4.14 UTILITIES, SERVICE SYSTEMS, AND ENERGY

This section evaluates the potential impacts on utilities, service systems, and energy resulting from implementation of the 2007 LRDP. This includes the potential for the 2007 LRDP to conflict with or obstruct existing capacity and future implementation of utility and service systems or to result in a cumulatively considerable net increase of demand in services. Existing on-campus utility and service systems that would continue to serve the campus under the 2007 LRDP include water supply (potable, reclaimed, and chilled/ heated piping), wastewater, solid waste, and energy (electricity, natural gas). Storm water and associated drainage facilities are addressed in Section 4.7, Hydrology and Water Quality. The disposal of hazardous waste is discussed in Section 4.6, Hazards and Hazardous Materials. Impacts to Climate Change are discussed in Section 5.0, Other CEQA Considerations.

4.14.1 ENVIRONMENTAL SETTING

4.14.1.1 WASTEWATER

The UCI campus is served by two wastewater collection systems. One system connects into the Irvine Ranch Water District (IRWD) collection system and the other connects into the Orange County Sanitation District (OCSD) collection system. The North Campus is served by OCSD, while the rest of the campus is served by IRWD. The OCSD is a wastewater treatment agency that services 2.5 million people in central and northwestern Orange County. The IRWD provides domestic water service, sewage collection, and water reclamation to the City of Irvine.

The IRWD provides sewage collection and treatment, and produces tertiary-treated recycled water. Wastewater is treated at the Michelson Water Reclamation Plant (MWRP) and at the Los Alisos Water Reclamation Plant (LAWRP). Wastewater from UCI, except for North Campus, is conveyed via pipelines to the MWRP. This facility is in the process of being upsized to treat up to 18 million gallons per day (mgd) of wastewater, and an additional upgrade to 28 mgd is scheduled to be complete in 2010. The level of treatment at MWRP provides tertiary level treatment, which is the necessary level of treatment for irrigation water.

Water reclaimed from the MWRP and LAWRP makes up 20 percent of the IRWD's total water supply, reducing the need to import water. The reclaimed water is delivered through a completely separate distribution system that includes more than 245 miles of pipeline, eight storage reservoirs and 12 pump stations. The system provides reclaimed water to approximately 1,000 acres of fields and orchards planted with a variety of fruits, vegetables and nursery products. Reclaimed water is also used to irrigate landscapes including parks, schools, golf courses, streetscapes, and open space managed by many community associations (IRWD 2005). Reclaimed water is not a potable water supply and therefore is not available for drinking, cooking, or bathing.

The Regional Water Quality Control Board (RWQCB) regulates wastewater discharges from municipal wastewater treatment plants, such as the MWRP and LAWRP, through the issuance of National Pollutant Discharge Elimination System (NPDES) permits. Discharges of wastewater to surface water must meet the effluent limitations prescribed in the NPDES permit issued by the RWQCB. MWRP discharges into the SJFM and into reclaimed water reservoirs for storage.

UCI's main campus wastewater collection system provides sewage disposal for the campus and consists of approximately 30,000 linear feet of gravity sewer line with sizes varying from 8 to 18 inches. According to the Sanitary Sewer Evaluation conducted by Tetra Tech in 2003, the campus wastewater

generally flows to the north in pipes owned and operated by UCI, and then merges and connects to the IRWD wastewater collection system at the intersection of Campus Drive and West Peltason Drive. From there, wastewater flows to the MWRP located at Michelson Drive and Harvard Avenue, over one mile north of the campus. Wastewater from the North Campus is collected by OCSD and transported to Water Reclamation Plant 2 (WRP2) located approximately five miles east of the campus in Huntington Beach. Wastewater effluent from WRP2 is disposed of in the Pacific Ocean via an outfall pipeline.

In accordance with the December 1963 Sewer Agreement (amended in October 1983) the University funded its proportional share of capital costs of sewer treatment plant capacity to serve the campus. UCI funds additional increments of sewage treatment capacity as needed to serve campus demand (in increments of 0.1 mgd) at an indexed cost that represents UCI's proportionate share of the capital cost of treatment facilities.

The sewer backbone on the UCI Campus can be grouped into three main branches: West Peltason Drive Branch, Aldrich Park Branch and Campus Drive Branch. The UCI Health Sciences Complex, School of the Arts, Crawford Hall athletics complex, Mesa Court student housing, and campus support facilities (including the central plant) all contribute to wastewater received at the West Peltason Drive Branch. The Aldrich Park Branch is divided into East and West sub-branches. The wastewater entering the East Aldrich Park Branch is mainly from academic buildings in the Central Core. However, Middle Earth Housing contributes some wastewater to the East Aldrich Park Branch. The West Branch receives wastewater from academic uses in the Central Core as well and from University Hills Residential Community. The Campus Drive Branch serves student housing neighborhoods including Arroyo Vista, Verano Place, Palo Verde, and Middle Earth.

UCI wastewater flows in 2006 were approximately 1.5 mgd. Approximately 33 percent of the flows from the West Peltason Drive Branch, approximately 37 percent from the Aldrich Park Branch, and approximately 29 percent from the Campus Drive Branch (Tetra Tech 2003). As discussed in Section 3.3.3.4 in the Project Description, the 2007 LRDP requires that some additional on-campus existing sanitary sewer distribution systems be installed and certain reaches of existing pipelines be upgraded to accommodate the proposed growth. Implementation would include the installation of new, replacement, or parallel sewer pipelines and manholes installed in existing campus streets, parking lots, undeveloped campus property, paved plaza areas, and landscaping.

4.14.1.2 WATER SUPPLY

UCI uses potable "domestic" water for drinking, sanitation, fire protection, heating, cooling, air conditioning, and research. UCI uses reclaimed water for landscape irrigation and is pursuing additional applications for reclaimed water use on campus. UCI uses approximately 2,000 acre-feet of potable water per year (approximately 1.8 mgd) and approximately 715 acre-feet of reclaimed water per year (approximately 0.6 mgd) for irrigation

The IRWD provides the water supply for UCI. The IRWD encompasses a 133-square mile service area with an estimated population of 316,000. It services the City of Irvine and portions of Costa Mesa, Lake Forest, Newport Beach, Orange, and Tustin. The IRWD is the largest constituent agency of the Municipal Water District of Orange County (MWDOC), a member agency and wholesale importer of water from the Metropolitan Water District (MWD). Approximately 35 percent of IRWD's drinking water is purchased from MWDOC imported through MWD from the Colorado River and from Northern California. The remaining 65 percent of the water supply comes from IRWD's extensive well system located in Santa Ana. Total water demand for the IRWD service area is projected to reach 136,560 acre-feet per year by the year 2030. In 1964, the Regents entered into a Water Service Agreement with IRWD regarding water

service for UCI. The Agreement states that IRWD will provide the UCI Campus water service of up to 3,620 acre-feet per service year consistent with the published IRWD schedule of rates for comparable entities within the District. The Agreement provides for the University to pay the charges, costs and expenses for future (Post-1964) connections to IRWD water transmission mains. These payments and the water rates paid by UCI represent UCI's payment for the IRWD capital facilities required to serve the campus.

The source of IRWD's groundwater supply is the lower Santa Ana River Basin. IRWD is an operator of groundwater-producing facilities in the Orange County Groundwater Basin ("Basin"). The Basin is managed solely by the Orange County Water District (OCWD) for the benefit of municipal, agricultural and private groundwater producers. To increase water supply, IRWD is constructing the Irvine Desalter Project treatment plants (seawater desalination) in the Irvine Subbasin. The Irvine Desalter Project is a joint groundwater quality restoration project by the IRWD and OCWD and is projected to produce both potable and non-potable water supplies starting in 2007. Likewise, OCWD has numerous projects to increase water supply include the Groundwater Replenishment System, which injects treated reclaimed water in the groundwater basin. These projects will add to the overall groundwater projections.

