Alternative – Summary of Environmental Impacts and Mitigation Measures, presents the environmental impacts of the Preferred Alternative and lists mitigation measures that will be implemented to avoid or reduce significant impacts.

Table 2.0-1
Preferred Alternative – Summary of Environmental Impacts and Mitigation Measures

Environmental Topic and Impact	Level of Significance before Mitigation	Mitigation Measures	Level of Significance after Mitigation
4.1 Aesthetics			
Impact VIS-1		**Mitigation Measure VIS-1**	
Construction activities associated with the project would create temporary aesthetic nuisances for adjacent land uses.	Potentially Significant	LBNL and their contractors shall minimize the use of on-site storage and when necessary store building materials and equipment away from public view to the maximum extent feasible and shall keep activity within the project site and laydown areas.	Less than significant
Impact VIS-2		**Mitigation Measure VIS-2**	
The proposed project would alter views of the LBNL site and would result in a substantial adverse effect to a scenic vista or substantially damage scenic resources.	Significant	Trees and mature vegetation removal that is required for the access road construction will be minimized to reduce the potential visibility of the improved roadway.	Significant and Unavoidable
Impact VIS-3		**Mitigation Measure**	
The proposed project would alter the existing visual character of the Berkeley Laboratory site but would not substantially degrade the existing visual character and quality of the site and its surroundings.	Less than significant	No project-level mitigation measure required.	Less than significant

Environmental Topic and Impact	Level of Significance before Mitigation	Mitigation Measures	Level of Significance after Mitigation
4.1 Aesthetics (continued)			
Impact VIS-4		**Mitigation Measure VIS-4**	
The proposed project would create a new source of substantial light or glare that would not adversely affect day or nighttime views in the area.	Potentially Significant	**Mitigation Measure VIS-4a**: Upon project implementation, the contractor shall install the PV panels at adequate angles that minimize the amount of glare that could be created while maintaining the functionality of the PV system. **Mitigation Measure VIS-4b**: Upon project implementation, the contractor shall install a mechanized system that controls the angle of the proposed PV louvers. This system shall be designed to ensure screening to building occupants while eliminating PV louver angles that would create substantial sources of glare. **Mitigation Measure VIS-4c**: To the maximum extent feasible, glazing materials shall be installed on the glass that comprises the PV louvers. The glazing shall be installed only if it can reduce glare while maintaining the functionality of the PV film within the glass.	Less than significant
4.2 Air Quality			
Impact AIR-1		**Mitigation Measure**	
Construction of the proposed project would generate short-term emissions of fugitive dust and criteria air pollutants that would not adversely affect local air quality in the vicinity of the construction site.	Less than significant	No project-level mitigation measure required.	Less than significant

Environmental Topic and Impact	Level of Significance before Mitigation	Mitigation Measures	Level of Significance after Mitigation
4.2 Air Quality (continued)			
Impact AIR-2		**Mitigation Measure**	
The proposed project would generate long-term operational emissions of criteria pollutants from increases in traffic and stationary and area sources that would not adversely affect air quality.	Less than significant	No project-level mitigation measure required.	Less than significant
Impact AIR-3		**Mitigation Measure**	
The proposed project would increase carbon monoxide concentrations at busy intersections and along congested roadways in the project vicinity but would not expose sensitive receptors to substantial pollution concentrations.	Less than significant	No project-level mitigation measure required.	Less than significant
Impact AIR-4		**Mitigation Measure**	
The proposed project would not create objectionable odors affecting a substantial number of people.	Less than significant	No project-level mitigation measure required.	Less than significant
Impact AIR-5		**Mitigation Measure**	
The proposed project would not expose maximally exposed individuals to cancer risks exceeding 10 in one million.	Less than significant	No project-level mitigation measure required.	Less than significant
Impact AIR-6		**Mitigation Measure**	
The proposed project would not generate ground level concentrations of noncarcinogenic toxic air contaminants that would result in a Hazard Index greater than 1.0 for the maximally exposed individual.	Less than significant	No project-level mitigation measure required.	Less than significant

