

4.9 WASTEWATER AND ENERGY SYSTEMS

4.9.1 INTRODUCTION

This section presents existing wastewater and energy systems that serve the project site and analyzes the potential for implementation of the proposed project to affect these systems. The Initial Study prepared to define the scope of this EIR concluded that the proposed project would result in a less than significant impact related to storm water drainage facilities, water supply, chilled water and steam generation, solid waste capacity and regulations, electrical and natural gas facilities, and telecommunication facilities. These utilities and service systems are not discussed further in this EIR, and the discussion in this section focuses on wastewater and energy systems.

Information used in the analysis below was obtained from site visits, the Lawrence Berkeley National Laboratory (LBNL) 2006 Long Range Development Plan (LRDP) Environmental Impact Report (EIR), and environmental documents associated with specific LBNL projects.

No comments were received regarding wastewater and energy systems in response to the Notice of Preparation (NOP) circulated for this EIR.

4.9.2 ENVIRONMENTAL SETTING

Wastewater System

LBNL On-Site Wastewater Collection System

Wastewater at the LBNL hill site is carried via a gravity flow system, owned and operated by UC LBNL. This system eventually discharges to the City of Berkeley's public sewer system through two monitoring stations, one located at Hearst Avenue (Hearst Monitoring Station) and the other at Centennial Drive in Strawberry Canyon (Strawberry Monitoring Station). The monitoring stations measure the volume of the effluent on a continuous basis. In 2008, LBNL discharged approximately 13.9 million gallons of wastewater through the Hearst Monitoring Station and approximately 19.5 million gallons through the Strawberry Monitoring Station (LBNL 2009). In addition, samples of the effluent are taken at regular intervals and evaluated for radioactivity and other constituents mandated by EBMUD.

Sewer System Conditions and Upgrades

On September 30, 2009, UC LBNL adopted a Sanitary Sewer System Management Plan (SSSMP) which guides the Facilities Division and the Environmental Health and Safety Division of UC LBNL in identifying, prioritizing, and continuously renewing and replacing sewer system facilities so as to

maintain reliable service, and in cost-effectively minimizing infiltration and inflow. As described in the SSSMP, UC LBNL has established procedures for monitoring and evaluating infiltration and inflow (I/I), including guidelines for taking action to limit I/I. Groundwater infiltration and inflow (GWI/I) and rain-dependent infiltration and inflow (RDI/I) are quantified and monitored to ensure that the hydraulic capacity of the sanitary sewer collection system is not exceeded and to determine if I/I reduction projects should be initiated. UC LBNL also maintains design and construction standards, specifications, and details which ensure that new and rehabilitated sanitary sewer collection system infrastructure is designed and installed in compliance with the latest federal and state regulations, and in line with general industry standards.

Wastewater flows from LBNL's western portion exit the LBNL hill site through sewer lines within Hearst Avenue that flow to the City of Berkeley's sanitary sewer sub-basin 17-013. According to the East Canyon Report, there is sufficient capacity both in the LBNL sanitary sewer system, at the Hearst Monitoring Station and sub-basin 17-013 to accept additional flows.

Sanitary sewage from LBNL's eastern portion generally is routed into pipes exiting the LBNL hill site at Centennial Drive. The LBNL Centennial Drive sanitary sewer system flows into the UC Berkeley sewer on Centennial Drive and then into City of Berkeley's sanitary sewer sub-basin 17-503. This sub-basin also collects wastewater from other sources, including the Panoramic Hill area. From these sewer sub-basins, LBNL's wastewater continues to flow through city sanitary sewer basin 17 to basin 15 and into EBMUD-operated interceptor sewers and its treatment plant. Sanitary sewer sub-basin 17-503 is constrained around Dwight Avenue during peak wet weather conditions. The problem is cross-jurisdictional, since sub-basin 17-503 receives wastewater flows from both the City of Berkeley and the City of Oakland. Additionally, the sewer pipes cross both the Hayward fault and numerous landslide areas, making them vulnerable to damage. The constricted portion of sub-basin 17-503 runs beneath Prospect Road, which is the principal automobile access to a large portion of the Panoramic Hill neighborhood.