In response to projected demand, IRWD has begun and will continue developing new sources for increased local groundwater supply. Some new water sources include water from the West Irvine Wells, Irvine Desalter Project, upgrades to recycled water system, expansion of recycled water treatment capacity and proposed seawater desalination projects. IRWD's 2005 Urban Water Management Plan (UWMP) includes a description of each of the projects and programs being implemented to ensure existing and future facilities are adequate to deliver water supplies to the region. The UWMP evaluates the adequacy of water supply to serve the district including the UCI LRDP through the year 2030. IRWD staff in consultation with UCI has evaluated UWMP assumptions for existing LRDP and the 2007 LRDP update. With implementation of the programs identified in the UWMP, water supply would be adequate to serve the 2007 LRDP.

Potable water is distributed to UCI from the IRWD potable water transmission system through 8-, 10-, and 12-inch water mains to UCI's distribution system and is served by five metered connections. The distribution system consists of two primary pressure zones, called IRWD Zones I and III. Zone I serves the majority of the campus with the exception of the south and east campuses. The Zone I system is directly served by three 6-inch IRWD metered connections. The Zone III system is served by one 10-inch IRWD metered connection adjacent to the east campus and one 8-inch IRWD metered connection adjacent to the south campus. An additional system, called the Subzone system, was created from the on-site Zone III system to serve existing mid/high-rise buildings with internal piping systems designed to operate with higher pressure than Zone I can supply. The Subzone system is operating as two separate systems pressure reduced from the Zone III System. The West Subzone serves mid/high-rise buildings within the campus core as well as the multistory residential buildings of Middle Earth and lower University Hills. The pressure reducing valve serving the West Subzone system is set at a hydraulic grade line of approximately 343 feet. The East Subzone system serves the multistory housing units on the east campus. The pressure reducing valve serving the East Subzone system is set at a hydraulic grade line of approximately 293 feet.

The existing UCI irrigation water systems in operation primarily consist of 2.5-, 3-, 4-, 6-, 10-, and 12-inch reclaimed water pipelines serving the Academic Core, East Campus, South Campus and West Campus. These systems are used for the irrigation of all landscaping areas including parks, slopes, greenbelts, parkways, and building perimeter landscaping. Certain small areas of landscaping including privately owned single-family homes in University Hills use domestic water for landscape irrigation.

To reduce water demand on campus, UCI implements a comprehensive system of water conservations measures. Current measures include:

- Use of reclaimed water for all landscape irrigation
- Landscaping policy which requires individual capital projects to landscape with native and drought-resistant species. This policy minimizes the demand for additional irrigation.
- Meet or exceed LEED requirements for new projects to reduce water use by 30% from 1992 Energy Policy Act fixture performance through the installation of water efficient fixtures including low flow water closets, waterless or ultra-low flow urinals, low flow restrictors.
- Retrofitting of existing campus facilities including the installation of ultra-low flow urinals on renovations and retrofit of high demand rest rooms, auto sensor flush valves, flow restrictive aerators on campus water faucets, auto-sensor sink faucets in campus rest rooms.

Program development identified in the 2007 LRDP requires the expansion of existing distribution facilities for domestic water and reclaimed water.

4.14.1.3 SOLID WASTE

UCI's Facilities Management Department implements and manages a comprehensive waste and recycling program. The program is aimed at:

- Reducing waste at the source;
- Encouraging the purchase and use of durable and reusable products;
- Encouraging the purchase of high post-consumer content recycled products;
- Increasing the total volume of waste materials diverted from landfills to recycling processes;
- Ensuring the long term viability of campus recycling operations through appropriate educational programs, coordination, management and oversight; and
- Remaining in compliance with Federal and state mandates.

Solid waste is collected in dumpsters located throughout campus and removed by a private refuse collection service for off site disposal at the Frank R. Bowerman (FRB) Landfill, formerly Bee Canyon Sanitary Landfill. This is one of three municipal solid waste facilities managed by the Integrated Waste Management Department (IWMD) of Orange County. The FRB landfill is approximately 725 acres in size with 341 acres permitted for waste disposal. The FRB landfill serves the central portion of Orange County and also receives solid municipal waste from southeastern Los Angeles County. As of February 2006, the IWMD is proposing to expand the total landfill capacity for the FRB landfill by 104 million cubic yards in order to accommodate Orange County's growing population and extend the life of the FRB landfill to 2053. It is estimated that Orange County's population will have increased by 25% by the year 2039. It is also estimated that Orange County's residents produce about 4 million tons of refuse every year. Presently, the FRB landfill is permitted to receive a daily maximum of no more than 8,500 tons per day. The proposed expansion will increase it daily capacity to 11,500 tons per day to address the needs of the growing population.

In 2005, a total of 2,238,050 tons of waste was disposed of at the FRB Landfill. UCI generated approximately 4,958 tons of solid non-hazardous waste in 2005, representing approximately 0.22 percent

of the annual total deposited at the FRB Landfill. Special pickups are required for activities that generate large amounts of refuse, such as office move outs, cleanouts, and special events.

UCI requires campus buildings to achieve recycling and waste management goals set forth in the UC Policy on Sustainable Practices, which is described below in Section 4.14.1.4. This policy supports minimizing the amount of University-generated waste sent to landfills. UC systemwide policy requires that campuses achieve a waste diversion of 50% by June 30, 2008 and 75% by June 30, 2012, with a goal of zero waste by 2020. All UC Campuses are required to develop an Integrated Waste Management Plan (IWMP), to include waste reduction and recycling integrated with green building design, and a funding mechanism for implementation of waste reduction projects by June 30, 2007.

UCI has established an IWMP consistent with UC Policy and as of June 2007 has programs in place for recycling beverage containers, building materials, cardboard, green waste and grass, mixed metals, and mixed office paper. In 2005, UCI recycled 3,220 tons of materials, for a diversion rate of 39 percent. As of June 2007, monitoring indicates that UCI has achieved a diversion rate of 50% in advance of the 2008 target date.

4.14.1.4 ENERGY AND RELATED UTILITIES

UCI's energy use includes electricity generated on campus at the Central Utilities Plant cogeneration facility, electricity purchased from Southern California Edison (SCE), and natural gas purchased from SCE. An important element of the campus's energy use and energy-related infrastructure is its centralized cooling and heating systems and cogeneration operations for on-site electric power production, which contribute to a reduction in the campus's overall consumption of energy. In addition, UCI employs numerous emergency generators for back up energy.

Electricity

Existing peak demand at UCI is calculated at 42,873 kilo volt-amps (KVA), with 70% diversity. "Diversity" acknowledges the fact that the loading of equipment and the loading of individual electrical circuits do not peak at the same time.

UCI receives electricity from SCE in a 66-kilovolt (KV) sub-transmission line from a utility substation facility located on MacArthur Boulevard. The 66KV sub-transmission line travels over Bonita Canyon road, connects to a riser pole at the edge of the University's property, and then proceeds underground where it connects to UCI's 66/12KV main substation, known as the University Substation. The University Substation then provides electricity to campus facilities through underground 12KV circuits and switching stations. This electrical system is known as the UCI campus 12KV electrical distribution system. However, there are exceptions where certain buildings receive their electricity directly from SCE. The buildings served directly by SCE are:

- North Campus (All facilities)
- Arroyo Vista, Palo Verde, Mesa Court, and University Hills
- Irvine Barclay Theatre
- American Heart Association
- Infant/Toddler Center
- Medical Plaza
- Extended Day Center
- University Montessori School
- University Extension
- Beckman Laser Clinic
- Faculty/Staff Housing Office
- Child Development Center
- Alumni House
- Engineering Instructional Facility
- Anteater Field, Baseball Field
- Concert Hall

UCI recently constructed a 13-megawatt cogeneration plant for producing electricity from natural gas at the Central Plant. The Central Plant is located within the Academic Central Core near Parking Lot 7. Gas-fired turbine generators (GTG) serving stream-driven chillers produce electrical power and chilled water. UCI's two electrical substations receive and distribute high-voltage power from SCE for any power needs not met by the cogeneration facility.