Environmental Topic and Impact	Level of Significance before Mitigation	Mitigation Measures	Level of Significance after Mitigation
4.3 Biological Resources			
Impact BIO-1		**Mitigation Measure BIO-1**	
Construction of the proposed project would result in the permanent removal of 4.01 acres of vegetation.	Potentially Significant	**Mitigation Measure BIO-1a:** All trees removed to construct the proposed project will be replaced at a ratio of 2:1. **Mitigation Measure BIO-1b:** For trees that would be removed by the project and meet the UC Berkeley Specimen tree criteria, LBNL will replace the trees at a ratio of 3:1, consistent with UC Berkeley's tree replacement policy. **Mitigation Measure BIO-1c:** To ensure the successful replacement of trees, a tree replacement plan shall be implemented within the LBNL boundary and shall meet the following standards. (1) The plan shall identify suitable areas for tree replacement to occur such that existing native woodlands are enhanced and/or expanded. (2) The plan shall provide for replacing trees at a 2:1 ratio (or 3:1 for specimen trees, as appropriate), with native trees replaced in-kind and non-native trees replaced with appropriate native species. (3) The plan shall specify, at a minimum, the following: (a) the location of planting sites; (b) site preparation and planting procedures; (c) a schedule and action plan to maintain and monitor the tree replacement sites; (d) a list of criteria and performance standards by which to measure success of the tree replacement; and (e) contingency measures in the event that tree replacement efforts are not successful.	Less than significant

Environmental Topic and Impact	Level of Significance before Mitigation	Mitigation Measures	Level of Significance after Mitigation
4.3 Biological Resources (continued)			
Impact BIO-2		**Mitigation Measure BIO-2**	
The proposed project could result in direct and indirect adverse effects to creeks and seeps subject to ACOE and CDFG jurisdiction and sensitive plant communities and sensitive habitats.	Less than significant	To further ensure the success of the required Wetland Mitigation Plan, the plan shall specify, at a minimum, the following: (1) the goals of the mitigation effort; (2) the location of the mitigation site; (3) the approach, site preparation and planting procedures; (4) a schedule and action plan to maintain and monitor the mitigation site; (5) a list of criteria and performance standards by which to measure success of the wetland mitigation; and (6) contingency measures in the event that mitigation efforts are not successful.	Less than significant
Impact BIO-3		**Mitigation Measure**	
The proposed project would not adversely affect special-status nesting birds (including raptors) such that nests are destroyed, they abandon their nests or that their reproductive efforts fail.	Less than significant	No project-level mitigation measure required.	Less than significant
Impact BIO-4		**Mitigation Measure**	
Removal of trees and structures during the breeding season would not result in direct mortality of special-status bats. In addition, construction noise would not cause maternity roost abandonment and subsequent death of young.	Less than significant	No project-level mitigation measure required.	Less than significant

Environmental Topic and Impact	Level of Significance before Mitigation	Mitigation Measures	Level of Significance after Mitigation
4.3 Biological Resources (continued)			
Impact BIO-5		**Mitigation Measure BIO-5**	
Construction of the proposed project would not result in take or harassment of Alameda whipsnake, but would involve the removal of coastal scrub habitat that is potentially suitable for Alameda whipsnake.	Potentially Significant	**Mitigation Measure BIO-5a:** Signage shall be posted along the road identifying the potential presence of rare and protected wildlife and the need to proceed with caution for the safety of the species.	Less than significant
		Mitigation Measure BIO-5b: To compensate for the loss of 3.98 acres of Alameda whipsnake habitat (combination of scrub and annual grassland), LBNL will enhance, create, and/or restore habitat for Alameda whipsnake with a minimum of a 2:1 functional equivalence to the habitat to be removed by development of the access road under the Preferred Alternative. To the degree possible, the mitigation will take place on LBNL land. A minimum of 8.0 acres of enhancement (Eucalyptus and other non-native tree removal, scrub planting, rock outcrop creation) will occur on the contiguous habitat area to the west of the project site. This area is designated as open-space perimeter in the LBNL 2006 LRDP. This mitigation shall be implemented by developing an Alameda whipsnake habitat enhancement, creation, and management plan that includes the foregoing provisions that will be submitted to the Resource Agencies for approval.	