Wastewater Treatment

EBMUD provides wastewater treatment services to parts of Alameda and Contra Costa counties along the east shore of the San Francisco Bay, including the LBNL hill site. Wastewater from the LBNL hill site is collected and conveyed via the City of Berkeley's public sewer system and EBMUD-operated interceptor sewers to the regional wastewater treatment facility located southwest of the Interstate 80 (I-80) and Interstate 580 (I-580) interchange in Oakland. Currently, EBMUD's Main Wastewater Treatment Plant has an average annual daily flow of 75 million gallons per day (mgd) (EBMUD 2010). During wet weather, the treatment plant accepts more flow. EBMUD has historically operated three Wet

Weather Facilities to provide treatment for high wet weather flows that exceed the treatment capacity of the Main Wet Weather Treatment Plant. The plant has a primary treatment capacity of 320 mgd and a maximum secondary treatment capacity of 168 mgd. After treatment, wastewater is discharged into the San Francisco Bay via a 1-mile-long deep-water outfall line.

Electrical System

Electrical power at the LBNL hill site is purchased from the Western Area Power Administration and delivered by the Pacific Gas and Electric (PG&E) transmission system to the Lab's Grizzly Substation located adjacent to Building 77. The Grizzly Substation consists of two DOE-owned transformers with a combined capacity of 100 MW. This substation is exclusively for LBNL use. In addition, power can be supplied to LBNL from UC Berkeley's Hill Area Substation, located adjacent to the Grizzly Substation. The on-site power distribution system at LBNL consists of a 12.47-kV underground system with smaller substations and transformers to reduce voltage. Total electrical power consumption at LBNL in 2006 was 71,100 megawatt hours (MWh) (Energy Management System 2007).

Natural Gas

Natural gas is used at the LBNL hill site for heating all buildings, equipment, operations, and some experimental uses. The natural gas supply is provided by the Defense Fuel Supply Center in Oregon and delivered by the PG&E system. The point of delivery is a meter vault in the hillside area above Cyclotron Road and below Building 88. A gas line distributes high pressure natural gas from PG&E's metering vault to the buildings throughout the LBNL hill site.

4.9.3 REGULATORY CONSIDERATIONS

State Regulations

Planning for energy is regulated at the state level. Specific regulations that would be relevant to implementation of the proposed project are described below.

Title 24

Buildings constructed after June 30, 1977, must comply with standards identified in Title 24 of the California Code of Regulations. Title 24 requires the inclusion of state-of-the-art energy conservation features in building design and construction, including the incorporation of specific energy-conserving design features, use of non-depletable energy resources, or a demonstration that buildings would comply with a designated energy budget. Consistent with the UC Policy on Sustainable Practices, the project design would exceed Title 24 requirements by at least 20 percent. Energy efficient equipment selections,

solar panels, ultra low air pressure drop air handling units, and daylight harvesting are some of the items that are planned to be incorporated into the project to comply with UC policy,

Local Plans and Policies

The LBNL hill site is an approximately 200-acre site owned by the Regents of the University of California, where the University conducts research, service, and training work within the University's mission. The LBNL hill site includes research and support structures that are primarily part of a multi-program national laboratory called the Lawrence Berkeley National Laboratory, a federally funded research and development center operated and managed by the University of California under a U.S. Department of Energy (DOE)-UC contract. The University is exempted by the state constitution from compliance with local land use regulations, including general plans and zoning. However, the University seeks to cooperate with local jurisdictions to reduce any physical consequences of potential land use conflicts to the extent feasible. The LBNL hill site is located astride the Berkeley – Oakland city boundary, with a portion of LBNL located in each city. The SERC project site is located within Berkeley city boundary. The following sections summarize objectives and policies from the LBNL 2006 LRDP and LBNL Design Guidelines, and UC Policy on Sustainable Practices as they relate to utilities.