Natural Gas

Southern California Gas Company (SCG), owned by Sempra Energy Utilities, is the nation's largest natural gas distribution utility serving 19.8 million consumers throughout Central and Southern California. SCG supplies the UCI campus with natural gas and owns the majority of the gas piping. Natural Gas is supplied to the campus by three main feeder lines that branch off of two 12" high pressure gas mains that run under Campus Drive and University Drive. The first feeder line provides services to the Health Sciences Complex and consists of a 4" high pressure gas line that extends from University Drive to California Avenue. The second line is an 8" medium pressure (40-45 lbs) line that starts at Campus Drive and proceeds along Bridge Road where is reduces to a 6" medium pressure line. This line continues to loop through the main campus providing service to the majority of the campus and a portion of University Hills. The last feeder line is a 6" medium pressure line that runs south on Berkeley from Campus Drive, then south on Gabrielino Drive. This feeder provides service to the East Campus and the east portion of University Hills.

The Central Plant is served by a 6" medium pressure line that extends from the Bridge Road feeder that provides interruptible service to the Central Plant Boilers, and an uninterruptible service that supplies the Academic Campus Core. The majority of the piping is found under paved areas approximately 24 to 36 inches in depth. Most facilities are served by above ground regulating stations located adjacent to buildings. However, there are a few regulating stations that exist in underground vaults.

Based on building uses and sizes and calculations from UCI staff, the existing natural gas demand load on campus is approximately 354,880 cubic feet per hour.

Cooling and Heating Systems

The Central Plant is the heart of the utility infrastructure of the Campus, producing and distributing chilled water for cooling, dehumidification, and process cooling; high temperature hot water for building heating water, domestic and industrial hot water, low-pressure steam generation for research equipment; and compressed air for instrumentation and automation functions and for research laboratories to campus buildings.

UCI's Central Steam Plant generates saturated steam at 235 pounds per square inch gauge for campus space heating and cooling needs. The Central Plant Steam generating equipment consists of four boilers, each capable of firing on either natural gas or fuel oil. The Central Plant boilers produce approximately 15,000 to 40,000 pounds per hour of steam to maintain these services. Hot water is distributed to the buildings on campus by supply piping which circles the campus in an underground tunnel.

The Central Plant also produces 630,000 gallons of chilled water to the campus to cool campus buildings. Large steam turbine driven chillers and electric motor driven chiller units are used to chill the water. The chiller system produces 45-degree water during low to moderate load conditions. In the summers as the heat increases, more chillers are put into service; in contrast, the demand for chilled water during the winter month's decreases. Further, UCI has the largest thermal energy storage water tank in the western U.S. with 53,000 ton-hours of storage capacity, allowing UCI to shift up to 5 megawatts of electric load to off-peak nighttime hours, when electricity rates are lowest, as an energy management tool.

Energy Conservation and Sustainability

Sustainability is an important component of UCI's capital project design, construction, and operating practices that focuses on conservation of natural resources. Sustainability refers to the physical development and institutional operating practices that meet the needs of present users without compromising the ability of future generations to meet their own needs, particularly with regard to use and waste of natural resources. Sustainable practices support ecological, human, and economic health and vitality. Sustainability presumes that resources are finite, and should be used conservatively and wisely with a view to long-term priorities and consequences of the ways in which resources are used.

UCI participates in UC systemwide efforts to achieve energy efficiency. In 2003, The UC Board of Regents expressed their support for a Presidential policy to promote "…the principles of energy efficiency and sustainability in the planning, financing, design, construction, renewal, maintenance, operation, space management, facilities utilization, and decommissioning of facilities and infrastructure to the fullest extent possible, consistent with budgetary constraints and regulatory and programmatic requirements" which ultimately resulted in the adoption of the policy known today as the UC Policy on Sustainable Practices.

Further, UC's Energy Conservation policy states that "The University will voluntarily comply with the State Energy Resources Conservation and Development Commission California Energy Commission standards for energy conservation" in nonresidential buildings. The UC Facilities Manual provides detailed guidelines and standards regarding this policy. The Facilities Manual presents planning and design guidelines, requires annual reports to be prepared and reviewed, and provides information about alternative fuel provision and utility regulatory agency requirements. The planning and design guidelines require that new buildings are designed according to CCR, Title 20, "Energy Building Regulations," and Title 24, "Energy Conservation Standards."

UC's Policy on Sustainable Practices recommends that University operations:

- Incorporate the principles of energy efficiency and sustainability in all capital projects within budgetary constraints and programmatic requirements;
- Minimize the use of non-renewable energy sources on behalf of the University's built environment by creating a portfolio approach to energy use, including the use of local renewable energy and purchase of green power from the grid as well as conservation measures that reduce energy consumption;
- Incorporate alternative means of transportation to/from and within the campus to improve the quality of life on campus and in the surrounding community. The campuses will continue their strong commitment to provide affordable on-campus housing, in order to reduce the volume of commutes to and from campus. These housing goals are detailed in the campuses' Long Range Development Plans.
- Track, report, and minimize greenhouse gas emissions on behalf of University operations;
- Minimize the amount of University generated waste sent to landfills;
- Utilize the University's purchasing power to meet its sustainability objectives.

Representative excerpts from the UC Policy on Sustainable Practices are listed below:[1]

I. Green Building Design

Incorporate the principles of energy efficiency and sustainability in all capital projects, renovation projects, operations and maintenance within budgetary constraints and programmatic requirements.

New Buildings

- All new building projects, other than acute-care facilities, to outperform the required provisions of the California Energy Code (Title 24) energy-efficiency standards by at least 20 percent.
- The University of California will design and build all new buildings, except for laboratory and acute care facilities, to a minimum standard equivalent to a LEED™ 2.1 "Certified" rating.
- Campuses will strive to achieve a standard equivalent to a LEED™ "Silver" rating or higher, whenever possible within the constraints of program needs and standard budget parameters.
- The University of California will design and build all new laboratory buildings to a minimum standard equivalent to a LEED™ 2.1 "Certified" rating and the Laboratories for the 21st Century (Labs21) Environmental Performance Criteria (EPC), as appropriate.

Building Renovations

- Any significant renovation projects involving existing buildings will also apply sustainability principles to the systems, components and portions of the building being renovated.
- Renovation of buildings that require 100 percent replacement of mechanical, electrical and plumbing systems and replacement of over 50 percent of all non-shell areas (interior walls, doors, floor coverings and ceiling systems) should at a minimum comply with a UC equivalent to a LEED-NC 2.1 or the most current version of the LEED NC program certified rating.

II. Clean Energy Standard

Minimize the use of non-renewable energy sources on behalf of the University's built environment by creating a portfolio approach to energy use, including the use of local renewable energy and purchase of green power from the grid, as well as conservation measures that reduce energy consumption.

- The University will implement a system-wide portfolio approach to reduce consumption of non-renewable energy. The portfolio will include a combination of energy efficiency projects, the incorporation of local renewable power measures for existing and new facilities, green power purchases from the electrical grid, and other energy measures with equivalent demonstrable effect on the environment and reduction in fossil fuel consumption.
- The University will strive to achieve a level of grid-provided electricity purchases from renewable sources equaling 20 percent of its electricity needs from renewable sources by 2010.
- The University will develop a strategic plan for siting renewable power projects in existing and new facilities with a goal of providing up to 10 megawatts of local renewable power by 2014.

[1] The UC Policy on Sustainable Practices is periodically updated and expanded. In anticipation of future modifications during the life of this EIR only excerpts of the policy are presented. The full text of the UC Policy on Sustainable Practices can be viewed online at http://www.ucop.edu/ucophome/coordrev/policy/PP032207ltr.pdf or obtained through University wide Policy Office, Office of the President, 1111 Franklin Street, 12th Floor, Oakland, CA 94607.