Environmental Topic and Impact	Level of Significance before Mitigation	Mitigation Measures	Level of Significance after Mitigation
4.3 Biological Resources (continued)			
Impact BIO-5 (continued)		It will include details on which trees will be removed, and provide information on areas suitable for scrub creation or enhancement within that area. It will detail the following (1) the approach, site preparation, plant species, and planting procedures; (2) a schedule and action plan to maintain and monitor the mitigation site; (3) a list of criteria and performance standards by which to measure success of the mitigation; and (4) contingency measures in the event that mitigation efforts are not successful. If adequate mitigation cannot be planned on LBNL land, potential mitigation sites shall be identified adjacent to or within the designated critical habitat for the Alameda whipsnake in the easternmost portion of the LBNL site; this area is designated as a fixed constraint under the 2006 LRDP and development within this area is prohibited. The USFWS and CDFG shall be consulted to discuss the measures to be included in the Plan.	
Impact BIO-6		**Mitigation Measure**	
Development of the proposed project would not result in the loss of San Francisco lacewing and suitable habitat for the species.	Less than significant	No project-level mitigation measure required.	Less than significant
4.4 Cultural Resources			
Impact CUL-1		**Mitigation Measure**	
The proposed project would not cause a substantial adverse change in the significance of a historical resource as defined in Section 15064.5.	Less than significant	No project-level mitigation measure required.	Less than significant

Environmental Topic and Impact	Level of Significance before Mitigation	Mitigation Measures	Level of Significance after Mitigation
4.4 Cultural Resources (continued)			
Impact CUL-2		**Mitigation Measure**	
The proposed project would not cause a substantial adverse change in the significance of an archaeological resource pursuant to Section 15064.5.	Less than significant	No project-level mitigation measure required.	Less than significant
Impact CUL-3		**Mitigation Measure**	
The proposed project would not disturb any human remains, including those interred outside of formal cemeteries.	Less than significant	No project-level mitigation measure required.	Less than significant
4.5 Geology and Soils			
Impact GEO-1		**Mitigation Measure**	
The proposed project would not expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving rupture of a known earthquake fault.	Less than significant	No project-level mitigation measure required.	Less than significant
Impact GEO-2		**Mitigation Measure GEO-2**	
The proposed project would not expose people to potential substantial adverse effects, including the risk of loss, injury, or death involving seismic ground-shaking hazards, although some structures could sustain damage.	Potentially Significant	In addition to damage assessment of the Helios building (which is covered in the LBNL Master Emergency Program Plan), assessment of stormwater conveyance systems and detention/retention ponds and Helios retaining walls will be conducted by the Damage Assessment Team following earthquakes strong enough to cause damage.	Less than significant
Impact GEO-3		**Mitigation Measure GEO-3**	
The proposed project could expose people and structures to seismic landslide hazards.	Potentially Significant	All recommendations of the site-specific geotechnical study shall be incorporated into the project design and implemented as part of the project.	Less than significant

Environmental Topic and Impact	Level of Significance before Mitigation	Mitigation Measures	Level of Significance after Mitigation
4.5 Geology and Soils (continued)			
Impact GEO-4		**Mitigation Measure GEO-4**	
The proposed project is located in an area of expansive soils that could create substantial risk to life or property.	Potentially Significant	Implementation of Mitigation Measure GEO-3	Less than significant
Impact GEO-5		**Mitigation Measure GEO-5**	
The proposed project is located on a geologic unit that may be unstable or could become unstable as a result of the project.	Potentially Significant	The project proposes the use of water quality swales to treat stormwater runoff. These treatment facilities often incorporate infiltration of stormwater to provide water quality treatment. If site-specific geotechnical investigations indicate that infiltration of excess stormwater is not feasible due to slope-stability considerations, stormwater control and water quality treatment features will be designed with appropriate underdrain and/or retention systems to maintain the function of these facilities without infiltrating the collected stormwater.	Less than significant
4.6 Hazards and Hazardous Materials			
Impact HAZ-1		**Mitigation Measure**	
Implementation of the proposed project would increase the routine use, transport and storage of hazardous materials and other scientific materials at LBNL but would not create a significant hazard to the public or the environment under the routine or reasonably foreseeable upset and accident conditions.	Less than significant	No project-level mitigation measure required.	Less than significant