2006 LRDP Principles and Strategies

The 2006 LRDP proposes four fundamental principles that form the basis for the development strategies provided for each element of the LRDP. The two principles most applicable to utilities-related aspects of new development are to “Preserve and enhance the environmental qualities of the site as a model of resource conservation and environmental stewardship” and to “Build a safe, efficient, cost-effective scientific infrastructure capable of long-term support of evolving scientific missions.”

Development strategies provided by the 2006 LRDP are intended to minimize potential environmental impacts that could result from implementation of the 2006 LRDP. Development strategies set forth in the 2006 LRDP that are applicable to utilities include the following:

- Provide flexibility in the identification of land uses and in the siting of future facilities to accommodate the continually evolving scientific endeavor;
- Increase development densities within areas corresponding to existing clusters of development to preserve open space, and enhance operational efficiencies and access;
- To the extent possible site new projects to replace existing outdated facilities and ensure the best use of limited land resources;
- To the extent possible, site new projects adjacent to existing development where existing utility and access infrastructure may be utilized;

- Site and design new facilities in accordance with University of California Presidential Policy for Green Building Design¹ to reduce energy, water, and material consumption and provide improved occupant health, comfort, and productivity;
- Exhibit the best practices of modern sustainable development in new projects as a way to foster a greater appreciation of sustainable practices at the Laboratory;
- Maintain a safe and reliable utility infrastructure capable of sustaining the Laboratory's scientific endeavors;
- Consolidate utility distribution into centralized utility corridors that generally coincide with major roadways;
- Ensure that utility infrastructure improvements accommodate future facility expansion and alterations in the most cost-effective means possible; and
- Design infrastructure improvements to embody sustainable practices.

LBNL Design Guidelines

The LBNL Design Guidelines were developed in parallel with the 2006 LRDP and provide specific guidelines for site planning, landscape and building design as a means to implement the 2006 LRDP's development principles as each new project is developed. The LBNL Design Guidelines provide the following specific planning and design guidance relevant to the utilities-related aspects of new development, such as providing appropriate site lighting for safety and security.

UC Policy on Sustainable Practices

As discussed in **Section 3.0, Project Description**, the proposed project would be consistent with the UC Policy on Sustainable Practices. This policy implements guidelines for new building construction related to energy efficiency and sustainable materials. The goal for new construction is to outperform the requirements of Title 24 energy-efficiency standards by at least 20 percent.

¹ This policy was subsequently updated and renamed the UC Policy on Sustainable Practices. (<http://www.universityofcalifornia.edu/sustainability/policy.html>)

4.9.4 IMPACTS AND MITIGATION MEASURES

Significance Criteria

The impact of the proposed project on utilities and service systems would be considered significant if it would exceed the following Standards of Significance, in accordance with Appendix G of the *State CEQA Guidelines* and the UC CEQA Handbook:

- Exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board;
- Require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects;
- Require or result in the construction of new storm water drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects;
- Have insufficient water supplies available to serve the project from existing entitlements and resources, or if new or expanded entitlements are needed;
- Result in the need for increased chilled water or steam generation capacity or major distribution improvements;
- Result in a determination by the wastewater treatment provider which serves or may serve the project that it does not have adequate capacity to serve the project's projected demand in addition to the provider's existing commitments;
- Be served by a landfill with insufficient permitted capacity to accommodate the project's solid waste disposal needs;
- Not comply with applicable federal, state, and local statutes and regulations related to solid waste;
- Require or result in the construction or expansion of telecommunication facilities, which would cause significant environmental impacts;
- Require or result in the construction or expansion of electrical or natural gas transmission facilities which would cause significant environmental impacts; and
- Require or result in wasteful, inefficient, or unnecessary consumption of energy during project construction, maintenance, or operation or require the construction of new power generation facilities.