- The University will develop a strategic plan for implementing energy efficiency projects for existing buildings and infrastructure to include operational changes and the integration of best practices.

III. Climate Protection Practices

- The University will develop a long term strategy for voluntarily meeting the State of California's goal, pursuant to the "California Global Warming Solutions Act of 2006" that is: by 2020, to reduce greenhouse gas emissions to 1990 levels.
- Each UC campus will pursue individual membership with the California Climate Action Registry.

IV. Sustainable Transportation Practices

Incorporate alternative means of transportation to/from and within the campus to improve the quality of life on campus and in the surrounding community. The campuses will continue their strong commitment to provide affordable on-campus housing, in order to reduce the volume of commutes to and from campus. These housing goals are detailed in the campuses' Long Range Development Plans.

V. Sustainable Operations

Track, report and minimize greenhouse gas emissions on behalf of University operations.

VI. Recycling and Waste Management (also see Section 4.141.3)

Minimize the amount of University generated waste sent to landfills by adopting the following waste diversion goals.

- 50% by June 30, 2008
- 75% by June 30, 2012
- Ultimate goal of zero waste by 2020

VII. Environmentally Preferable Purchasing Practices

Utilize the University's purchasing power to meet its sustainability objectives related to:

- Green Seal certified products
- Reduction of hazardous electronic waste
- Environmentally responsible packaging
- Effective recycling and manufacturer take-backs
- Supply chain environmental responsibility
- Evaluating environmental claims
- Training and annual plan and report

UCI incorporates programs and techniques that create buildings and systems that are environmentally friendly and help provide for a sustainable environment. Under the 2007 LRDP, the campus would continue to promote sustainable development practices. Pursuant to the 2007 LRDP planning principles, UCI is committed to stewardship of the environment and to reducing its dependence on non-renewable energy sources. UCI has established a framework for environmentally sound development and operations within all sectors of the campus. This includes initiatives consistent with the UC Policy on Sustainable Practices.

Examples of UCI sustainability efforts include:

- Construction of a Cogeneration Facility capable of generating up to 13 megawatts of power for campus operations;
- Purchasing green power from the electrical grid;
- Investigating energy projects – such as solar power – that will reduce campus fossil fuel consumption;
- Incorporating energy retrofit projects into major UCI building renovations;
- Working in collaboration with the US Green Building Council to establish the first campuswide Leadership in Energy and Environmental Design (LEED™) green building design and certification program in the U.S.;
- Advancing fuel cell technology through research at UCI's National Fuel Research Center; and
- Powering campus shuttles with 100% biodiesel fuel.

UCI Sustainability Committee

To implement the UC's Policy on Sustainable Practices, UCI created a Chancellor's Committee on Sustainability. The Chancellor's Committee on Sustainability is comprised of UCI students, faculty, and staff who meet regularly to address sustainability as related to air quality, energy efficiency, green buildings, recycling, transportation management, water management, and waste management. The mission of the committee is:

- To create an integrated relationship between the environment and the existing programs on education and research at UCI;
- To assess, support, and promote the implementation of needed resources towards conservation, while maintaining a proper quality of current performance; and
- To encourage sustainable practices in UCI's long-range planning and design of the campus, and to serve as an inspiration and role model for the surrounding community.

4.14.2 REGULATORY FRAMEWORK

4.14.2.1 FEDERAL

UCI receives its water entirely from the IRWD, which is responsible for meeting federal and state laws and regulations regarding water supply and water quality. Such regulations include water supply treatment system testing and monitoring, as specified in Title 23, Division 4, Chapter 1, Article 4 of the California Code of Regulations (CCR), and federal regulations promulgated by the Environmental Protection Agency.

4.14.2.2 STATE

Urban Water Management Planning Act (California Water Code, Division 6, Part 2.6, Section 10610 et. seq.)

The Urban Water Management Planning Act was developed due to concerns for potential water supply shortages throughout California. It requires information on water supply reliability and water use

efficiency measures. Urban water suppliers are required, as part of the Act, to develop and implement Urban Water Management Plans to describe their efforts to promote the efficient use and management of water resources.

Water Conservation Projects Act

The State of California's requirements for water conservation are codified in the Water Conservation Projects Act of 1985 (Water Code Sections 11950-11954), which encourages local agencies and private enterprise to implement potential water conservation and reclamation projects.

California Integrated Waste Management Act - AB 939

The California Integrated Waste Management Act of 1989 (AB 939) established the existing organization, structure, and mission of California Integrated Waste Management Board (CIWMB) with an integrated waste management hierarchy that consists of the following (in order of importance): source, reduction, recycling, composting, and land disposal of solid waste. Under the provisions of this statute, the University of California (UC) is not subject to this and other regulations pertaining to solid waste. However, the University has voluntarily adopted waste diversion goals in the March 2007 UC Sustainability Policy.

This regulation also included Waste Diversion Mandates which required each city or county plan to include an implementation schedule which shows: diversion of 25 percent of all solid waste from landfill or transformation facilities by January 1, 1995 through source reduction, recycling, and composting activities; and, diversion of 50 percent of all solid waste by January 1, 2000 through source reduction, recycling, and composting activities.

Porter-Cologne Water Quality Control Act

The Porter-Cologne Water Quality Control Act, codified in the California Water Code, authorizes the State Water Resources Control Board to implement programs to control pollution into state waters. This law essentially implements the requirements of the Federal Clean Water Act. Pursuant to this law, the RWQCB establishes the wastewater concentrations of a number of specific hazardous substances in treated wastewater discharged from the campus.

UC Policy on Sustainable Practices

As discussed in Section 4.14.1.4, the Regents have adopted a Policy on Sustainable Practices which includes practices related to green building design, clean energy, climate protection, transportation, operations, recycling and waste management, and environmentally preferable procurement. Goals of this policy include reducing consumption of non-renewable energy for all proposed and existing facilities. UCI is required to show status of project compliance at the time of Regents' approval of new projects.

UC Energy Conservation Policy

Adopted in 1977, this policy requires universities to "voluntarily comply with California Energy Commission standards for energy conservation" and "cooperate with local water districts in efforts to conserve water and meet reduced water-use goals of the local districts." Detailed guidelines and standards for this policy are located in the UC Facilities Manual. Chapter 5 of Volume 6 of the Facilities Manual is titled Energy and Water Conservation and Management. This chapter provides planning and design guidelines and operational guidelines to conserve both energy and water.

4.14.3 PROJECT IMPACTS AND MITIGATION

4.14.3.1 ISSUE 1 –WASTEWATER TREATMENT

Utilities, Service Systems, and Energy Issue 1 Summary

Would implementation of the 2007 LRDP result in an exceedence of the Santa Ana Regional Water Quality Control Board's wastewater treatment requirements or the IRWD's treatment capacity to serve the project's projected demand?

Impact: The planned expansion of the Michelson Water Reclamation Plant (MWRP), which would undergo additional environmental review and continue to abide Industrial User Discharge Permit regulations, would have sufficient capacity to accommodate increases in wastewater generation as a result of implementation of the 2007 LRDP.

Mitigation: No mitigation is required.

Significance Before Mitigation: Less than significant.

Significance After Mitigation: Not applicable.

Standards of Significance

Based on Appendix G of the CEQA Guidelines, implementation of the 2007 LRDP may have a significant adverse impact if it would exceed the RWQCB's wastewater treatment requirements or if IRWD, the wastewater treatment provider that serves the campus, would not have adequate capacity to serve the project's projected demand in addition to the provider's existing commitments.

Impact Analysis

Implementation of the 2007 LRDP would increase the amount of on-campus building space and residential population, which would result in the generation and discharge of additional wastewater flows requiring treatment at the MWRP operated by the IRWD and at the WRP2 operated by OCSD.

As discussed in Section 4.14.1.1, UCI wastewater flows were approximately 1.5 mgd in 2006. Estimated wastewater flows from the UCI campus could ultimately reach 4.3 mgd at full implementation of the 2007 LRDP. Therefore, buildout of the UCI campus under the 2007 LRDP could result in a wastewater flow increase of approximately 2.8 mgd.