Environmental Topic and Impact	Level of Significance before Mitigation	Mitigation Measures	Level of Significance after Mitigation
4.6 Hazards and Hazardous Materials (continued)			
Impact HAZ-2		**Mitigation Measure HAZ-2**	
The proposed project would not be located on a site that is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 but some project components would be located in areas where contamination may be present, and as a result, could create a potentially significant hazard to the public or the environment.	Potentially Significant	LBNL will prepare a due diligence assessment of all areas that would be excavated in order to install the new sewer pipeline. If contaminated materials are anticipated, the soils will be tested, and LBNL will implement appropriate measures to ensure that the contaminated soils or groundwater do not adversely affect construction workers and the environment.	Less than significant
Impact HAZ-3		**Mitigation Measure**	
The proposed project would not impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan.	Less than significant	No project-level mitigation measure required.	Less than significant
Impact HAZ-4		**Mitigation Measure**	
The proposed project would not expose people or structures to a significant risk of loss, injury, or death involving wildland fires.	Less than significant	No project-level mitigation measure required.	Less than significant
4.7 Hydrology and Water Quality			
Impact HYDRO-1		**Mitigation Measure HYDRO-1**	
Development of the project site would increase the area of impervious surfaces that would result in increased volume of stormwater runoff that could contribute to erosion and/or siltation in Strawberry Creek.	Potentially Significant	Using the Bay Area Hydrology Model, calculations shall be provided following approval of the final project design to show that the proposed bioretention pond is sized appropriately to control flows such that 'flow duration control' is provided between 10 percent of the 2-year recurrence storm and the 10-year recurrence storm.	Less than significant

Environmental Topic and Impact	Level of Significance before Mitigation	Mitigation Measures	Level of Significance after Mitigation
4.7 Hydrology and Water Quality (continued)			
Impact HYDRO-2		**Mitigation Measure**	
Development of the site would alter surface drainage patterns on the site which could result in increased peak flows and induce flooding in downstream reaches.	Less than Significant	No project-level mitigation measure required.	Less than significant
Impact HYDRO-3		**Mitigation Measure**	
Project construction activities would not increase turbidity or decrease water quality in surface waterways.	Less than significant	No project-level mitigation measure required.	Less than significant
Impact HYDRO-4		**Mitigation Measure**	
Stormwater runoff from the proposed parking area, access road and other impervious surfaces could potentially contribute to long-term pollutant discharges to surface waters, including on-site streams and downstream to Strawberry Creek and the Bay.	Less than Significant	No project-level mitigation measure required.	Less than significant

Environmental Topic and Impact	Level of Significance before Mitigation	Mitigation Measures	Level of Significance after Mitigation
4.7 Hydrology and Water Quality (continued)			
Impact HYDRO-5		**Mitigation Measure HYDRO-5**	
Discharge of groundwater pumped or drained as part of construction-phase or post-construction-phase dewatering activities could adversely affect surface water quality.	Potentially Significant	Tritium monitoring shall continue at existing temporary monitoring wells SB31-02-2 and SB31-02-1 and shall be included in the long-term tritium monitoring program. In addition, sampling of discharges related to dewatering activities in the northern portion of the project, both during (where encountered in pier and/or test borings or other excavations) and after project construction (via pumping or gravity subdrains), shall be added to and managed under the tritium monitoring portion of LBNL Environmental Restoration Program. All water from the dewatering system in the northern portion of the project will be collected and transported to an approved disposal facility, or will be re-infiltrated near the top of the plume to increase the residence time of the water and allow the tritium to decay.	Less than significant

Environmental Topic and Impact	Level of Significance before Mitigation	Mitigation Measures	Level of Significance after Mitigation
4.8 Land Use and Planning			
Impact LU-1		**Mitigation Measure**	
The proposed project would not conflict with the applicable land use plan or policy (i.e., 2006 LBNL LRDP, 2006 LBNL Design Guidelines, or UC Berkeley 2020 LRDP) adopted for the purpose of avoiding or mitigating an environmental effect.	Less than significant	No project-level mitigation measure required.	Less than significant
4.9 Noise			
Impact NOISE-1		**Mitigation Measure**	
Construction/demolition activities would temporarily elevate noise levels at the project site and surrounding areas.	Less than significant	No project-level mitigation measure required.	Less than significant
Impact NOISE-2		**Mitigation Measure**	
Temporary vibration related to construction activities would not cause an impact.	Less than significant	No project-level mitigation measure required.	Less than significant
Impact NOISE-3		**Mitigation Measure**	
Vehicular traffic associated with the Helios project would result in an incremental, but imperceptible, long-term increase in ambient noise levels.	Less than significant	No project-level mitigation measure required.	Less than significant
Impact NOISE-4		**Mitigation Measure**	
The operation of heating, ventilating, and air conditioning equipment at the Helios Facility would not result in a substantial long-term increase in ambient noise levels.	Less than significant	No project-level mitigation measure required.	Less than significant
4.10 Population and Housing			
Impact POP-1		**Mitigation Measure**	
The proposed project would not induce substantial population growth in an area, either directly or indirectly.	Less than significant	No project-level mitigation measure required.	Less than significant