Issues Not Discussed Further

The SERC project Initial Study found less than significant impacts to storm water drainage facilities, water supply, chilled water and steam generation, solid waste capacity, solid waste regulations, and telecommunication facilities. As discussed in the Initial Study, potential construction of a 12-inch storm

drain would not result in significant environmental impacts to sensitive resources. Since the expected water demand for the project was accounted for in the water demand estimate for development under the 2006 LRDP and thus, in EBMUD's 2020 water demand projection, the project would not result in the need for new or expanded water entitlements. The project-related demand for water supply, including water delivery for the purposes of firefighting, would not result in the need for new or upgraded water facilities. The proposed project would not result in the need for distribution system improvements because the increased need for chilled water and steam would be accommodated by cooling towers and boilers installed on site. Implementation of the project would not cause any landfill to exceed its permitted capacity and would result in a less than significant impact related to solid waste. The proposed project would not result in the need for upgraded telecommunication facilities and no impact would occur. These issues are not discussed further in this section.

Mitigation Measures included in the Proposed Project

The following mitigation measures, adopted as part of the 2006 LRDP, are required by the 2006 LRDP for the proposed project and are thus included as part of the proposed project. The analysis presented below evaluates environmental impacts that would result from project implementation including the application of these mitigation measures.

LRDP EIR MM UTILS-2:

LBNL shall implement programs to ensure that additional wastewater flows from the Lab are directed into unconstrained sub-basins, as necessary and appropriate. LBNL shall continue to direct the Lab's existing western effluent flows into sub-basin 17-013. In addition, new flows at the Lab shall be directed into either sub-basin 17-013, sub-basin 17-304, unconstrained portions of sub-basin 17-503, or another sub-basin that has adequate capacity. Final design and implementation of these improvements shall be negotiated between the appropriate parties and shall undergo appropriate environmental review and approval. LBNL shall closely coordinate the planning, approval, and implementation of this mitigation measure with the City of Berkeley and UC Berkeley, as appropriate.

LRDP EIR MM UTILS-4:

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

Project Impacts and Mitigation Measures

SERC Impact UTILS-1: **Implementation of the proposed project would not require an expansion of the EBMUD wastewater treatment plant or an expansion of the sewer conveyance facilities. (*Less than Significant*)**

The proposed project would generate wastewater in the form of wastewater from restrooms, laboratory wastewater, and cooling tower blowdown. These sources combined would generate on an average approximately 1,950 gpd of wastewater flows and peak day flows of about 2,820 gpd. EBMUD has previously indicated the wastewater treatment plant has sufficient capacity to serve all of the development envisioned under the 2006 LRDP. Therefore, there is sufficient capacity at the wastewater treatment plant to serve the proposed project.

Currently, wastewater from the project area flows into two sanitary sewer sub-basins in the City of Berkeley. A sanitary sewer line to the west of the project site conveys flows to the sewer main located between Buildings 16 and 7 and eventually flows to sewer sub-basin 17-013 within Hearst Avenue in the City of Berkeley. The sanitary sewer line to the east of the project site conveys flows toward sewer sub-basin 17-503 within Centennial Drive. Sub-basin 17-503 currently has capacity constraints.

However, **LRDP EIR Mitigation Measure UTILS-2**, which requires that UC LBNL ensure that additional wastewater flows are directed to unconstrained sewer sub-basins, applies to the proposed project. Therefore, as demonstrated by plans for SERC, the SERC project is being designed so that all wastewater flows from the facility would be directed to sewer sub-basin 17-013, which does not have constrained capacity. Therefore, due to the design of the project, the proposed project would not require or result in the expansion of wastewater conveyance facilities. The impacts would be less than significant.

Mitigation Measure: No project-level mitigation measure is required.

SERC Impact UTILS-2: **The construction of electrical and natural gas connections for the proposed project would not result in significant environmental impacts. (*Less than Significant*)**

The proposed project is anticipated to require 1,670 MWh per year of electricity and 55,000 therms per year of natural gas. Electricity and natural gas would be delivered to the project site by the existing infrastructure at the LBNL hill site. No transmission improvements outside of the project site are required.