In accordance with the agreements between the UC and IRWD, UCI provides funding for its proportional share of capital costs of sewer treatment plant capacity to serve the campus through the purchase of 0.1-mgd increments of sewage treatment capacity at an indexed cost that represents UCI's proportionate share of the treatment facilities.

The IRWD expects to collect and treat 26.11 mgd of wastewater by 2025, including the projected 4.3 mgd from full implementation of the 2007 LRDP at the UCI campus (pers. comm., Richard Diamond, IRWD, March 29, 2007). With the 28-mgd upgrade expected to be completed in 2010, the MWRP would have sufficient capacity to accommodate the 2007 LRDP anticipated sewage generation. Therefore, the impact to wastewater treatment capacity from implementation of the 2007 LRDP would be less than significant.

Full implementation of the 2007 LRDP would not exceed wastewater treatment capacity at the MWRP, as described above; however, it has the potential to affect compliance with the waste discharge requirements of the MWRP by discharging types or quantities of constituents that cannot be adequately treated by the

plant. UCI would continue to comply with Industrial User Discharge Permit regulations regarding sewage generation quantities and constituents; therefore, implementation of the 2007 LRDP would not result in a significant impact with regard to wastewater treatment requirements.

Mitigation Measures

The 2007 LRDP would have a less than significant impact with regard to wastewater treatment; therefore, no mitigation measures are proposed.

4.14.3.2 ISSUE 2 – NEW WATER OR WASTEWATER FACILITIES

Utilities, Service Systems, and Energy Issue 2 Summary

Would implementation of the 2007 LRDP require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities?

Impact: Because implementation of the 2007 LRDP would increase the demand for water and waste water, implementation of the 2007 LRDP would require the construction of additional water and wastewater facilities, which could impact the physical environment (Utl-2).	**Mitigation:** Applicable mitigation measures in other sections of this EIR.
Significance Before Mitigation: Significant.	**Significance After Mitigation:** Less than significant.

Standards of Significance

Based on Appendix G of the CEQA Guidelines, implementation of the 2007 LRDP may have a significant adverse impact if it would 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.

Impact Analysis

Table 4.14-1 provides data on both existing and projected domestic and reclaimed water demand. Existing domestic water average demand is 1.8 MGD while projected domestic water average demand at full LRDP implementation is estimated at 4.9 MGD. Therefore, the increase in domestic water average demand would be 3.1 MGD. Existing reclaimed water average demand is 0.6 MGD, while projected reclaimed average demand is 1.2 MGD. Therefore the increase in reclaimed water average demand would be 0.6 MGD.

Potable and reclaimed water service to the UCI campus would be provided by the IRWD. Program development identified in the 2007 LRDP would require the expansion of existing distribution facilities for domestic water, central plant water, fire suppression water, and reclaimed water for irrigation and other non-potable water needs.

Table 4.14-1. Existing and Projected 2025 Domestic and Reclaimed Water Demand on UCI Campus

	Average Demand		Percent increase from Existing to Projected Demand
	Daily in gallons per day	Annual in acre-feet per year	
Existing Domestic Water Demand	1,800,827 gpd	2,016 afy	
Projected Domestic Water Demand	4,867,746 gpd	5,455 afy	170 %
Existing Reclaimed Water Demand	636,121 gpd	712 afy	
Projected Reclaimed Water Demand	1,253,373 gpd	1,400 afy	108 %

In 2005, the average volume of wastewater treated by the IRWD was 13.97 MGD. The projected volume of wastewater treated in 2025 would be 26.1 MGD. In 2005, UCI contributed approximately 11 percent of the IRWD's total treated wastewater. In 2025, UCI would contribute approximately 19 percent of the IRWD's total treated wastewater. UCI's increase in wastewater flows would be accommodated by planned increases of wastewater treatment capacity by the IRWD.

In the highly urbanized UCI campus, many of the expansions to existing campus distribution facilities for domestic water, central plant water, fire suppression water, and reclaimed water for irrigation and other non-potable water needs under the 2007 LRDP would occur in existing utility corridors or beneath existing roadways. Other utility improvements would occur along new roadways or in undeveloped areas of the outer campus. The distribution facilities improvements would likely be addressed as part of a larger campus development project; however, it is possible that they could be proposed as an individual project or projects. Any such projects would be subject to CEQA review prior to their approval, and physical impacts that associated with the construction of expanded facilities would be analyzed in subsequent CEQA analyses. The environmental impacts associated with the development of water distribution facilities are analyzed in other sections of this EIR, and UCI would implement appropriate mitigation measures from those sections as required to reduce the potential impacts of such improvements. However, prior to implementation of mitigation measures, impacts to the physical environment as a result of construction of additional water and wastewater facilities would be significant.

Impact Utl-2 Because implementation of the 2007 LRDP would increase the demand for water and waste water, implementation of the 2007 LRDP would require the construction of additional water and wastewater facilities, which could significantly impact the physical environment.

Mitigation Measures

Implementation of applicable mitigation measures in other sections of this EIR would reduce significant impacts associated with the construction of new facilities, including utility improvements, to below a level of significance. These measures include Aes-1A, Aes-2A, Aes-3B, Air-2A, Air-2B, Bio-1A, Bio-2A, Bio-2B, Bio-3A, Bio-3B, Bio-3C, Bio-3D, Bio-4A, Cul-1A, Cul-1B, Cul-2A, Cul-4A, Haz-6A, Hyd-1A, Hyd-2A, Hyd-2B, Lan-2A, Noi-2A, and Noi-4A.

4.14.3.3 ISSUE 3 – IMPACTS FROM NEW STORM WATER FACILITIES

Utilities, Service Systems, and Energy Issue 3 Summary

Would implementation of the 2007 LRDP require or result in the construction of new storm water drainage facilities or expansion of existing facilities which could cause adverse effects on the environment?

Impact: Because implementation of the 2007 LRDP would increase the amount of impervious surface, implementation of the 2007 LRDP would require the construction of additional storm water facilities, which could impact the physical environment (Utl-3).

Mitigation: Applicable mitigation measures in other resource sections of this EIR.

Significance Before Mitigation: Significant.

Significance After Mitigation: Less than significant.

Standards of Significance

Based on Appendix G of the CEQA Guidelines, implementation of the 2007 LRDP may have a significant adverse impact if it would 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.

Impact Analysis

As discussed in Section 4.7, development under the 2007 LRDP would increase impervious surfaces on campus, which could increase the volume of storm water discharged from project sites or the campus as a whole. These increases may overflow capacities of existing storm water facilities requiring construction of detention basins or larger conveyance facilities. In addition, in order to treat storm water from new developments, new facilities may need to be developed that possess the chemical, physical, and/or biological characteristics that facilitate removal of pollutants from storm water.

As with water and wastewater facility improvements, these improvements would be subject to CEQA review prior to their approval. The storm water facilities improvements would likely be addressed as part of a larger development project; however, it is possible that they could be dealt with as individual projects. Environmental impacts that could result from the development of storm water facilities are analyzed in other sections of this EIR, and UCI would implement appropriate mitigation measures from those sections as required to reduce the potential impacts of such improvements. However, prior to implementation of mitigation measures, impacts to the physical environment as a result of construction of additional storm water facilities would be significant.

Impact Utl-3 Because implementation of the 2007 LRDP would increase the amount of impervious surface, implementation of the 2007 LRDP would require the construction of additional storm water facilities, which could significantly impact the physical environment.

Mitigation Measures

Implementation of applicable mitigation measures in other sections of this EIR would reduce significant impacts associated with the construction of new facilities, including storm water facilities, to below a level of significance. These measures include Aes-1A, Aes-2A, Aes-3B, Air-2A, Air-2B, Bio-1A, Bio-2A, Bio-2B, Bio-3A, Bio-3B, Bio-3C, Bio-3D, Bio-4A, Cul-1A, Cul-1B, Cul-2A, Cul-4A, Haz-6A, Hyd-1A, Hyd-2A, Hyd-2B, Lan-2A, Noi-2A, and Noi-4A.