Environmental Topic and Impact	Level of Significance before Mitigation	Mitigation Measures	Level of Significance after Mitigation
4.11 Public Services			
Impact PUB-1		**Mitigation Measure**	
The proposed project would not result in substantial adverse physical impacts associated with the provision of new or physically altered fire protection facilities in order to maintain acceptable service ratios, response times, or other performance objectives, the construction of which could cause significant environmental impacts.	Less than significant	No project-level mitigation measure required.	Less than significant
Impact PUB-2		**Mitigation Measure**	
The proposed project would not result in substantial adverse physical impacts associated with the provision of new or physically altered police protection facilities in order to maintain acceptable service ratios, response times, or other performance objectives, the construction of which could cause significant environmental impacts.	Less than significant	No project-level mitigation measure required.	Less than significant
Impact PUB-3		**Mitigation Measure**	
The proposed project would not result in substantial adverse physical impacts associated with the provision of new or physically altered school facilities in order to maintain acceptable service ratios or other performance objectives, the construction of which could cause significant environmental impacts.	Less than significant	No project-level mitigation measure required.	Less than significant

Environmental Topic and Impact	Level of Significance before Mitigation	Mitigation Measures	Level of Significance after Mitigation
4.11 Public Services (continued)			
Impact PUB-4		**Mitigation Measure**	
The proposed project would not result in substantial adverse physical impacts associated with the provision of new or physically altered park or recreational facilities in order to maintain acceptable service ratios or other performance objectives, the construction of which could cause significant environmental impacts.	Less than significant	No project-level mitigation measure required.	Less than significant
Impact PUB-5		**Mitigation Measure**	
The proposed project would not increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facilities would occur or be accelerated.	Less than significant	No project-level mitigation measure required.	Less than significant
4.12 Transportation and Traffic			
Impact TRANS-1		**Mitigation Measure**	
The proposed Helios project would not cause an increase in traffic that is substantial in relation to the existing traffic load and capacity of the street system result in additional delay at study intersections under the Near-Term conditions.	Less than significant	No project-level mitigation measure required.	Less than significant

Environmental Topic and Impact	Level of Significance before Mitigation	Mitigation Measures	Level of Significance after Mitigation
4.12 Transportation and Traffic (continued)			
Impact TRANS-2		**Mitigation Measure TRANS-2**	
The design of the proposed Helios parking lot area and access road would not result in inefficient and unsafe operations.	Less than significant	Final design should shall incorporate the following measures to improve the efficiency and ensure the safety of vehicles, bicyclists, and pedestrians: • Design the Centennial Drive/Helios Access Road intersection to provide adequate sight distance for a design speed of 35 miles per hour to allow vehicles to safely turn into and out of the new Helios Access Road. • Locate the gates on the new roadway to provide adequate sight distance for vehicles approaching the gate. • Design the new Centennial Drive/Helios Access Road intersection, roadway, and parking lot area to accommodate shuttle bus circulation. • Provide minimal landscaping at the new Centennial Drive/Helios Access Road intersection (no shrubs or trees to exceed 3 feet in height). Maintain the landscaping regularly to provide adequate sight distance at this intersection.	Less than significant
Impact TRANS-3		**Mitigation Measure**	
The proposed Helios project would result in increases in transit ridership.	Less than significant	No project-level mitigation measure required.	Less than significant