Construction of the proposed project involves the use of fossil fuels for the duration of about 2 years. The proposed project is similar in nature to other construction activity within the LBNL hill site and surrounding area, in that it would use conventional construction equipment. Gasoline and other fuel are available in the surrounding area through existing private distributorships. The energy system is considered adequate to handle the demand during construction. Because of the high cost of fuel, construction activities are not anticipated to result in wasteful, inefficient, and unnecessary use of energy as construction contractors would purchase fuel from local suppliers and would conserve the use of their supplies to minimize the cost of constructing the project. For these reasons this impact is considered less than significant.

Operation

Consistent with the 2006 LRDP planning principles, the SERC building would be in close proximity to a shuttle stop and employees would be encouraged to participate in the LBNL employee ride share program. The project would also supply bicycle racks and shower facilities and reduce the amount of parking spaces at the site from 35 to 26 spaces. Therefore SERC employees are not expected to generate a large number of daily vehicle trips. As stated in **Section 3.0**, based on the trip generation rate from the 2006 LRDP EIR, the project would generate a maximum of 71 daily trips. Energy use associated with these vehicle trips would be low and would not represent wasteful use of energy resources.

The proposed project would be designed consistent with the UC Policy for Sustainable Practices, which requires new buildings to outperform California Code of Regulations Title 24 standards by at least 20 percent, and design and build new buildings to a minimum standard equivalent to a LEED Silver rating. Energy measures being considered during design include a heat recovery system, an evaporative pre-cooling hybrid system, ultra low air pressure drop air handling units, and daylight harvesting. Therefore, the proposed project would not result in wasteful or inefficient consumption of energy, and the impact would be less than significant. Furthermore, the project's demand for electricity by itself would not require the construction of new power generation facilities and the project's impact related to off-site generation facilities would also be less than significant. The project's demand could, however, combine with the demand for electricity associated with other proposed projects in the region and could contribute to the need for an expansion of an existing power plant or the construction of a new power plant. Sources of electricity are diverse and widespread, and supply is usually made from a number of sources. Both electricity and gas needed by the project may in fact be generated out of state. It is therefore speculative and not reasonable to predict where the supply sources would be located or to evaluate the environmental consequences from the construction and operation of such facilities. Furthermore, if the new power generation facilities were to be located in California, they would be subject to environmental review and would be required to avoid or minimize their environmental impacts. Accordingly, the

project's contribution to the impact related to new power generation facilities would be less than significant.

The project would benefit the State by developing alternative fuel sources. The goal of SERC is to develop the science and technology that would allow the use of sunlight to create energy sources. Research conducted in the SERC facility would focus on development of efficient alternative fuel sources such as microscopic solar panels to harness solar power which would help reduce reliance on fossil fuels.

Mitigation Measure: No project-level mitigation measure required.

4.9.5 CUMULATIVE IMPACTS

As stated in **subsection 4.0.4**, the 2006 LRDP EIR included the evaluation of the environmental impacts from the construction of a large building at the proposed site of the SERC project, in conjunction with the rest of the projected growth at the LBNL hill site, growth at UC Berkeley, and in the nearby communities.

The cumulative impacts related to utilities (LRDP Impact UTILS-6), including wastewater and energy systems, are presented on pages IV.M-27 to IV.M-28 of the 2006 LRDP EIR. The analysis considers the contribution to cumulative demand for utilities, service systems, and energy resulting from growth under the 2006 LRDP, including the proposed project, the UC Berkeley 2020 LRDP, and the City of Berkeley and Oakland general plans. The analysis concludes that the increase in demand associated with the 2006 LRDP would not represent a substantial increase in demand for utility and service systems. No further evaluation of cumulative impacts is considered necessary.

4.9.6 REFERENCES

- East Bay Municipal Utility District (EBMUD). 2010. Wastewater Online Tour. Accessed May 12. <http://www.ebmud.com/our-water/wastewater-treatment/wastewater-online-tour>.
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