4.14.3.4 ISSUE 4 – WATER SUPPLY AVAILABILITY

Utilities, Service Systems, and Energy Issue 4 Summary

Would implementation of the 2007 LRDP result in insufficient water supplies available to serve the project from existing entitlements and resources, or new or expanded entitlements needed?

Impact: Projected water demands as a result of implementation of the 2007 LRDP are consistent with Irvine Ranch Water District's recently adopted Urban Water Management Plan and would not change the Plan's conclusions with respect to water supply reliability.

Mitigation: No mitigation required.

Significance Before Mitigation: Less than significant.

Significance After Mitigation: Not applicable.

Standards of Significance

Based on Appendix G of the CEQA Guidelines, implementation of the 2007 LRDP may have a significant adverse impact if sufficient water supplies are not available to serve the project from existing entitlements and resources, or new or expanded entitlements are needed.

Impact Analysis

As described in Table 4.14-1, UCI's 2006 average domestic water demand is 1.8 MGD and 2007 LRDP projected domestic water demand is 4.9 MGD. UCI's 2006 reclaimed water demand is 0.6 MGD and 2007 LRDP reclaimed water demand is projected at 1.2 MGD. The net increase over existing 2006 demand projected to serve the 2007 LRDP is 3.1 MGD (3,500 acre-feet per year) of domestic water and 0.6 MGD (670 acre-feet per year) of reclaimed water.

The IRWD has developed an Urban Water Management Plan (UWMP, 2005) which projects district-wide water supply availability and demand through 2030. This UWMP includes assessment of existing available water supplies and future expanded water supplies to meet district-wide need. The UWMP includes UCI LRDP development assumptions as an element of the plan analysis. IRWD staff in consultation with UCI has reviewed projected domestic water and reclaimed water service demand for the 2007 LRDP for consistency with projections and conclusions of the UWMP. As a result of this analysis, IRWD has concluded that projected 2007 LRDP demands are consistent with IRWD's recently adopted UWMP and would not change UWMP conclusions with respect to water supply reliability (R. Diamond, IRWD letter, April 10, 2007). These conclusions are based on the assumptions that UCI would continue to use reclaimed water for all landscape irrigation including parks, greenbelts, streetscapes, and other common areas.

Water supply projections included in the IRWD UWMP for 2030 would be sufficient to supply the domestic and reclaimed water demands projected for the 2007 LRDP. Therefore, impacts to water supply availability resulting from implementation of the 2007 LRDP would be less than significant. Although implementation of the 2007 would result in less than significant impacts, UCI would continue to work cooperatively with IRWD to reduce domestic water demand on campus consistent with UCI sustainability goals. UCI would:

- Continue to use reclaimed water for all landscape irrigation uses where feasible and permissible by law.

- Work with IRWD to identify opportunities for additional uses of reclaimed water on-campus to reduce domestic water demand including central utility plant applications, dual plumbing systems in buildings, and other applications to reduce demand for domestic water.
- Work collaboratively with IRWD to complete a comprehensive water conservation study to identify feasible programs, projects, and measures to reduce domestic water demand, to include a plan for implementation of feasible measures.

Mitigation Measures

Because sufficient water supplies are available to serve the implementation of the 2007 LRDP, no mitigation measures are required.

4.14.3.5 ISSUE 5 – LANDFILL CAPACITY

Utilities, Service Systems, and Energy Issue 5 Summary

Would the campus be served by a landfill with insufficient permitted capacity to accommodate the 2007 LRDP's solid waste disposal needs?

Impact: Because UCI would continue to administer its recycling and waste diversion program and because an expansion of the Frank R. Bowman Landfill is likely, the landfill would have sufficient permitted capacity to accommodate the increase in solid waste generation as a result of implementation of the 2007 LRDP.

Mitigation: No mitigation is required.

Significance Before Mitigation: Less than significant.

Significance After Mitigation: Not applicable.

Standards of Significance

Based on Appendix G of the CEQA Guidelines, implementation of the 2007 LRDP may have a significant adverse impact if the campus would be served by a landfill with insufficient permitted capacity to accommodate the solid waste disposal needs generated by the 2007 LRDP.

Impact Analysis

As previously discussed, non-hazardous solid waste on campus is deposited in dumpsters, which are located throughout the campus, and removed by a private refuse collection service. Refuse is correctly disposed of off-site at the FRB Landfill, which is operated by the County of Orange and is the primary disposal site for solid waste in the City of Irvine. UCI generated 4,960 tons of solid waste in 2005, which is approximately 0.22 percent of the annual total solid waste received at the FRB Landfill in 2005.

The FRB Landfill is expected to operate and accept refuse for another 17 years beyond 2005, through the year 2022. Presently, the FRB Landfill is permitted to receive a daily maximum of no more than 8,500 tons per day. The IWMD is proposing to expand the total landfill capacity for the FRB landfill by 104 million cubic yards in order to accommodate Orange County's growing population and extend the life of the FRB landfill to 2053. The first phase of the expansion project is expected to begin in Summer 2007.

As of June 30, 2005, the remaining space available in the FRB landfill would accommodate another 44.56 million tons. Based on the daily amount of refuse allowed to be received and the total amount of space remaining, the FRB Landfill would have space remaining for approximately 14.3 years, which is approximately three years short of the expected operational life of the landfill. This calculation does not account for regional increase in landfill demand; therefore, the shortfall may be more than three years. Approximately 3,116,084 tons per year could be accepted by FRB Landfill. Assuming that the total amount of solid waste produced by UCI would increase proportionally to the increase in campus population, approximately 8,524 tons of waste could be estimated to be produced in 2025 by the UCI Campus. This is approximately 0.27 percent of the projected tonnage per year accepted by FRB Landfill.

UCI administers a recycling program on-campus. In 2005, approximately 3,220 tons of material, or 50 percent of the campus's solid waste, was recycled and diverted from the landfill. As the program continues, it is anticipated that the percentage of diverted solid waste would increase. the UC Policy on Sustainable Practices requires 50% diversion by 2008, 75% diversion by 2012, and an ultimate zero-waste goal. Therefore, the amount of solid waste actually going to the FRB Landfill would be less than described above for the 2025 scenario. Further, IWMD is proposing to expand the total landfill capacity for the FRB landfill to accommodate Orange County's growing population. The proposed expansion would increase its daily capacity to 11,500 tons per day to address the needs of the growing population.

Further, University policy requires the implementation of a comprehensive program of solid waste reduction and diversion measures as described in Section 4.14.1.3 including adherence to US Green Building Council LEED "Certified" or equivalent level of Green Building Certification for all new building construction. UCI is implementing these mandatory waste reduction policies and UCI Design standards require compliance with USGBC LEED-equivalent requirements that 50% of all construction waste be diverted from landfill disposal. Furthermore, the UC Policy on Sustainable Practices requires 50% diversion by 2008, 75% diversion by 2012, and an ultimate zero-waste goal. Therefore, because UCI would continue to administer its recycling program and because an expansion of the FRB Landfill is likely, solid waste generated by UCI would not be expected to result in a significant impact with regard to landfill capacity. The disposal of hazardous waste is discussed in Section 4.6, Hazards and Hazardous Materials.

Mitigation Measures

Because the FRB landfill would accommodate increase in waste generation as a result of implementation of the 2007 LRDP and because of UCI's participation in waste diversion and recycling programs, no mitigation measures are required.

4.14.3.6 ISSUE 6 – APPLICABLE SOLID WASTE REGULATIONS

Utilities, Service Systems, and Energy Issue 6 Summary

Would implementation of the 2007 LRDP result in UCI's failure to comply with federal, state, and local statutes and regulations related to solid waste?