Environmental Topic and Impact	Level of Significance before Mitigation	Mitigation Measures	Level of Significance after Mitigation
4.12 Transportation and Traffic (continued)			
Impact TRANS-4		**Mitigation Measure TRANS-4**	
The proposed Helios project would result in increased parking demand that may exceed the available parking supply.	Significant	LBNL shall implement the following measures during special events at the Helios auditorium: • Provide attendant and/or stacked parking for special events only. Attendant and/or stacked parking should not be used for regular day-to-day operations as it would be inconsistent with the LBNL principle to discourage driving and encourage alternative travel modes; and • Include information on availability of alternative transportation modes, such as LBNL shuttles, in announcements of special events at the Helios auditorium.	Less than significant
Impact TRANS-5		**Mitigation Measure**	
The proposed Helios project would not result in increased hazards to pedestrians or bicyclists or conflicts with adopted policies, plans, or programs promoting walking or bicycling.	Less than significant	No project-level mitigation measure required.	Less than significant
Impact TRANS-6		**Mitigation Measure TRANS-6**	
The construction of the proposed Helios project would temporarily and intermittently result in impacts on vehicles, pedestrians, or bicyclists, and parking.	Less than significant	LBNL shall include the following additional measures in the CTMP prepared for the proposed project: • Consider stacked parking within the LBNL site or off-site parking for construction workers to minimize parking demand. • If necessary, require a flag person shall to direct traffic when trucks enter and exit the Helios Access Road on Centennial Drive.	Less than significant

Environmental Topic and Impact	Level of Significance before Mitigation	Mitigation Measures	Level of Significance after Mitigation
4.13 Utilities and Service Systems			
Impact UTILS-1		**Mitigation Measure**	
Implementation of the Helios project would not require an expansion of the EBMUD wastewater treatment plant or an expansion of the City's sewer conveyance facilities.	Less than significant	No project-level mitigation measure required.	Less than significant
Impact UTILS-2		**Mitigation Measure**	
The proposed project would require the construction of new storm water drainage facilities, the construction of which would not cause significant environmental impacts.	Less than significant	No project-level mitigation measure required.	Less than significant
Impact UTILS-3		**Mitigation Measure**	
The proposed project would result in the need for additional chilled water facilities, the construction and operation of which would not result in a significant environmental impact.	Less than significant	No project-level mitigation measure required.	Less than significant
Impact UTILS-4		**Mitigation Measure**	
The proposed project would create additional demand for electricity and natural gas, but would not result in the construction of new or expansion of existing transmission or energy production facilities.	Less than significant	No project-level mitigation measure required.	Less than significant
5.0 Cumulative Impacts			
Cumulative Impact VIS-1		**Mitigation Measure**	
Construction activities associated with the proposed project, in conjunction with other near-term development, would not substantially affect visual resources.	Less than significant	No project-level mitigation measure required.	Less than significant

Environmental Topic and Impact	Level of Significance before Mitigation	Mitigation Measures	Level of Significance after Mitigation
5.0 Cumulative Impacts (continued)			
Cumulative Impact VIS-2		**Mitigation Measure**	
The proposed project, in conjunction with reasonably foreseeable near-term and long-term development, would not substantially affect visual resources.	Less than significant	No project-level mitigation measure required.	Less than significant
Cumulative Impact AIR-1		**Mitigation Measure**	
The proposed project would not result in a cumulatively considerable net increase of any criteria pollutant for which the project region is in nonattainment under an applicable federal or state ambient air quality standard.	Less than significant	No project-level mitigation measure required.	Less than significant
Cumulative Impact AIR-2		**Mitigation Measure**	
Although the proposed project would result in greenhouse gas emissions, its contribution to the significant cumulative impact associated with greenhouse gas emissions would not be cumulatively considerable.	Less than significant	No project-level mitigation measure required.	Less than significant
Cumulative Impact AIR-3		**Mitigation Measure**	
Even though overall cumulative impacts will decrease over time, the proposed project will make some incremental contribution to cumulative cancer risk impacts associated with future development of LBNL and UC Berkeley.	Significant	Because most of the cancer risk from TACs is due to diesel particulate emissions, measures to reduce the risk (beyond regulations already in place that will substantially reduce diesel particulate emissions in the next 20 years) shall include those measures that could reduce vehicle travel to and from the Helios project (LRDP Mitigation Measures TRANS-1d and TRANS-3), and those measures that reduce emissions from construction equipment and the project's backup generator (LRDP Mitigation Measures AQ-1b and AQ-4a).	Significant and Unavoidable

Environmental Topic and Impact	Level of Significance before Mitigation	Mitigation Measures	Level of Significance after Mitigation
5.0 Cumulative Impacts (continued)			
Cumulative Impact AIR-4		**Mitigation Measure**	
The proposed project would not result in a cumulatively considerable contribution to cumulative noncancer health impacts associated with future development of LBNL and UC Berkeley.	Less than significant	No project-level mitigation measure required.	Less than significant
Cumulative Impact BIO-1		**Mitigation Measure**	
The proposed project, in conjunction with other reasonably foreseeable near-term projects and long-term development, would not result in a significant cumulative impact on biological resources.	Less than significant	No project-level mitigation measure required.	Less than significant
Cumulative Impact CUL-1		**Mitigation Measure**	
The proposed project, in conjunction with other reasonably foreseeable near-term and long-term development, would not result in a significant cumulative impact on cultural resources.	Less than significant	No project-level mitigation measure required.	Less than significant
Cumulative Impact GEO-1		**Mitigation Measure**	
The proposed project, in conjunction with reasonably foreseeable near-term and long-term development, would place new structures and introduce an increased population in a seismically active region.	Less than significant	No project-level mitigation measure required.	Less than significant

Environmental Topic and Impact	Level of Significance before Mitigation	Mitigation Measures	Level of Significance after Mitigation
5.0 Cumulative Impacts (continued)			
Cumulative Impact HAZ-1		**Mitigation Measure**	
The proposed project, in conjunction with reasonably foreseeable near term and long-term development, would involve the use of hazardous chemicals that would not pose a significant cumulative risk to the public or the environment.	Less than significant	No project-level mitigation measure required.	Less than significant
Cumulative Impact HAZ-2		**Mitigation Measure**	
The proposed project, in conjunction with reasonably foreseeable near term and long term development, would result in a cumulative impact related to emergencies associated with a wildland fire or a major earthquake, but the project's contribution to the cumulative impact would not be considerable.	Less than significant	No project-level mitigation measure required.	Less than significant
Cumulative Impact HYDRO-1		**Mitigation Measure**	
The proposed project, in conjunction with reasonably foreseeable near term and long-term development, would not result in a cumulative impact on surface water resources.	Less than significant	No project-level mitigation measure required.	Less than significant
Cumulative Impact LU-1		**Mitigation Measure**	
The proposed project, in conjunction with reasonably foreseeable near term and long-term development, would not involve a significant cumulative impact related to land use.	Less than significant	No project-level mitigation measure required.	Less than significant

Environmental Topic and Impact	Level of Significance before Mitigation	Mitigation Measures	Level of Significance after Mitigation
5.0 Cumulative Impacts (continued)			
Cumulative Impact NOISE-1		**Mitigation Measure**	
Near-term development in the vicinity of the project site would increase exterior noise levels during construction.	Less than significant	No project-level mitigation measure required.	Less than significant
Cumulative Impact NOISE-2		**Mitigation Measure**	
The proposed project, in conjunction with reasonably foreseeable near term and long-term development, would not result in a significant cumulative permanent increase in ambient noise levels.	Less than significant	No project-level mitigation measure required.	Less than significant
Cumulative Impact POP-1		**Mitigation Measure**	
The proposed project, in conjunction with reasonably foreseeable near-term and long-term development, would not result in a significant cumulative impact on population or housing.	Less than significant	No project-level mitigation measure required.	Less than significant
Cumulative Impact PUB-1		**Mitigation Measure**	
The proposed project, in conjunction with reasonably foreseeable near-term and long-term development, would not result in a significant cumulative demand for public services.	Less than significant	No project-level mitigation measure required.	Less than significant
Cumulative Impact TRANS-1		**Mitigation Measure Cumulative TRANS-1**	
The proposed project, in conjunction with reasonably foreseeable near-term and long-term development, would degrade intersection levels of service.	Significant	Further mitigation is not feasible.	Significant and Unavoidable

Environmental Topic and Impact	Level of Significance before Mitigation	Mitigation Measures	Level of Significance after Mitigation
5.0 Cumulative Impacts (continued)			
Cumulative Impact TRANS-2		**Mitigation Measure**	
Although construction traffic associated with near-term projects could result in temporary periods of traffic congestion on city streets, the project's contribution to the impact would not be cumulatively considerable.	Less than significant	No project-level mitigation measure required.	Less than significant
Cumulative Impact TRANS-3		**Mitigation Measure**	
The proposed project, in conjunction with other reasonably foreseeable near-term and long-term development, would not substantially affect transit, parking, or pedestrian and bicycle circulation.	Less than significant	No project-level mitigation measure required.	Less than significant
Cumulative Impact UTILS-1		**Mitigation Measure**	
The proposed project, in conjunction with reasonably foreseeable near-term and long-term development, would not result in a significant cumulative demand for utilities and service systems.	Less than significant	No project-level mitigation measure required.	Less than significant