Impact: Because UCI would continue to adhere to the University of California Policy on Sustainable Practices which requires waste diversion and recycling on all UC Campuses, implementation of the 2007 LRDP would comply with applicable laws and regulation related to solid waste.

Mitigation: No mitigation is required.

Significance Before Mitigation: Less than significant.

Significance After Mitigation: Not applicable.

Standards of Significance

Based on Appendix G of the CEQA Guidelines, implementation of the 2007 LRDP may have a significant adverse impact if it would fail to comply with federal, state, and local statutes and regulations related to solid waste.

Impact Analysis

As an entity created by the State Constitution, the UC is not subject to AB 939 or other local regulations pertaining to solid waste. However, according to the bill, the UC is encouraged to adopt reduction measures similar to those imposed on local agencies. Therefore, the University adopted a sustainability policy, as described in Section 4.14.1.3, that requires UC campuses to reduce solid waste generation and disposal. In adherence to this UC policy and other campus sustainability goals, UCI implements a campus-wide comprehensive waste prevention and recycling program (UCI Facilities Management Recycling Program) which works in collaboration with multiple campus entities including the UCI Student Organization "Anteaters for Conservation and Recycling" and campus internship programs to promote and implement recycling. The purpose of this program is to set forth standards and organizational processes aimed at (1) reducing waste at the source; (2) encouraging the purchase and use of durable and reusable products; (3) encouraging the purchase of high post-consumer content recycled products; (4) increasing the total volume of waste materials diverted from landfills to recycling processes; (5) ensuring the long term viability of campus recycling operations through appropriate educational programs, coordination, management and oversight; and (6) remaining in compliance with Federal and state mandates.

As discussed in Section 4.14.3.5, UCI generated 4,960 tons of solid waste and recycled approximately 3,220 tons of solid waste in 2005. Thus, approximately 50 percent of the solid waste generated by UCI in 2005 was recycled. In the future, UCI will continue to implement, promote and improve the campus-wide comprehensive waste prevention and recycling program. Furthermore, as discussed previously the UC Policy on Sustainable Practices promotes recycling and would continue to do so in the future, and has the ultimate goal of zero waste; therefore, solid waste generated by UCI is not expected to create a significant impact with regard to applicable regulations.

Mitigation Measures

Development under the 2007 LRDP would not result in UCI's failure to comply with relevant statutes and regulations regarding solid waste; therefore, no mitigation measures are necessary.

4.14.3.7 ISSUE 7 – ENERGY CONSUMPTION

Utilities, Service Systems, and Energy Issue 7 Summary

Would implementation of the 2007 LRDP require or result in the construction or expansion of electrical, natural gas, chilled water, or steam facilities or result in the wasteful, inefficient or unnecessary use of energy?

Impact: Compliance with UC's Policy on Sustainable Practices would increase energy efficiency and reduce inefficient consumption of energy; however, the development of additional electricity and natural gas facilities, which would undergo additional environmental review, would result in impacts to the physical environment (Utl-7).

Mitigation: Applicable mitigation measures in other sections of this EIR.

Significance Before Mitigation: Significant.

Significance After Mitigation: Less than significant.

Standards of Significance

Based on Appendix G of the CEQA Guidelines, implementation of the 2007 LRDP may have a significant adverse impact if it would require or result in the construction or expansion of electrical, natural gas, chilled water, or steam facilities, which would cause significant environmental impacts or result in the wasteful, inefficient or unnecessary use of energy.

Impact Analysis

Development of additional building space would result in the consumption of additional energy, including electricity, natural gas and other fossil fuels with the implementation of the 2007 LRDP. This additional consumption may require the expansion of facilities, which are discussed in detail below. As with the other utilities that may require construction under the 2007 LRDP, these improvements would be subject to CEQA review prior to their approval and impacts would be mitigated to the greatest extent feasible. Impacts associated with the construction of energy facilities associated with the 2007 LRDP are expected to be less than significant.

Energy Efficiency. With regard to efficient energy consumption under the 2007 LRDP, UCI would continue to incorporate programs and techniques that create buildings and systems that are environmentally friendly and help provide for a sustainable environment. Specifically, UCI would continue to implement energy-saving projects that conserve energy, improve efficiency, and reduce energy costs through a variety of programs. Project design typically incorporates energy efficient lighting fixtures; occupancy sensors which activate lights when people enter/leave rooms; double glazed, low "E" windows to reduce heat gain/loss though out the day; and low-flow plumbing fixtures. The University also works to meet or improve upon the Title 24 energy efficiency standards. In addition, the Policy on Sustainable Practices would also continue to be implemented. This policy provides information and guidance to the UC campuses for implementing policies and standards for the design of green buildings and the use of clean energy. The continued implementation of these energy-efficient programs and

policies would ensure that the UCI campus would not result in wasteful, inefficient, or unnecessary use of energy. No significant impact would occur.

Electricity. Electricity consumption on the campus for 2005-06 totaled 42,873 KVA with 70% diversity. This demand equals approximately 25,723 kW. Projections conducted by UCI staff estimated that future electricity demands in 2025-26 would total approximately 91,909 KVA with 70% diversity. This future demand equals approximately 55,145 kW (assuming a power factor of 60%). The campus recently constructed a 13-megawatt cogeneration facility. SCE provides power needs which are not met by the cogeneration facility. The increased campus population would result in an increase of 103% in electricity demand. Future growth would demand additions or changes to the existing facilities such as switching stations, tie-ins, distribution feeders, gas turbines, motors, cable, and ductbanks. The construction of the additional electrical facilities improvements would have the potential to cause additional secondary environmental effects. Any future electrical facilities projects located on- or off-campus would require review pursuant to CEQA prior to approval. Secondary impacts resulting from the on-campus development of new electrical facilities would be mitigated by mitigation measures in other sections of this EIR.

Natural Gas. The total annual natural gas consumption for the campus during 2005-06 was 354,880 CFH and the projected annual natural gas consumption for 2025-26 would be approximately 893,309 CFH. This future demand estimate assumes that UCI would implement a number of energy saving measures during the planning horizon of the 2007 LRDP. As previously discussed, SCG provides natural gas service to UCI through numerous high pressure gas mains. These mains connect to an on-campus system to distribute the gas throughout the campus. New major users of natural gas would be expected to require an additional connection to the SCG system.

The construction and operation of additional natural gas facilities improvements would have the potential to cause additional secondary environmental effects. Any future natural gas facilities projects located on- or off- campus would require review pursuant to CEQA prior to approval. Mitigation measures for secondary impacts resulting from the on-campus development of new natural gas facilities have been presented in other sections of this EIR.

Impact Utl-7 Compliance with UC's Policy on Sustainable Practices would increase energy efficiency and reduce inefficient consumption of energy; however, the development of additional electricity and natural gas facilities, which would undergo additional environmental review, would result in significant impacts to the physical environment.

Mitigation Measures

Implementation of applicable mitigation measures in other sections of this EIR would reduce significant impacts associated with the construction of new facilities to below a level of significance. These measures include Aes-1A, Aes-2A, Aes-3B, Air-2A, Air-2B, Bio-1A, Bio-2A, Bio-2B, Bio-3A, Bio-3B, Bio-3C, Bio-3D, Bio-4A, Cul-1A, Cul-1B, Cul-2A, Cul-4A, Haz-6A, Hyd-1A, Hyd-2A, Hyd-2B, Lan-2A, Noi-2A, and Noi-4A.

4.14.4 CUMULATIVE IMPACTS AND MITIGATION

Utilities, Service Systems, and Energy Cumulative Issue Summary

Would implementation of the 2007 LRDP have a cumulatively considerable contribution to a cumulative utilities, service systems, and energy facility construction impact considering past, present, and probable future projects?

Cumulative Impact	Significance	LRDP Contribution
Wastewater Treatment: Proposed expansion of IRWD facilities would accommodate projected population growth.	Less than significant.	N/A
New Water or Wastewater Facilities: Installation and construction of additional facilities could result in adverse physical impacts to the environment.	Significant.	Not cumulatively considerable.
Impacts from New Storm Water Facilities: The construction of additional storm water facilities could result in adverse physical impacts to the environment.	Significant.	Not cumulatively considerable.
Water Supply Availability: IRWD's recently adopted Urban Water Management Plan is projected to accommodate future growth and water demand.	Less than significant.	N/A
Landfill Capacity: A recently approved project will extend the life of the FRB landfill to 2053.	Less than significant.	N/A
Applicable Solid Waste Regulations: Previous difficulties in complying with AB 939 are likely to continue as population levels increase in Orange County.	Significant.	Not cumulatively considerable.
Energy Consumption: Increasing population would increase the demand for energy and energy facilities which would result in adverse physical impacts to the environment.	Significant.	Not cumulatively considerable.

4.14.4.1 WASTEWATER TREATMENT

The geographic context for the analysis of cumulative impacts for wastewater treatment facility capacities is the Irvine Ranch Water District (IRWD) service area. As discussed in Section 4.14.1.2, the MWRP treats approximately 14 million gallons of wastewater per day from a 133-square-mile area, which includes UCI. However, the IRWD's MWRP has the capacity to treat up to 18 mgd and there are plans to expand the capacity of the MWRP. Overall demand within the IRWD service area is expected to double by 2025 and plans to expand the MWRP would be able to accommodate the projected increase in sewage. The expansion would increase the plant's capacity to 33 mgd and would be completed in 2025. The IRWD expects to collect and treat 26.11 mgd in 2025 which includes the sewage that would be generated under the 1989 UCI LRDP. Therefore, because the proposed expansion would accommodate projected demand, the cumulative impact to wastewater treatment facility capacities would be less than significant.

4.14.4.2 NEW WATER OR WASTEWATER FACILITIES

The geographic context for the analysis of cumulative impacts for new water or wastewater facilities is the IRWD service area. As of June 2007, IRWD is planning to expand the MWRP and no new water or wastewater facilities are planned. However, distribution facilities may be proposed as part of future development projects within the IRWD service area. The installation and construction of such facilities may result in adverse physical impacts to the environment, which could result in a significant cumulative impact to the physical environment. However, in the highly urbanized UCI campus, many of the expansions to existing campus distribution facilities under the 2007 LRDP would occur in existing utility corridors or beneath existing roadways, which would limit physical impacts to the environment. Therefore, the project's contribution to a significant physical impact to the environment would not be cumulatively considerable.

4.14.4.3 IMPACTS FROM NEW STORM WATER FACILITIES

The geographic context for the analysis of cumulative impacts resulting from new storm water facilities is the UCI campus and its vicinity. As discussed in Section 4.7, Hydrology and Water Quality, runoff from adjacent properties would not flow across the UCI Campus and run-off from the UCI Campus would not flow onto adjacent properties; therefore, runoff from the UCI Campus would not impact or be impacted by adjacent properties and would not increase demand for storm water facilities off-campus. Therefore, the geographic context for the cumulative analysis is the UCI Campus and its immediate vicinity.

Increased development on-campus may result in an increase in the square footage of impervious surfaces on-campus, which could result in a need for additional storm water facilities. The construction of additional storm water facilities could result in a significant cumulative physical impact to the environment. However, storm water facilities improvements would require environmental review. Environmental impacts that could result from the development of storm water facilities are analyzed in other sections of this EIR, and UCI would implement appropriate mitigation measures from those sections as required to reduce the potential impacts of such improvements. As such, the project's contribution to a significant physical impact to the environment would not be cumulatively considerable.

4.14.4.4 WATER SUPPLY AVAILABILITY

The geographic context for the analysis of cumulative impacts for water supply availability is the IRWD service area. IRWD has reviewed the projected water demands associated with implementation of the 2007 LRDP. As a result of this review, IRWD has concluded that the projected LRDP water demands are consistent with IRWD's recently adopted Urban Water Management Plan, would not affect the water demand projections in the UWMP, and, therefore, would not change UWMP conclusions with respect to water supply reliability. Therefore, because the IRWD's UWMP would be able to supply both the UCI Campus and its service area in the future, cumulative impacts to water supply availability are less than significant.

4.14.4.5 LANDFILL CAPACITY

The geographic context for the analysis of cumulative impacts to landfill capacity is the Orange County region. Based on the IWMD, the life of the FRB Landfill has been extended to 2053. Future landfill capacity in Orange County is adequate to serve the region and UCI through 2053 and will be sufficient upon the approval and construction of future landfill projects being undertaken by the County. Therefore, no significant cumulative impact to landfill capacity would occur.

4.14.4.6 APPLICABLE SOLID WASTE REGULATIONS

The geographic context for the analysis of cumulative impacts to landfill capacity is the Orange County region. Applicable solid waste regulations include the Integrated Waste Management Act (AB 939) which requires cities and counties to divert 50 percent of all solid waste by January 1, 2000 through source reduction, recycling, and composting activities. According to a report prepared by the IMWD Waste Management Commission in December 2005, in 2000 and 2003, Orange County cities diverted approximately 47 percent of their waste from the landfills. In 2002, only 19 of Orange Counties 32 cities attained the 50 percent diversion goal even though over 1,000 recycling and waste reduction programs were implemented. Further, the areas within unincorporated Orange County had a diversion rate of 33 percent in 2003. As the population continues to grow within Orange County, compliance with AB 939 may become more difficult to attain. Therefore, a significant cumulative impact regarding applicable solid waste regulations exists.

While the UCI is not subject to AB 939, the University has adopted waste diversion goals as outlined in the March 2007 UC Sustainability Policy. As discussed in Section 4.14.3.6, UCI diverted approximately 50 percent of the solid waste generated by UCI in 2005 and UCI continues to implement, promote, and improve campus-wide comprehensive waste prevention and recycling programs. It is expected that UCI would increase its diversion rate despite the growth to the UCI population. Therefore, because UCI implements waste reduction and recycling programs and continues to increase its waste diversion rate, the project's contribution to significant cumulative impacts to applicable solid waste regulations would not be cumulatively considerable.

4.14.4.7 ENERGY CONSUMPTION

The geographic context for the analysis of cumulative impacts to energy consumption is the Southern California Edison (SCE) service area. The SCE service area includes Orange County, Los Angeles County, San Bernardino County, and parts of Riverside, Kern, Tulare, Inyo, Santa Barbara, and Mono Counties. Sources of electricity are diverse and widespread. Electricity and natural gas can be transmitted over long distances, and supply is usually made available from varying and numerous sources. Both electricity and natural gas needed in the region may in fact be generated outside of the state or the country. It is not possible to reasonably predict where the new generation facilities would be located, or to evaluate environmental impacts from the construction and operation of these new facilities. However, should they be proposed in California, the California Energy Commission conducts a complete environmental review of proposed power plant projects 50 megawatts and larger before approving them, and requires as a matter of practice that all significant impacts be mitigated to a less-than-significant level. Smaller projects must also go through environmental review under the oversight of the local jurisdiction in which they are proposed. It can be assumed that additional facilities would be required in the future; however, because the locations and schedules of such projects are unknown, it is assumed that the construction of such facilities would result in a significant cumulative physical impact to the environment.

UCI recently completed the construction of a 13-megawatt cogeneration facility. This facility would alleviate the amount of energy demanded from SCE. Further, UCI would comply with the UC Sustainability Policy and construct buildings which include energy saving components to reduce energy demand. Therefore, while the on-campus energy demand would increase as the campus population increases, UCI is implementing policies to limits its demand from SCE. Therefore, the project's contribution to a significant physical impact to the environment resulting from the construction of additional energy facilities would not be cumulatively considerable.

4.14.5 CEQA CHECKLIST ITEMS ADEQUATELY ADDRESSED IN INITIAL STUDY

The 2007 LRDP Initial Study indicated that all checklist items under the Utilities category should be evaluated in the EIR.

4.14.6 REFERENCES

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